Bulletin nº 147 Novembre-Décembre 1964

U. R. S. I.

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

Nous avons le grand plaisir d'annoncer à nos lecteurs que le Prix Nobel de Physique a été attribué en partie au Prof. A. Prokhorov, Vice-Président de notre Union, auquel nous adressons ici nos plus vives félicitations.

COLLOQUE GÉNÉRAL SUR LA PHYSIQUE DES PHÉNOMÈNES SOLAIRES-TERRESTRES

Au cours de la dernière Assemblée Générale de l'U.R.S.I., il a été décidé d'organiser un Colloque sur la Physique des Phénomènes solaires-terrestres qui aurait lieu à Belgrade immédiatement avant la XV^{e} Assemblée Générale de l'U.R.S.I. à Munich. D'autres Unions internationales prendront également part à l'organisation de ce Colloque et l'on prévoit aussi la participation d'autres organismes internationaux.

Afin d'éviter tout chevauchement entre, d'une part, le programme du Colloque et, de l'autre, les programmes pour l'Assemblée Générale des Commissions III (Ionosphère), IV (Magnétosphère) et V (Radioastronomie) — Commissions de l'U.R.S.I. directement intéressées par le sujet général du Colloque, il a été jugé nécessaire de spécifier les points qui seront discutés au cours de l'Assemblée Générale.

Programme de l'Assemblée Générale de l'U.R.S.I. (Munich)

Les Présidents des Commissions III et IV proposent les sujets suivants pour le programme de l'Assemblée Générale :

1) Absorption ionosphérique à incidence oblique et verticale.
2) Ondes en fréquences très basses et en fréquences extrêmement basses (VLF, ELF).
3) Bruit radioélectrique d'origine terrestre.

Ils suggèrent également que les sujets relatifs à la physique des milieux dans lesquels les ondes se propagent soient inclus au programme du Colloque.

Le Président de la Commission V propose, pour sa part, que les sujets suivants figurent à l'ordre du jour de l'Assemblée Générale :

1) Techniques d'observation et de mesure en Radioastronomie (*a.* Antennes, *b.* Récepteurs ; *c.* Etalonnage et mesures).

2) Le Soleil et le système solaire.

3) Observations galactiques et extragalactiques.

Programme du Colloque général (Belgrade)

Les détails du Programme seront mis au point par un Comité spécial pour le Programme, mais il est probable que le sujet central du Colloque sera l'interaction entre le vent solaire et la magnétosphère terrestre.

Certains des points suivants, ou tous, seront également inclus :

a) Ondes hydromagnétiques et micropulsations.

b) Géomagnétisme et ionosphère.

c) Températures des électrons, des ions et des particules neutres dans l'ionosphère et la magnétosphère.

d) Mouvements de l'ionosphère et de la magnétosphère.

e) Effet des particules énergétiques sur l'ionosphère *calme* dans les régions *non-polaires*.

f) La région D.

g) Phénomènes solaires corpusculaires, optiques et radioélectriques en relation avec les effects géomagnétiques, ionosphériques et magnétosphériques.

h) Emissions en très basses fréquences (VLF).

Il est presque certain que d'ici 1966, l'interaction entre le vent solaire et la magnétosphère terrestre constituera un aspect de haute signification et particulier des relations soleil-terre. Il est suggéré dès lors que tous les chercheurs s'occupant, sur le plan théorique ou expérimental, de cet aspect des relations soleil-terre, s'efforcent, en vue du Colloque de Belgrade, de tirer les conclusions des travaux qu'ils effectueront au cours de l'année prochaine.

GENERAL SYMPOSIUM ON SOLAR-TERRESTRIAL PHYSICS

At the last General Assembly of U.R.S.I., it has been decided to organize a Symposium on Solar-Terrestrial Physics to be held in Belgrade immediately prior to the XVth General Assembly

of U.R.S.I. in Munich. Other international Unions will cooperate in the organization of the Symposium and it is hoped that other international bodies will participate.

In order to avoid any interference between the programme of the Symposium and the programmes at the General Assembly of Commissions III (Ionosphere), IV (Magnetosphere) and V (Radio Astronomy) which are the U.R.S.I. Commissions directly interested in the general subject of the Symposium, it has been felt necessary to mention the topics which will be discussed at the General Assembly.

Programme of the U.R.S.I. General Assembly (Munich)

The Chairmen of Commissions III and IV suggest that the topics to be considered at the General Assembly should include :

1) Ionospheric absorption at vertical and oblique incidence.
2) VLF and ELF waves.
3) Radio noise of terrestrial origin.

They also suggest that topics concerned with the physics of the media in which waves are propagated should be included in the programme of the Symposium.

The Chairman of Commission V suggest to deal at the General Assembly with the following topics :

1) Radio Astronomy Techniques (*a.* Antennas ; *b.* Receivers ; *c.* Calibration and Measurements).
(2) The sun and solar system.
(3) Galactic and extra-galactic observations.

Programme of the General Symposium (Belgrade)

The details of the programme are to be worked out by a special Programme Committee, but it is probable that a central topic of the Symposium will be the interaction between the solar wind and the earth's magnetosphere.

Some or all of the following topics will also be included :

(*a*) Hydromagnetic waves and micropulsations.
(*b*) Geomagnetism and the ionosphere.

(*c*) Temperatures of electrons, ions and neutral particles in the ionosphere and magnetosphere.

(*d*) Movements of the ionosphere and magnetosphere.

(*e*) The effect of energetic particles on the *quiet* ionosphere in *non-polar* regions.

(*f*) The D-region.

(*g*) Radio, optical and corpuscular solar phenomena related to magnetospheric, ionospheric and geomagnetic effects.

(*h*) VLF emissions.

By 1966, a highly significant and topical aspect of solar-terrestrial relationships will almost certainly be the interaction between the solar wind and the earth's magnetosphere. It is therefore suggested that all concerned with experimental and theoretical work in this aspect of solar-terrestrial relationships should aim at bringing their work in the next year to a focus at the Belgrade Symposium.

Letter from the Secretary General of U.R.S.I.

To : the Officers of the Board,
the Members of the Organizing Committee and of the Programme Committee of the 1966 General Symposium

General Symposium on Solar-Terrestrial Physics

BELGRADE, 1966

Organized by U.R.S.I. with the collaboration of I.A.U. and I.U.G.G. (I.A.G.A.)

1. — It has been planned to organize a joint symposium on Solar-Terrestrial Physics in Belgrade, in August 1966.

2. — An Organizing Committee has been set up consisting of the following members :

Convener : Dr. D. BAJIĆ (Yugoslav National Committee).

Members : Prof. C. W. ALLEN (I.A.U.),
Prof. H. G. BOOKER (U.R.S.I. Commission IV),
Prof. R. COUTREZ (U.R.S.I. Commission V),

Prof. W. Dieminger (U.R.S.I. Vice-President),
Prof. A. Kimpara (U.R.S.I. Sub-Commission IV*a*),
Prof. E. R. Mustel (I.A.U.),
Prof. M. Nicolet (I.U.G.G.) ;
Mr. J. A. Ratcliffe (U.R.S.I. Commission III),
Dr. J. G. Roederer (I.U.G.G.).

Members ex officio : Prof. I. Koga, President of U.R.S.I.
Ing. E. Herbays, Secretary General of U.R.S.I.

Terms of reference :

The Organizing Committee is invited to take in cooperation with the Yugoslav National Committee all measures concerning the general organization of the 1966 Symposium, including inter alia :

(i) Dates of the meeting ;

(ii) Drafting of the general programme of the meeting taking into account the date of the beginning of the General Assembly and the meetings of the Board of Officers and the Coordinating Committee of U.R.S.I. ;

(iii) Organization of a special information session on the future organization of the study of solar-terrestrial physics ;

(iv) Endorsment of the scientific programme established by the Programme Committee ;

(v) Distribution of invitations to U.R.S.I. and other scientific bodies interested in the topics included in the Symposium (invitations will be sent by the Yugoslav National Committee).

The drafting of programmes for the various scientific sessions belongs to the domain of the Programme Committee which will inform the Organizing Committee of the number of sessions.

If felt necessary, the Organizing Committee may appoint a Chairman and a Secretary.

3. — A *Programme Committee* has been set up with the following *terms of reference* :

(i) draft the programme of the various scientific sessions,

(ii) where desirable invite selected speakers to present summarizing coordinating papers ;

(iii) select the papers to be submitted to the various sessions ;

(iv) fix a limiting date for the submission of papers ;

(v) appoint a scientific editor for the publication of the proceedings.

Membership of the Programme Committee :

U.R.S.I. : Prof. H. G. Booker,
Mr. J. A. Ratcliffe (Convener).

I.U.G.G. (I.A.G.A.) : Prof. M. Nicolet,
Dr. J. G. Roederer.

I.A.U. : Prof. C. W. Allen,
Dr. E. R. Mustel.

Mr. J. A. Ratcliffe will also represent the Inter-Union Commission on the Ionosphere, and Prof. C. W. Allen, the Inter-Union Commission on Solar-Terrestrial Relationships.

If felt needed the Programme Committee may elect a Chairman and a Secretary.

C.O.S.P.A.R. will be asked to appoint a consultant to the Programme Committee.

4. — *Yugoslav Organizing Committee.*

The Yugoslav National Committee has appointed the following Committee to take care of local arrangements :
Chairman and Symposium arrangement : Dr. Dejan Bajić.
Secretary and financial arrangements : Milan Sedlar, B. Sc.
Scientific Programme : Dr. Ivan Anastasijević.
Information and Communications : Kosta Comić, B. Sc.
Visits, entertainments and Ladies' Programme : Mrs Mirjana Vukićević-Karabin, B. Sc.

5. — *Scientific Programme* :

The details of the programme will be worked out by the Programme Committee ; it is probable that a central topic of the Symposium will be the interaction between the solar wind and the earth's magnetosphere.

Some or all of the following topics will also be included :

(*a*) Hydromagnetic waves and micropulsations.

(*b*) Geomagnetism and the ionosphere.

(*c*) Temperatures of electrons, ions and neutral particles in the ionosphere and magnetosphere.

(*d*) Movements of the ionosphere and magnetosphere.

(*e*) The effect of energetic particles on the *quiet* ionosphere in *non-polar* regions.

(*f*) The D-region.

(*g*) Radio, optical and corpuscular solar phenomena related to magnetospheric, ionospheric and geomagnetic effects.

(*h*) VLF emissions.

Brussels, November 9, 1964.

The Secretary General,
HERBAYS

MÉDAILLE D'OR VAN DER POL

Nous reproduisons ci-dessous les Règles adoptées pour l'attribution de la Médaille d'Or Balth. van der Pol.

Nous rappelons que les propositions pour l'attribution de cette Médaille doivent parvenir au Secrétariat Général de l'U.R.S.I. au plus tard le 15 juillet 1965 et que les travaux ou découvertes des candidats doivent se rapporter à la période 1962-1965.

1. Pour honorer la mémoire du Professeur Balth. van der Pol et pour rappeler son long attachement et son dévouement fécond à la cause de l'U.R.S.I., il est fondé un prix triennal consistant en l'attribution d'une Médaille d'Or qui sera appelée « Médaille d'Or Balth. van der Pol ».

2. Cette médaille sera décernée lors de chaque Assemblée Générale de l'U.R.S.I. à un radiophysicien éminent qui, au cours de la période de trois ans se terminant un an avant l'Assemblée Générale, aura apporté une contribution de valeur dans un des domaines d'activité de l'Union, soit par ses écrits, travaux, découvertes, réalisations, ou par toute autre activité.

3. Pour le 15 juillet au plus tard, de chaque année précédant celle où sera décernée la médaille, les Comités Nationaux de l'U.R.S.I. désirant présenter un candidat, feront parvenir au Secrétaire Général de l'Union le nom d'un seul candidat. Cette proposition sera accompagnée :

(i) d'une note biographique mentionnant, entre autres, les travaux réalisés par le candidat et les écrits publiés,

(ii) d'une note justificative donnant les raisons pour lesquelles le candidat est présenté.

4. Les membres du Bureau et les Présidents des Commissions procéderont de la même façon pour un candidat que chacun d'eux désirerait présenter.

5. Les documents cités aux art. 3 et 4 ci-dessus seront envoyés par le Secrétaire Général, pour avis et commentaires, aux Présidents des Commissions.

6. Les avis et commentaires ainsi recueillis, accompagnés des documents mentionnés aux art. 3 et 4 seront communiqués aux membres du Bureau de l'U.R.S.I. par le Secrétaire Général. Après avoir pris connaissance de ces documents, les membres du Bureau décideront du nom du lauréat. Celui-ci devra recueillir au minimum 3/4 des voix (chaque membre disposant d'une voix). Dans le cas où aucun candidat ne recueillerait ce quorum, il pourrait être fait appel à l'arbitrage des Présidents d'Honneur.

7. Dans le cas où le Bureau de l'U.R.S.I. estimerait qu'aucun candidat n'est suffisamment qualifié, il pourrait décider de ne pas décerner la Médaille.

VAN DER POL GOLD MEDAL

We reproduce hereunder the Rules adopted for the award of the van der Pol Gold Medal.

It should be recalled that the proposals for the award of the Medal should reach the General Secretary's Office at the latest for July 15, 1965 and that the works and discoveries of the nominees should refer to the 1962-1965 period.

(Translation)

1. In order to commemorate Professor Balth. van der Pol's long attachment and fruitful devotion to U.R.S.I.'s activities, a triennal award is established consisting of a Gold Medal which shall be named « Balth. van der Pol Gold Medal ».

2. This Medal shall be awarded at each General Assembly of U.R.S.I. to an outstanding radio scientist who, during the three year period preceding the year of the General Assembly, will have made a valuable contribution in one of the fields of activity of the Union, either by his research work, discoveries, achievements, or by any other activity.

3. At the latest by July 15th of the year preceding the one during which the Medal will be awarded, U.R.S.I. National Committees wishing to present a candidate will forward to the Secretary General of the Union the name of a single candidate together with :

(i) a biographical notice mentioning, inter alia, the works and the writings of the candidate,

(ii) an explanatory note to justify the proposal.

4. The Officers of U.R.S.I. (Members of the Board and Commission Chairmen) will proceed in the same way for one candidate each they would wish to propose.

5. Documents in art. 3 and 4 shall be forwarded for suggestions and comments to the Commission Chairmen by the Secretary General.

6. Such suggestions and comments, together with the documents mentioned in art. 3 and 4 shall be communicated to the Board of Officers of U.R.S.I. by the Secretary General. After consideration of these documents, the Officers will designate the name of the laureate. He would have to obtain 3/4 of the votes (each Officer having one vote). In case no candidate obtains this quorum of votes, the Honorary Presidents shall be called upon to decide by arbitration.

7. In case the Board of Officers should judge that there is no sufficiently qualified candidate, it may decide not to award the Medal.

XIVth GENERAL ASSEMBLY

Proceedings — Part 5 on Radio Astronomy

We wish to inform the readers that the Report submitted to Commission V by the Netherlands' National Committee (Current radio astronomical research in the Netherlands, by G. Westerhout) Part 5, pp. 71-81, was originally published in the Proceedings of the Institution of Radio Engineers, Australia, in which the copyright is vested. It may not be reproduced, wholly or in part, except as a part of a literary review or technical abstract with due credit, without the permission of the Institution. Such permission was granted to U.R.S.I. and we wish to express our thanks to the Institution of Radio Engineers, Australia.

COMITÉS NATIONAUX

France

COLLOQUE INTERNATIONAL SUR LES « TECHNIQUES DES MÉMOIRES »

La Société Française des Electroniciens et des Radioélectriciens a l'intention d'organiser, du 5 au 9 avril 1965, sous le patronage de la Fédération Nationale des Industries Electroniques et de l'U.R.S.I., un colloque international sur les « techniques des mémoires », destiné à confronter les possibilités actuelles et prévisibles des mémoires obtenues à partir des différents phénomènes électroniques et les besoins des utilisateurs de ces mémoires, en particulier dans le domaine du traitement de l'information.

Les sujets de conférence s'inscriront dans les trois grands chapitres suivants :

1. — *Matériaux et phénomènes fondamentaux.*

Les communications entrant dans ce chapitre devront être relatives à des matériaux exploitant des phénomènes fondamentaux tels que :

— magnétisme,
— ferroélectricité,
— semiconduction,
— optoélectronique [1],
— supraconduction.

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[1] Dans le cadre du Colloque, sont du domaine de l'optoélectronique les phénomènes qui mettent en jeu conjointement, des photons et des électrons pour la transmission ou la conservation d'une information.

2. — *Composants.*

Les composants seront examinés selon les aspects suivants, portant sur leurs performances intrinsèques et leurs possibilités d'emploi :

— vitesse de commutation,
— consommation en énergie,
— conservation de l'information,
— encombrement,
— tenue en température,
— possibilités d'association et d'intégration,
— fiabilité.

3. — *Dispositifs et systèmes.*

Ce chapitre comportera trois domaines d'intérêt :

— l'organisation et la réalisation des mémoires sous le double aspect technologique et logique, et son influence sur la structure des machines utilisatrices ;

— les technique d'application des mémoires dans la mesure où elles fournissent des indications pour exprimer les besoins et orienter les recherches ;

— les systèmes électroniques associés aux composants tels que : organes de sélection, d'écriture, de lecture.

En outre, certaines utilisations analogiques ou numériques particulièrement originales de procédés classiques dans les domaines électrique, mécanique, hydraulique, pneumatique, etc... pourront également faire l'objet de conférences.

Pour tous renseignements complémentaires, s'adresser à la Société Française des Electroniciens et des Radioélectriciens, 10, avenue Pierre Larousse, Malakoff (Seine).

Republic of South Africa

MEMBERSHIP

President : Dr. F. J. Hewitt, National Institute for Telecommunication Research, P. O. Box 10319, Johannesburg.

Official Members :

Commission I : Dr. K. Posel, University of the Witwatersrand, Milner Park, Johannesburg.

Commission II : Mr. R. W. Vice, Director, N.I.T.R., P.O. Box 3718, Johannesburg.

Commission III : Prof. J. A. Gledhill, Department of Physics, Rhodes University, Grahamstown.

Commission IV : Prof. N. D. Clarence, Department of Physics, University of Natal, King George V Ave, Durban.

Commission V : Mr. G. D. Nicolson, N.I.T.R., P.O. Box 3718, Johannesburg.

Commission VI

Commission VII : Mr. P. Meerholz, c/o P.O. Box 75, Alberton, Transvaal.

U. S. A.

RADIO SCIENCE

Hereunder the contents of the 1964 issues of *Radio Science* edited by the U.S. Department of Commerce, National Bureau of Standards in cooperation with the U.S. National Committee of U.R.S.I.

Vol. 68D, No. 1 — January 1964.

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Periodic fading of VLF signals received over long paths during sunrise and sunset. D. D. CROMBIE.

Effects of wall perturbations in multimode waveguides. S. W. MALEY and E. BAHAR.

VLF utilization at N.A.S.A. satellite tracking stations. C. H. LOONEY, Jr.

Long waves associated with disturbances produced in plasmas. H. BREMMER.

Some remarks on the Watson transformation and mode theory. Leslie A. BERRY.

Concerning limitations and further corrections to geometric-optical theory for LF, VLF propagation between the ionosphere and the ground. J. Ralph JOHLER.

Some remarks on mode and ray theories of VLF radio propagation. James R. WAIT.

Two-dimensional treatment of mode theory of the propagation of VLF radio waves. James R. WAIT.

Reflection of electromagnetic waves from a lossy magnetoplasma. James R. WAIT and Lillie C. WALTERS.

Propagation of ELF waves below an inhomogeneous anisotropic ionosphere. Janis GALEJS and Ronald V. ROW.

VLF propagation under the ionosphere in the lowest mode of horizontal polarization. Harold A. Wheeler.

Propagation of VLF waves under disturbed conditions. B. BURGESS.

VLF disturbances caused by trapped beta-rays from the decay of neutrons produced in high-altitude nuclear explosions. A. J. ZMUDA, B. W. SHAW and C. R. HAAVE.

VLF anomalies observed at State College, Pa., during the U.S. 1962 high-altitude nuclear tests. C. F. SECHRIST.

Publications of the Staff of the National Bureau of Standards.

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Generation of an electromagnetic pulse by an expanding plasma in a conducting half-space. A. P. STOGRYN and R. N. GHOSE.

Impedance of a monopole antenna with a radial-wave ground system on an imperfectly conducting half-space, part II. S. W. MALEY and R. J. KING.

Capacitor type biconical antennas. Janis GALEJS.

Simulated angular response patterns for transhorizon propagation. J. W. STROHBEHN and A. T. WATERMAN, J.

Radio-star scintillations from ionospheric waves. James W. WARWICK.

Ionosonde studies of some chemical releases in the ionosphere. J. W. WRIGHT.

Diurnal changes of transmission time in the artic propagation of VLF waves. W. T. BLACKBAND.

Geometrical optics convergence coefficient for the whistler case. J. H. CRARY.

Comments on a paper « Collisional Detachment and the Formation of an Ionospheric » by E. T. PIERCE. Helen R. ARNOLD.

The quasi-longitudinal approximation in the generalized theory of radio wave absorption. Robert F. BENSON.

Diurnal phase variation of VLF waves at medium distances. Hans VOLLAND.

Application of diffractions by convex surfaces to irregular terrain situations. H. T. DOUGHERTY and L. J. MALONEY.

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Propagation of radio waves with frequency 99.9 Mhz as a function of the vertical structure of the atmosphere derived from daily radiosonde observations. G. P. A. BRAAM.

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An interpretation of rapid changes in the phase of horizontally polarized VLF waves recorded at night over a short path in the Southwestern United States. Earl E. GOSSARD and M. R. PAULSON.

Precise phase and amplitude measurements on VLF signals propagated through the Artic zone. F. H. REDER, C. J. ÅBOM and G. M. R. WINKLER.

On the long term phase stability of the 19.8 kc/s signal transmitted from Hawaii, and received at Boulder, Colorado. A. H. BRADY.

Oblique propagation of groundwaves across a coastline — Part III. James R. WAIT.

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Variational solution for the admittance of a long cylindrical antenna. R. A. HURD.

Admittance of annular slot antennas radiating into a plasma layer. Janis GALEJS.

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An experimental investigation of signal strenght in the area around a transmitter's antipode. Robert M. PIPP and James B. WEBSTER.

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Some nonlinear problems arising in the study of random processes. M. ROSENBLATT.

An approach to empirical time series analysis. Emanuel PARZEN.

Effect of linear and nonlinear signal processing on signal statistic. A. V. BALAKRISHNAN.

Random volume scattering. H. BREMMER.

Phase fluctuation statistics. John B. Smyth.

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On the intensity distribution $\frac{2R}{\sqrt{a\beta}} \exp\left[-\frac{R^2}{2}\left(\frac{1}{a}+\frac{1}{\beta}\right)\right] I_0\left[\frac{R^2}{2}\left(\frac{1}{\beta}-\frac{1}{a}\right)\right]$ and its application to signal statistics. M. NAKAGAMI.

Statistical inference for Rayleigh distributions. M. M. SIDDIQUI.

A probabilistic approach to the problem of large antenna arrays. Y. T. Lo.

Influence of data processing on the design and communication of experiments. Solomon W. GOLOMB.

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Theoretical heights and durations of echoes from large meteors. Laurence A. MANNING.

Experimental determination of meteoric line densities and attachment rates. Laurence A. MANNING.

Broadband radio-star scintillations, II. Interpretation. D. G. SINGLETON.

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Electron collision frequency in the ionospheric *D* region. Robert F. BENSON.

Theory of a slotted-sphere antenna immersed in a compressible plasma. Part I. James R. WAIT.

Theory of a slotted-sphere antenna immersed in a compressible plasma. Part II. James R. WAIT.

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Wave hop theory of long distance propagation of low frequency radio waves. Leslie A. BERRY.

Wave propagation in a compressible ionosphere. Part. I. S. R. SESHADRI.

Wave propagation in a compressible ionosphere. Part II. S. R. SESHADRI.

Spatial properties of the amplitude fading of continuous HF radio waves. John AMES.

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Forthcoming Papers in Future Issues of 1965

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An experimental study of gyro interaction in the ionosphere, at oblique incidence. F. H. HIBBERD.

On some nonlinear phenomena in the ionospheric plasma. P. CALDIROLA and O. DE BARBIERI.

Ionospheric cross-modulation : A microscopic theory. David LAYZER and Donald H. MENZEL.

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Alteration of the electron density of the lower ionosphere with ground based transmitters. Pietro P. LOMBARDINI.

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The effect of electron collisions on the formulae of magnetoionic theory. K. G. BUDDEN.

On the point of emergence of a microwave beam entering a linearly graded plasma. A. L. CULLEN.

Self and mutual admittances of waveguided radiating into plasma layers. Janis GALEJS.

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Radio Science Features « Waves in Plasma » Papers

In accordance with its policy of publishing timely papers on a specific subject, Radio Science will carry thirteen papers on « Waves in Plasma » in the February issue. Dr. James R. Wait, editor of the journal, which is published by the National Bureau of Standards in cooperation with U.R.S.I., issued invitations to international leaders in the field to submit contributions, some of which are presented in this issue. Additional papers on the same subject will appear in later issues.

With the advent of manned space vehicles and the need for communications during reentry, the consequences of the plasma sheath become increasingly important. These featured papers investigate various aspects of the related problems. Included in the list of topics are the following : the alleviation of black-out effects ; radiation characteristics of satellite-borne antennas which

are immersed in a plasma ; effects of surface waves at the interface between the surface of the vehicle and the plasma ; ray theory for deducing the profile of the electron density variation in the transverse direction ; driving point impedance of an antenna immersed in a plasma ; and modifications required to generalize the classical theory of wave propagation in a plasma.

Other papers cover the area of microwave methods to determine electron collision frequency in an oxygen-type plasma ; experimental procedures for observing perturbations in an ionospheric plasma ; calculation of radar cross section using geometrical optics ; effect of temperature on electroacoustic wave propagation ; effect of finite compressibility on the radar return from an orbiting body in the ionospheric plasma ; and electroacoustic and electromagnetic waves in a compressible plasma.

The following authors contributed to the February edition's special section : Dr. Bachynski, R.C.A. Research Laboratories, Canada ; Professor Felsen of the Polytechnic Institute of Brooklyn ; Drs. Adachi and Mushiake, Tohoku University, Japan ; Professor Cullen, Sheffield University, England ; Dr. Janis Galejs, Sylvania Electric Products, U. S. ; Dr. Budden, Cambridge University, England ; Dr. Mentzoni, Sylvania Electric Products ; Dr. Heisler, University of Sydney, Australia ; Drs. Lee, Peters, and Walter, Ohio State University ; Dr. Chen, Michigan State University ; and Dr. Wait, N.B.S., Boulder.

Further information available from N.B.S. Office of Technical Information, Washington 25, C.D.

U. R. S. S.

CONCOURS POUR LA MÉDAILLE D'OR A. S. POPOV

L'Académie des Sciences de l'U.R.S.S. annonce le Concours pour la Médaille d'Or A. S. Popov.

La Médaille d'or A. S. Popov est décernée pour des travaux ou inventions scientifiques importants dans le domaine de la technique radioélectrique et de l'électronique.

La Médaille d'Or est attribuée aussi bien aux chercheurs soviétiques qu'aux chercheurs étrangers, mais à une personnalité à la fois, pour un travail scientifique original ou pour une importante série de travaux, pour des découvertes ou inventions.

Les propositions peuvent être soumises par des instituts de recherches ou d'éducation, des sociétés scientifiques, les académiciens, les membres correspondants et les membres étrangers de l'Académie des Sciences de l'U.R.S.S.

Les documents suivants doivent être présentés pour le Concours A. S. Popov : publications scientifiques (séries de communications) ou descriptions de la découverte (invention) en triple exemplaire ; certificat de la valeur et de l'importance scientifique du travail pour le progrès de la science et de la technique radioélectrique, bref curriculum vitæ de l'auteur et liste des principales communications ou inventions scientifiques.

Les documents portant l'inscription « Pour le Concours A. S. Popov » sont à adresser à l'Académie des Sciences de l'U.R.S.S., Division de Physique Générale et Appliquée, Leninskii Prospekt 14, Moscou B-71.

La date limite pour la présentation des documents est le 1er mars 1965.

Le Praesidium de l'Académie des Sciences de l'U.R.S.S.

U. S. S. R.

A. S. POPOV GOLD MEDAL CONTEST

The Academy of Sciences of the U.S.S.R. announces the Contest for the A. S. Popov Gold Medal.

A. S. Popov Gold Medal is awarded for distinguished scientific work and inventions in the field of radio engineering and electronics.

The Gold Medal is awarded both to Soviet and foreign scientists, but only to one competitor for the best original scientific work or a series of important works, for distinguished discoveries or inventions.

The papers can be submitted by research and educational institutes, design offices, scientific societies, by academicians,

corresponding members and foreign members of the U.S.S.R. Academy of Sciences.

For the A. S. Popov Gold Medal Contest the following are to be submitted : scientific publications (series of papers) or discoveries (inventions) in triplicate ; a testimonial of the scientific value and the importance of the work for the progress of science and engineering, a brief biographical note of the author should be appended with a list of the main scientific papers and inventions.

The papers with the inscription « For the A. S. Popov Gold Medal Contest » should be addressed to the Academy of Sciences of the U.S.S.R., Moscow B-71, Lenin Prospekt 14, the Division of General and Applied Physics.

The deadline for submitting papers is March 1, 1965.

Praesidium of the U.S.S.R. Academy of Sciences

COMMISSIONS ET COMITÉS

Commission I — Mesures et Etalons Radioélectriques

SIGNAUX HORAIRES ET FRÉQUENCES ÉTALON

Vœux de l'U.G.G.I.

L'Assemblée Générale de l'Union Géodésique et Géophysique Internationale qui s'est tenue à Berkeley, Californie, en août 1963, a adopté le vœu ci-après reproduit :

Vœu 21.

L'Union géodésique et géophysique internationale, reconnaissant :

a) l'importance des signaux horaires transmis dans la bande de 14 à 100 kHz, et

b) les avantages des signaux horaires continus,

et *notant* que de tels signaux sont déjà en service dans les Amériques et qu'ils se sont avérés très utiles,

recommande :

que, dans cette bande, les signaux horaires, de préférence continus, soient étendus et transmis à d'autres régions du monde.

* * *

L'Assemblée Générale de l'Association Internationale de Géodésie qui s'est tenue à Berkeley, Californie, en août 1963, a adopté le vœu ci-après :

Vœu 15.

L'Assemblée internationale de géodésie, considérant :

a) que la diffusion simultanée par différentes stations transmettant les fréquences-étalon et les signaux horaires sur la même fréquence crée de sérieuses interférences,

b) que les arrangements pour des diffusions non simultanées déjà obtenus sur MHz dans la zone européenne, à la suite de la

Xe Assemblée Plénière du C.C.I.R. (Genève, 1963), ont apporté une amélioration très nette ;

recommande vivement :

1) que l'action déjà entreprise par l'U.I.T. en vue de réduire les interférences entre les diverses stations transmettant les fréquences-étalon et les signaux horaires soit poursuivie :
2) que l'établissement par ces stations d'un programme pour une diffusion non simultanée soit étendu à d'autres fréquences et à d'autres régions du monde, particulièrement à l'Extrême-Orient et entre l'Europe et l'Amérique.

Commission I
on Radio Standards and Measurements

TIME SIGNALS AND STANDARD FREQUENCY

I.U.G.G. Resolutions

The General Assembly of the International Union of Geodesy and Geophysics held in Berkeley, California, in August 1963 adopted the following resolution :

RESOLUTION 21.

The International Union of Geodesy and Geophysics, recognizing :

(*a*) the importance of time signals transmitted in the band about 14 to 100 kc/s, and

(*b*) the advantages of continuous time signals ;

and *noting* that such signals are already available in the Americas and that they have proved very useful ;

recommends :

that time signals in this band, preferably continuous, be extended and provided in other areas of the world.

The General Assembly of the International Association of Geodesy, held in Berkeley, California, in August 1963, adopted the following resolution :

RESOLUTION 15.

The International Association of Geodesy, considering :

(*a*) that the simultaneous broadcasting by various standard frequency and time transmission stations on the same frequency produces serious mutual interference ;

(*b*) that the time-sharing arrangements already brought into effect on 5 Mc/s in the European zone following the Xth Plenary Assembly of C.C.I.R. (Geneva, 1963) have given a very significant improvement ;

strongly recommends :

(1) that the action already taken by I.T.U. for the reduction of mutual interference between standard frequency and time transmission stations be continued ;

(2) that the establishment by these stations of a time-sharing scheme be extended to other frequencies and to other regions of the world, particularly in the Far East and between Europe and America.

Commission II on Radio and Troposphere

BIBLIOGRAPHY

Attention of the members of Commission II is called to

« A general survey on the radiometeorological conditions in the Hellenic Area », by John S. Nicolis, Hellenic Telecommunication Organization, Radio Research Laboratory, Athens.

This report was presented in N.A.T.O. summer school in Radio Meteorology, Lagonissi, Greece, September 1964 as an official communication from the Hellenic Telecommunication Organization.

The main parts of the report are :

A. The radiometeorology of the Hellenic Area

B. On the propagation conditions of VHF/UHF in the Hellenic area ; in particular :

B. 1 The distribution of hourly median values.

B. 2 The distribution of hourly max fluctuations (fading range) and fluctuation speed (fading rate).

B. 3 The correlation between hourly median values and corresponding fading rate.

B. 4 The correlation between hourly median values and corresponding hourly max fluctuations.

B. 5 The distribution of instantaneous received values during different periods of the study time.

B. 6 The variation of instantaneous values with season for various percentages of study time.

B. 7 The diurnal effect.

B. 8 The diurnal variation of several propagation mechanisms for various seasons.

B. 9 The distribution of the wave length dependence.

B. 10 Radiometeorological correlations.

B. 11 The scattering from the rough soil (trees, buildings).

Commission III — Ionosphère

INDICES D'ACTIVITÉ SOLAIRE POUR LA PROPAGATION IONOSPHÉRIQUE

(Extrait du *Journal des Télécommunications*, Vol. 31, n° 11, novembre 1964)

Conformément à la résolution 4 du Comité consultatif international des radiocommunications (C.C.I.R.), le secrétariat spécialisé du C.C.I.R. a préparé les tableaux suivants concernant les indices fondamentaux de la propagation ionosphérique (Avis 371 et Rapport 246 du C.C.I.R.).

VALEURS OBSERVÉES

● R_{12} (moyenne glissante sur douze mois du nombre de taches solaires) :

Année \ Mois	1	2	3	4	5	6	7	8	9	10	11	12
1963	29	30	30	29	29	27	28	27	27	26	23	

● I_{F_2} (indice ionosphérique) (*) :

Année \ Mois	1	2	3	4	5	6	7	8	9
1964	9(2)*	6(2)*	20(2)*	14(2)*	1(2)*	—3(2)*	1(1)*	—3(1)*	4(1)*

● Φ (flux du bruit solaire moyen mensuel) (**) :

Année \ Mois	1	2	3	4	5	6	7	8	9
1964	74	76	75	73	69	69	67	69	70

Prévisions pour les mois a venir (1er novembre 1964) (***) :

● R_{12}

Année \ Mois	10	11	12	1	2	3
1964	6	6	7			
1965				7	7	8

(*) Les chiffres entre parenthèses indiquent le nombre de valeurs de foF_2 qui ne sont pas encore parvenues au secrétariat du C.C.I.R. et dont on n'a donc pas tenu compte dans le calcul de l'indice I_{F_2}. Pour plus de détails, voir le numéro du *Journal des Télécommunications* (avril 1964), page 119.

Par rapport aux données contenues dans le Rapport 246 du C.C.I.R., une station de sondages ionosphériques a cessé de fonctionner — celle de Porto Rico (en juin 1963). Les valeurs de I_{F_2} contenant entre parenthèses le chiffre (1) sont donc depuis le mois de juin 1963 les valeurs définitives de l'indice I_{F_2}. En outre, la station de Fairbanks n'a pas fonctionné pendant la période août-octobre 1963. Pour cette période, les valeurs définitives de l'indice I_{F_2} sont celles contenant le chiffre (2) entre parenthèses.

(**) Renseignements obligeamment fournis par le « National Research Council », Ottawa.

(***) Renseignements obligeamment fournis par le Prof. Waldmeier, Observatoire Fédéral de Zurich.

ESTIMATION DE L'ERREUR SUR LES PRÉVISIONS DE R_{12} : ± 5

● I_{F_2} (*) :

Année	Mois 9	10	11	12	1	2	3
1964	—1	—1	—2	—2			
1965					—4	—4	(—4)

La valeur prévue six mois à l'avance est donnée entre parenthèses.

ESTIMATION DE L'ERREUR SUR LES PRÉVISIONS DE I_{F_2} :

Mois (1964)	9	10	11	12
Max.	+4	+4	+4	+5
Min.	—8	—10	—10	—9

Mois (1965	1	2	3	4
Max.	+4	+3	+1	
Min.	—11	—13	—14	

SOLAR INDICES FOR IONOSPHERIC PROPAGATION

(Reprint from *Telecommunication Journal*, Vol. 31, No. 11, November 1964)

In accordance with Resolution 4 of the International Radio Consultative Committee (C.C.I.R.), the Secretariat of this body has produced the following tables, showing the basic indices of ionospheric propagation (C.C.I.R.) Recommendation 371 and Report 246).

(*) Renseignements obligeamment fournis par le « Department of Scientific and Industrial Research, Radio Research Station », Slough.

PARAMETERS

● R_{12} (smoothed mean, over twelve months, of sunspots observed) :

Year \ Month	1	2	3	4	5	6	7	8	9	10	11	12
1963	29	30	30	29	29	27	28	27	27	26	23	

● I_{F_2} (ionospheric index) :

Year \ Month	1	2	3	4	5	6	7	8	9
1964	9(2)*	6(2)*	20(2)*	14(2)*	1(2)*	—3(2)*	1(1)*	—3(1)*	4(1)*

● Φ (mean monthly solar noise flux) (**) :

Year \ Month	1	2	3	4	5	6	7	8	9
1964	74	76	75	73	69	69	67	69	70

(*) The figures in brackets represent the number of figures for foF_2 which have not yet reached the C.C.I.R. Secretariat, and have been overlooked in calculation of I_{F_2}. For further detail, see the *Telecommunication Journal*, April 1964, page 119.

With regard to the data contained in C.C.I.R. Report 246 one ionospheric sounding station has ceased to operate — Puerto Rico (in June 1963). The values of I_{F_2} that include the figure (1) in brackets are therefore as from the month of June, 1963, the definitive value for I_{F_2}. Furthermore the Fairbanks sounding station did not operate during the period August-October 1963. For that period the definitive values of I_{F_2} are those including the figure (2) in brackets.

(**) Data kindly supplied by the National Research Council, Ottawa.

FORECASTS FOR THE NEXT FEW MONTHS (1 NOVEMBER, 1964)

● R_{12} (*)

Year \ Month	10	11	12	1	2	3
1964	6	6	7			
1965				7	7	8

ESTIMATED ERROR IN FORECASTS OF R_{12} : $\pm$ 5

● I_{F2} (**)

Year \ Month	9	10	11	12	1	2	3
1964	—1	—1	—2	—2			
1965					—4	—4	(—4)

The figure in brackets is the figure forecast six months in advance.

Estimate of the error in I_{F2} predictions :

Month (1964)	9	10	11	12
Max.	+4	+4	+4	+5
Min.	—8	—10	—10	—9

Month (1965)	1	2	3	4
Max.	+4	+3	+1	
Min.	—11	—13	—14	

(*) Data kindly supplied by Prof. WALDMEIER, Federal Observatory, Zurich.

(**) Data kindly supplied by the Department of Scientific and Industrial Research, Radio Research Station, Slough.

CARACTÉRISTIQUES DE LA PROPAGATION EN CLIMAT DÉSERTIQUE

par MM. Boithias et Battesti,

Entre deux points en visibilité ou proches de la visibilité, il ne semble pas que la propagation en climat désertique présente des caractéristiques très particulières dans la gamme VHF.

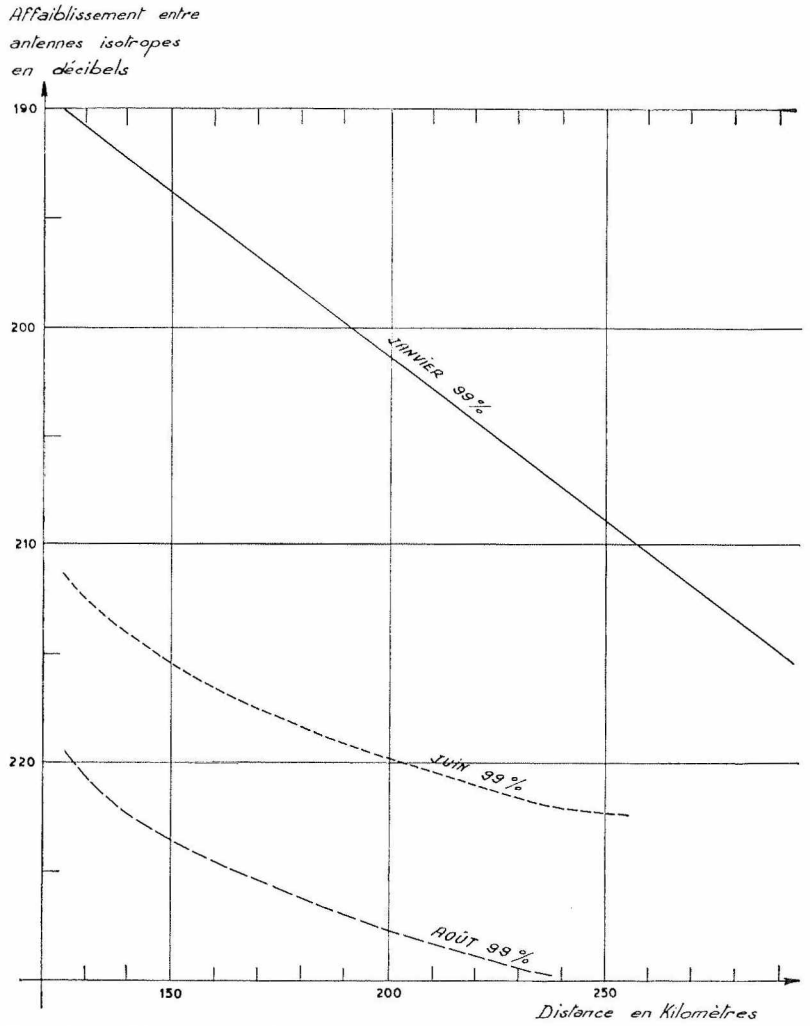

Fig. 1. — Climat saharien 450 MHz. Affaiblissement à 99 % pour divers mois.

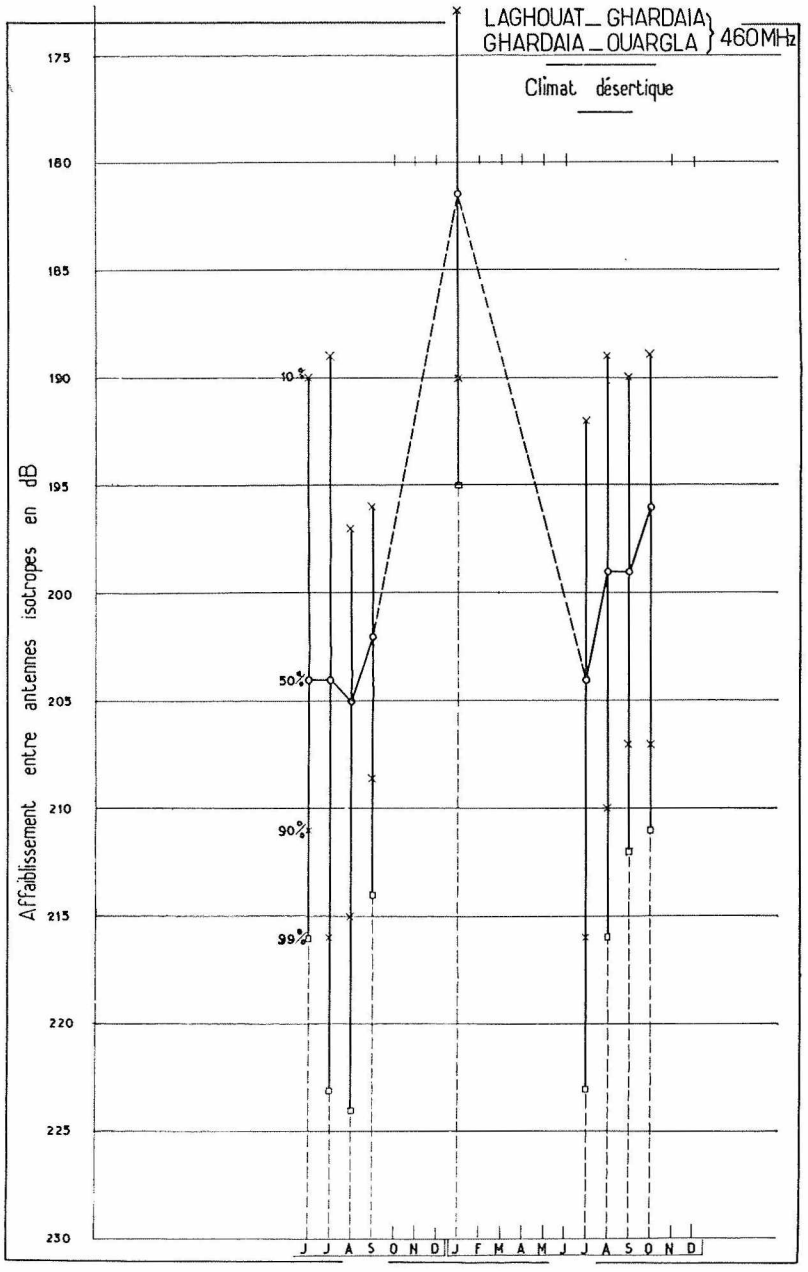

FIG. 2. — 1960-1961

Au-delà de l'horizon, et dans la zone de propagation «par diffusion» (scatter), au contraire, la propagation en climat désertique présente des caractéristiques très particulières qu'on peut résumer ainsi :

1) La période de plus mauvaise propagation se situe en été et la meilleure période est l'hiver.

2) Les variations du niveau reçu (non compris les fluctuations rapides sont considérables, soit entre l'été et l'hiver (25 décibels) soit entre le jour et la nuit (20 dB en été).

Les courbes de la figure 1 donnent l'affaiblissement non dépassé durant 99 % du temps pour divers mois et pour la fréquence 450 MHz.

La figure 2 résume les résultats des mesures effectuées sur deux liaisons Laghouat-Ghardaia (167 km) et Ghardia-Ouargla (16 km).

Laghouat 33°47'N — 2°55'E altitude 760 m angle au départ : OmR
Ghardaia 32°30'N — 3°40'E altitude 566 m angle au départ : OmR
Ouargla 31°57'N — 5°20'E altitude 140 m angle au départ : OmR

La fréquence était de 460 MHz, la puissance d'émission de 1 kW, les aériens des paraboles de 10 m de diamètre de 31 dB de gain isotrope.

3) L'effet diurne est représenté figures 3 et 4.

4) En été, aucune mesure n'a été effectuée sur des liaisons d'une longueur supérieure à 200 km.

Il est possible que pour des liaisons longues ($d \geqslant 300$ km) l'effet saisonnier soit moins marqué que sur les liaisons courtes.

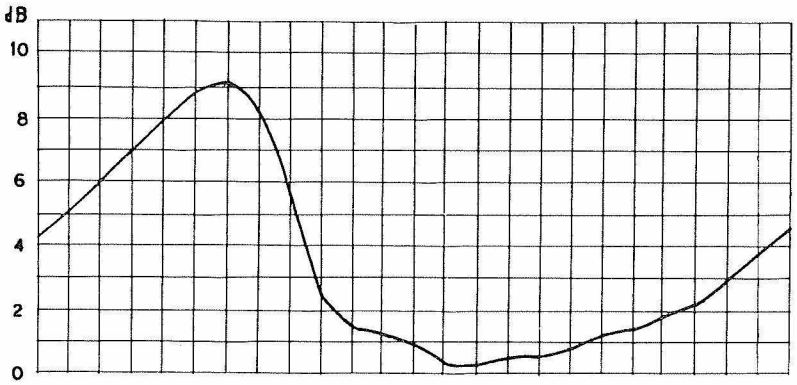

FIG. 3. — Effet diurne d'hiver

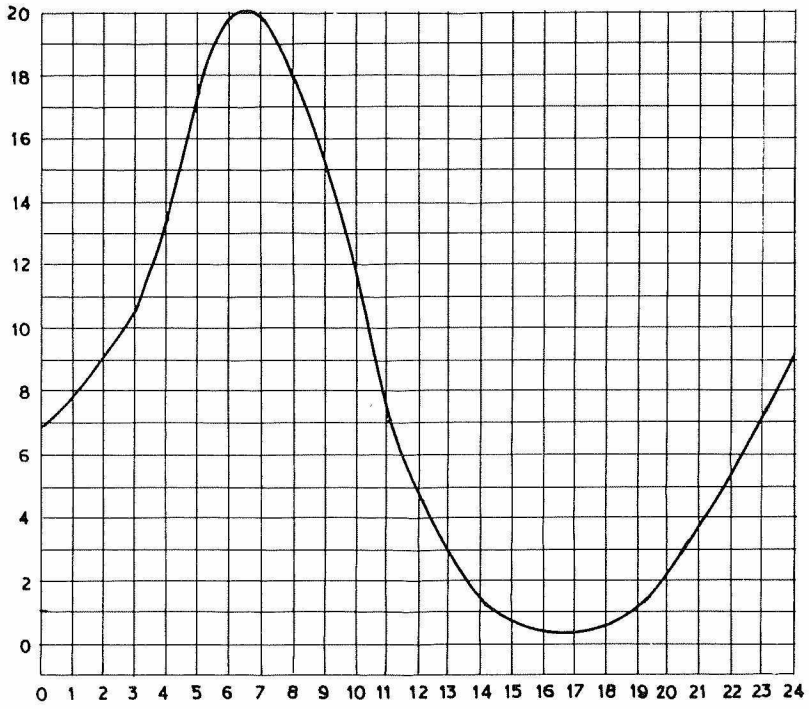

FIG. 4. — Effet diurne d'été

On peut donner de ces observations l'explication suivante :

En été la propagation est mauvaise car la température très élevée du sol provoque une instabilité presque totale des basses couches de l'atmosphère, détruisant ainsi les feuillets atmosphériques. A mesure qu'on s'élève en altitude, la stabilité augmente. Comme l'altitude du volume commun augmente à mesure que la longueur de la liaison s'accroît, la différence entre l'hiver et l'été aura tendance à diminuer.

Remarque.

Il est difficile de faire une étude radiométéorologique en climat désertique, car les hygromètres généralement utilisés par la météo, ne permettent pas de mesurer les humidités inférieures à 10 % ; d'autre part, les stations au sol sont souvent situées au voisinage de points d'eau. Il est donc pratiquement impossible d'obtenir

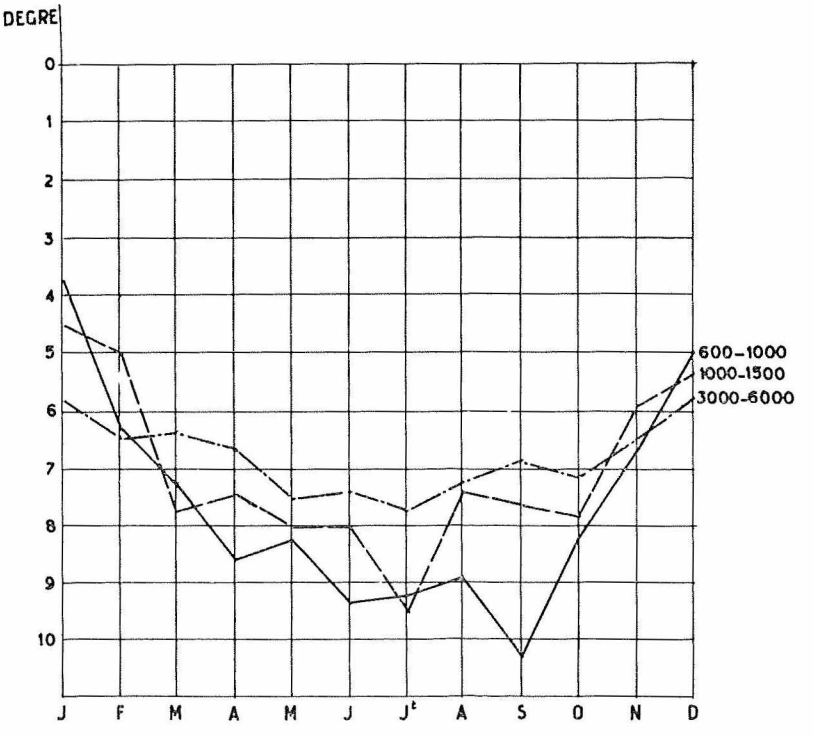

FIG. 5. — Variation annuelle du gradient de température $\frac{\triangle T \times 1000}{\triangle h}$ au Sahara (station d'Aoulef).

une valeur correcte du gradient d'indice de réfraction de l'air. Il semble que la variation annuelle du gradient de température dans la zone du volume commun donne une bonne représentation de la variation du champ (cette méthode est uniquement valable dans les climats où l'humidité est très faible). La figure 5 représente la variation du gradient de température en altitude au Sahara (station de radiosondage d'Aoulef) entre diverses altitudes.

Commission V on Radio Astronomy

PROJECT WEST FORD — CONCLUSIONS

(Reprint from *British Communications and Electronics*)

The Space Science Board of the National Academy of Sciences has issued its final report on the effect of the experiment, in May 1963,

in which 400 million dipoles 1.77 cm long by 18 microns, were put into orbit with a view to providing an experimental reflecting surface at 8000 Mc/s.

The radio reflectivity of the belt was somewhat less than predicted for frequencies near resonance, but was somewhat greater than predicted for emissions in the u.h.f. region, at least during the first few months of the belt's existence. This is probably due to the fact that some of the dipoles (perhaps somewhat more than one-half of the total number) failed in the early stages of the experiment to separate into individual reflectors, but remained loosely tangled in small clusters or chains.

The changes in the orbital elements and the rate of spreading of the dipole belt during the first few months of its existence agree well with predictions computed on the basis of a theory that takes into account the resonant interaction of the Earth's nonspherical gravitational field and solar radiation pressure. The predicted lifetime is about three years.

The agreement of observation and prediction says the report, is good enough to engender confidence that astronomers can predict accurately enough for all practical purposes the astronomical side-effects of experiments similar to the West Ford, should any such ever be proposed, given the characteristics of the experiment and those of the observing equipment, whether optical or radio.

The report finally concludes that with the observing techniques available today, the present experiment has not so far been harmful for optical or radio astronomy.

Commission VI on Radio Waves and Circuits

INTERNATIONAL CONFERENCE ON MICROWAVES, CIRCUIT THEORY AND INFORMATION THEORY I. C. M. C. I.

The Institute of Electrical Communication Engineers of Japan has issued three volumes of summaries of papers presented at the I.C.M.C.I. held in Tokyo, September 7-11, 1964. The conference was sponsored by the Institute of Electrical Communication Engineers of Japan, supported by the Science Council of Japan

and U.R.S.I. Commission VI, in co-operation with the Academy of Science of U.S.S.R., the Société Française des Electroniciens et des Radioélectriciens, the Verband Deutscher Elektrotechnikers, the Institute of Electrical Engineers (U. K.), and the Institute of Electrical and Electronics Engineers (U. S. A.).

The three volumes of summaries and their main sub-divisions are :

Part 1. — *Microwaves* :

Transmission lines and waveguides.
Circuit components.
Measurements and non-linear devices.
Parametric amplifiers and devices.
Masers and Lasers.
Microwave tubes.
Communication systems.
Propagation.
Antennas.
Plasmas.

Part 2. — *Circuit theory* :

Network theory.
Network design.
Network topology.
Active networks.
Time varying systems.
Non-linear systems.
Circuit physics.

Part 3. — *Information theory* :

Channel capacity and signal design.
Coding.
Models of communication.
Filtering and noise.
Variable channels.
Signal detection.
Signal processing.
Pattern recognition and learning.
Automata.
Sensory devices.

Space Radio Research Committee

RELIABILITY ABSTRACTS AND TECHNICAL REVIEWS

The United States National Aeronautics and Space Administration (N.A.S.A.) has issued the Third Annual Volume of «Reliability Abstracts and Technical Reviews ».

In order to help scientists concerned with the reliability of parts, assemblies, components, and systems to stay abreast of the latest developments in the literature in this field, the National Aeronautics and Space Administration in April, 1961 contracted with the Research Triangle Institute for the conduct of an abstracting and review service for technical literature on reliability. The first annual volume of Reliability Abstracts and Technical Reviews produced under this contract contained Serial Numbers 1-275, which were issued during the period between April, 1961 and May, 1962. The second annual volume contained Serial Numbers 276-775, produced during the period between June, 1962 and May, 1963. This, the third annual volume contains Serial Numbers 776-1305, issued between June, 1963 and May, 1964.

Current papers on reliability and closely related subjects are sought from all available sources, including technical journals, trade magazines, and proceedings of conferences and meetings. Authors of papers and technical reports in the field are invited to submit their material for inclusion in the service.

I. Q. S. Y.

IIIrd I.Q.S.Y. Assembly, Madrid, 1965

ADVANCE NOTICE OF PROGRAMME

The IIIrd I.Q.S.Y. Assembly will be held in Madrid, Spain from Monday 29th March to Friday 2nd April, 1965 at the kind invitation of the Consejo Superior de Investigaciones Cientificas. A provisional outline of the programme is given below.

We would be most grateful to be informed of the names of those U.R.S.I. Officers (Officers of the Board, Chairmen, Vice Chairmen and Secretaries of U.R.S.I. Commissions and Committees) who intend to attend the I.Q.S.Y. meeting.

Provisional Programme

MARCH

Monday 29th		
	Morning	Opening Ceremony First Plenary Meeting
	Afternoon	Council for the I.Q.S.Y. Discipline Working Groups
Tuesday 30th		
	Morning	Discipline Working Groups
	Afternoon	Scientific papers and discussions
Wednesday 31st		
	Morning	Scientific papers and discussions
	Afternoon	Scientific papers and discussions

APRIL

Thursday 1st		
	Morning	Scientific papers and discussions
	Afternoon	Probably free

Friday 2nd

Morning	Council for the I.Q.S.Y.
Afternoon	Final Plenary Meeting

Notes

The details of the programme are at present under consideration but the following items will probably receive the greatest emphasis :

1. Review of progress in the programme of scientific observations planned for the I.Q.S.Y.
2. The possible need for minor changes in the programme in 1965.
3. Review of recent.advances in the branches of geophysics represented by the I.Q.S.Y. disciplines. Particular attention will be given to solar-terrestrial relations.
4. The analysis and publication of the scientific results of the I.Q.S.Y., both in *Annals of the I.Q.S.Y.* and in scientific journals.
5. The need for continued synoptic measurements in the I.Q.S.Y. disciplines after 1965.
6. The future role of the international data exchange organization and the World Data Centres.

I.Q.S.Y. Notes

The I.Q.S.Y. Secretariat has issued No. 9 of *I.Q.S.Y. Notes* (October 1964). The contents of this issue is as follows :

IONOSPHERIC OBSERVATIONS DURING THE SECOND INTERNATIONAL POLAR YEAR 1932-33

by Sir Edward Appleton, F. R. S.
University of Edinburgh

From *I.Q.S.Y. Notes*, No. 9, Oct. 1964

Now that the exploration of the ionosphere constitutes one of the essential features of any international programme of geophysical observations, it may be of interest to recall some features of the very first occasion when the ionosphere was explored, by « Experiments in Concert », during the Second International Polar Year of 1932-33. Our knowledge of the ionosphere was then in a rapidly developing phase, because it had only recently been realized how the detailed features of an ionogram could furnish information concerning the peak electron densities of the different ionospheric layers ; while the now well-known sunspot-cycle of the ionosphere was, in those days, still only a matter of mere surmise. Nevertheless, the International Union of Scientific Radio, with what now appears to be most courageous foresight, invited an U.R.S.I. Polar Year Sub-Commission to draft a programme of ionospheric measurements, in which any country possessing vertical radio sounding equipment could participate.

The U.R.S.I. Second Polar Year Ionospheric Programme

It is perhaps of historical interest, in these days of automatic ionospheric sounding, to quote the preamble of the U.R.S.I. Polar Year Sub-Commission's report which reads as follows :

« The type of radio observations suggested is based on the following considerations. In measurements of the equivalent height of reflexion of the ionosphere we may proceed in two ways. Using a single mean frequency, f, we can observe how the equivalent height, h', varies with time t ; from the data obtained we can plot an equivalent height/time graph. Another, and more productive, method is to make, as quickly as possible, a number of measurements of the equivalent height, h', for a range of frequencies from which an equivalent height/frequency curve can be drawn. The discontinuities in such a curve, which indicate critical penetration frequencies, may be used for the measurement of maximum ionization content ».

The above rather naive statement, then, sets out the pattern of the international programme which consisted of what we would now call $h'(t)$ and $h'(f)$ measurements, the latter being executed on spot frequencies with as close spacing as possible. For the $h'(t)$ determinations the internationally agreed frequencies of 4 Mc/s and 2 Mc/s were recommended. For the determination of maximum electron density, by way of $h'(f)$ measurement, it was recommended that attention should be concentrated, alternately, on Region E and on Region F. It was, in fact, only during the course of the 2nd International Polar Year itself that the bifurcation of the F Region, under day-time conditions, became recognized as a regular occurrence. The U.R.S.I. programme therefore makes no reference to Region F1 and Region F2, but only to Region F.

However, if we were limited to rather crude techniques and deficient in our ionospheric understanding, our international programme of observations had a modern look about it. There was devised, for example, a Polar Year Ionospheric Calendar, with selected International Days of the First, Second and Third Order, to which $h'(t)$ and $h'(f)$ measurements were assigned. As a participant myself, I can confirm that the programme was a rather demanding one, because of the manual

attention required by the equipment of that day. But people often do their best work in a frontier situation; and, looking back on things, I realize that many interesting results would have been missed had the programme been less challenging and exacting.

British Ionospheric Observations during 1932-33 : *The Tromsø Expedition.*

Since it appears, in retrospect, that the British programme of observations, carried out simultaneously in both North Norway and South-East England, constituted the most comprehensive undertaking of the U.R.S.I. International Polar Year programme, the rest of this article will be devoted to it.

Following the suggestion of Sir George Simpson, the British National Committee for the Second Polar Year decided to choose a site in North Norway for the ionospheric work in high latitudes, while comparable reference observations were maintained in Slough, Cambridge and London, all in South-East England. The Norwegian Committee for Cosmic Physics invited the northern expedition to establish its principal station at Nordlys Observatoriet, Tromsø, where they were good enough to provide the necessary laboratory accommodation. Special facilities and privileges in connection with the transit of apparatus into and out of the country were accorded by the Norwegian Government; and, largely due to the help of the Bergenske Steamship Company, our then tons of equipment, some of it delicate, completed its 1500 mile voyage without the breakage of so much as a single receiving valve.

As a result of a valuable survey visit to Tromsø, made by Mr. R. A. (now Sir Robert) Watson Watt, it was possible to plan the siting of our sending station at Simavik, on the island of Ringvassøy, some ten miles north of the projected receiving station at Tromsø. The great advantage accruing from this arrangement was that, at Simavik, there was the hydro-electric station which provided the electric supply for Tromsø. It was therefore possible to use the same alternating-current supply for the maintenance of the synchronization of our equipment at both sending and receiving stations.

The members of the British Expedition to North Norway consisted of Dr. G. Builder, Mr. R. Naismith, Mr. W. C. Brown and myself. The party arrived in Norway about a month before the International Polar Year began, in August 1932, in order that the necessary stations could be erected and our equipment thoroughly tested. There was little difficulty in assembling our receiving equipment at the Tromsø Observatory. But our pre-expedition planning of the erection of the aerial system at Simavik proved to be entirely faulty. There were only two houses on the latter site and, while their inhabitants were particularly helpful and friendly, our ignorance of Norwegian made matters a little more complicated than they need have been. With the aid of a dictionary and various signs we gathered that our Norwegian friends wanted to impress on us that the aerial masts would have to be very strongly stayed in view of the extraordinary strength of the Arctic winds in winter. We realised at once that the ground was most unsuitable for driving in the stay-wire pegs we had brought with us. Finally we decided to attach our stays to boulders buried in the ground, a method which proved absolutely reliable. There was no aerial trouble at Simavik during the whole Polar Year; and, in fact, the masts have been reported to me as having remained in position till 1949, a matter of seventeen years, when they were at last blown down in a particularly fierce gale !

Ionospheric Results and their Discussion.

Before discussing the actual results of the work at Tromsø, it may be useful to outline the kind of problem which we hoped might be solved by radio observations at high latitudes. At the time the work was planned, the nature of the radiation causing upper-atmospheric ionization was in sharp dispute. It was known that the sun was, in any case, involved in the matter, but it was not known whether the ionizing radiation was electromagnetic or corpuscular in character. Fortunately, the Tromsø results, which are described briefly below, indicated that both types of radiation were effective in high latitudes, though the corpuscular type of radiation was noted only as a concomitant of magnetic activity.

Our earliest observations at Tromsø indicated that there were two main reflecting regions, the same as in England. On a magnetically quiet day it was found that Region-E ionization was less at Tromsø than in lower latitudes, by an amount which was in satisfactory agreement with the ultra-violet theory of ionospheric origin. However, one of the remarkable features of the polar ionosphere was found to be the frequent occurrence of disturbed conditions associated with magnetic activity and auroral displays. Now magnetic disturbances at Tromsø usually occur during the night, from 20 h. to 04 h. local time, and it was during such periods that we discovered what is now known as auroral-E ionization. However, under conditions of more intense magnetic activity, we found a result which completely surprised us. We got no ionospheric echoes at all on any of our available frequencies. Moreover, it was found that the no-echo condition, which was obviously due to intense absorption in the lower ionosphere, often persisted into the day-time when the magnetic activity had subsided ; and it is now clear to me that we were probably experiencing one of the now familiar features of Polar Cap Absorption, though we did not, of course, realize this at the time. However, the nocturnal occurrence of auroral-E echoes clearly indicated the need to invoke the atmospheric irruption of corpuscular radiation, as well as of ultra-violet radiation, to explain all the varied phenomena encountered at Tromsø.

From the sustained series of measurements made simultaneously at Tromsø and Slough, various other conclusions were reached. At both stations it was found that the peak ionization density in the F Region varied, in general, inversely with magnetic activity. This was specially noticeable, at both stations, in the spring months of 1933 when the critical penetration frequency of the F Region was subject to a well-defined 27-day recurrence tendency. Such results have been amply confirmed in later ionospheric studies, though it has been found that, at equatorial stations, the negative correlation between F-Region ionization and magnetic storminess changes over to a positive one.

The Second International Polar Year of 1932-33, like the International Years of the Quiet Sun, 1964-65, was a period of low solar activity, the minimum of the particular sunspot cycle occurring in the latter half of 1933. In a series of measurements of

the Region-E critical penetration frequency, made at Slough before the International Polar Year began, there had been disclosed evidence suggesting that the lower ionosphere was subject to a sunspot-cycle control. During the Polar Year itself it was possible to examine Region-F in the same connection, reliance in this case being placed mainly on the Slough measurements because of the freedom of that site from magnetic storminess. The critical penetration frequency of the F Region was found to vary in direct sympathy with sunspot number and even more markedly than in the case of the E Region. This led us to conclude, in the paper written on the Polar Year results, that « there is a variation of solar ultra-violet light during the sunspot cycle ; and, since the effect is most marked for the highest ionospheric region, we must conclude that the variation is greatest for the most easily absorbed radiation which is presumably of very short wave-length ».

Now it is always interesting to compare old theoretical conclusions with new experimental evidence, and I am prompted to do this by the quotation I have given immediately above. Undoubtedly the conclusion that the intensity of solar ultra-violet light varies directly with sunspot activity is now fully endorsed in more recent investigations of the subject ; and I think that it is also generally agreed that the sunspot-cycle variation of the ionizing radiation responsible for the F Region is greater than that of the X-radiation which is now thought to produce the E-Region. But, as I have already mentioned, the F Region, under daytime conditions, exhibits a dual structure, the lower F1 stratum exhibiting entirely different characteristics, in time and place, from the upper F2 stratum. One attractive theory in this connection is that both the F1 and F2 layers are produced by the same band of solar ultra-violet radiation, and that it is the variation of atmospheric characteristics which accounts for their different behaviour. According to this theory, then, the solar radiation responsible for the two layers would exhibit the same sunspot-cycle variation. However, we have no entirely convincing evidence that this is the case, though we may well see the matter resolved by further rocket measurements of the intensity of the solar helium 304 A emission line during the I.Q.S.Y., to be compared with those made near the last period of sunspot maximum, in 1958.

THIRD MEETING OF THE SPECIAL COMMITTEE FOR THE I.Q.S.Y. (FLORENCE, MAY 1964)

Resolutions

1. *Ionosphere Key Stations.*

The Special Committee for the I.Q.S.Y. :

notes that only one vertical incidence sounding station has been designated as a key station in middle latitudes in the Southern Hemisphere, and that it would be desirable to have three to six such stations well distributed in longitude,

calls the attention of I.Q.S.Y. participating committees to these gaps in the distribution of key stations and

invites the nomination of additional key stations at middle latitudes in the Southern Hemisphere.

2. *Flow of f-plots.*

The Special Committee for the I.Q.S.Y. :

notes that the flow of *f*-plots to the WDCs is referred to in the Guide to Data Exchange (*I.Q.S.Y. Manual*, No. 6) and that *f*-plots are used for the compilation of world ionospheric indices which are required as quickly as possible,

urges that the *f*-plots from key stations should flow to WDCs at a faster rate than that specified in the Guide.

3. *Customs Charges.*

The Special Committee for the I.Q.S.Y. :

notes that customs authorities frequently charge import duty based on the full value of scientific equipment, even when it has been imported temporarily in connection with international scientific projects such as the I.Q.S.Y.,

regrets that this action often prevents the implementation of important scientific programmes and thus hinders scientific progress,

strongly urges U.N.E.S.C.O. and other competent organizations to take all possible steps to ensure that the duty charged on temporarily imported scientific equipment shall be reduced to a minimum or cancelled.

4. *Absolute Calibrations.*

The Special Committee for the I.Q.S.Y. :

notes (*a*) that the I.Q.S.Y. provides the first opportunity for making extensive measurements of the intensity of solar radio noise and of uv- and x-radiation at the minimum phase of the solar cycle,

(*b*) that the stability of the instruments used and hence the relative accuracy of the resulting measurements is often high, but that the absolute accuracy of such measurements is not always as high as could be desired,

invites I.A.U., U.R.S.I., C.O.S.P.A.R. and other competent organizations to emphasize the importance of making absolute calibrations and of organizing the inter-comparison of instruments as soon as possible and certainly before the end of the I.Q.S.Y.

MEMBERSHIP OF THE I.Q.S.Y. COMMITTEE

(September 1964)

President : Prof. W. J. G. Beynon (U.R.S.I.).

Vice-Presidents : Dr. M. A. Pomerantz (I.U.P.A.P.),
Dr. N. V. Pushkov (U.G.G.I.),
Prof. G. Righini (I.A.U.).

The above are representatives of the four participating Unions.

I.Q.S.Y. Reporters appointed in consultation with appropriate international organizations ;

Meteorology : Dr. W. L. Godson (U.G.G.I./W.M.O.).
Geomagnetism : Father J. O. Cardus (I.A.G.A.).
Aurora : Mr. J. Paton (I.A.G.A.).
Airglow : Dr. D. Barbier (I.A.G.A.).
Ionosphere : Prof. W. Dieminger (U.R.S.I.).
Solar Activity : Dr. R. Michard (I.A.U.).
Cosmic Rays : Prof. S. N. Vernov (I.U.P.A.P.).
Aeronomy : Dr. M. Nicolet (I.A.G.A.).
Space Research : Dr. H. Friedman (C.O.S.P.A.R.).
World Days : Mr. A. H. Shapley (I.U.W.D.S.).

Two members for administration, finance and publications :

Dr. D. C. MARTIN (Convenor, Publication Sub-Committee).
Dr. H. ODISHAW (Convenor, Finance Sub-Committee).

Three representatives of World Data Centres A, B, and C.

WDC A Dr. H. ODISHAW (Convenor, WDC Group).
WDC B Dr. V. BURKHANOV.
WDC C Prof. T. NAGATA.

Representative of the World Meteorological Organization :

Mr. O. M. ASHFORD.

Two representatives of C.O.S.P.A.R. :

Dr. J. BLAMONT.
Dr. Z. SVESTKA (Member, Publications Sub-Committee).

Representative of S.C.A.R. : Dr. F. JACKA.

Four regional representatives :

Prof. K. R. RAMANATHAN (Asia-India).
Prof. S. MANCZARSKI (Europe-Asia).
Prof. C. A. ONWUMECHILLI (Africa).
Prof. J. G. ROEDERER [1] (Latin and Central America).

Ex-Officio :

Secretary General of I.C.S.U. : Prof. D. BLASKOVIC.
Treasurer of I.C.S.U. } Ing. Gén. G. LACLAVÈRE (Member of Publications and Finance Sub-Committees).
Secretary General of C.I.G. }
Executive Secretary of C.O.S.P.A.R. : Mr. M. GAZIN.

Secretary of the I.Q.S.Y. Committee : Dr. C. M. MINNIS.

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[1] August 1963 to August 1964.

NATIONAL PARTICIPATION IN THE I.Q.S.Y.

Argentine
Australia
Austria
Belgium
Bolivia
Brazil
Bulgaria
Burma
Canada
Ceylon
Chile
Colombia
Congo Rep. (Léop.)
Cuba
Czechoslovakia
Denmark
East Africa
Ethiopia
Finland
France
German Dem. Rep.
Germany, Fed. Rep. of
Ghana
Greece
Guatemala
Hungary
Iceland
India
Indonesia
Iran
Iraq
Ireland
Israel
Italy
Jamaica
Japan
Korea, Dem. Rep.
Korea, Rep.
Laos
Malagasy Rep.
Mexico
Mongolia
N. Rhodesia
Netherlands
New Zealand
Nigeria
Norway
Pakistan
Peru
Philippines
Poland
Portugal
Rumania
Sénégal
Sierra Leone
South Africa
S. Rhodesia
Spain
Sweden
Switzerland
Taiwan (Rep. of China)
Thailand
United Arab Rep.
United Kingdom
U. S. A.
U. S. S. R.
Venezuela
Viet-Nam, Dem. Rep.
Viet-Nam, Rep.
Yugoslavia

RECORDS OF SUDDEN IONOSPHERIC DISTURBANCES

Miss J. Virginia Lincoln has sent copies of the following letter to those known to be observing Sudden Ionospheric Disturbances. Others who are interested may wish to supply copies of their records to the Centres mentioned.

World Data Center A for Solar Activity, S.I.D.
Central Radio Propagation Laboratory
National Bureau of Standards
Boulder, Colorado 80301
U. S. A.

July 21, 1964

Dear Colleague :

Resolution 6 of the Solar Activity Working Group for I.Q.S.Y. was adopted at the Rome 1963 meeting as follows :

« Records of S.I.D. for selected events during I.Q.S.Y. should be contributed to the World Data Centers by the collaborating stations, in the form of copies of their records, when these are requested ».

In accordance with the resolution, it is requested that copies of your original records covering the S.I.D. events of March 16, 1964 beginning at 0446 UT and 1553 UT be furnished to each of the three World Data Centers.

World Data Center A for Solar Activity, S.I.D.,
Central Radio Propagation Laboratory,
Attn : 582.60 J. V. LINCOLN,
National Bureau of Standards,
Boulder, (Colorado), U. S. A. 80301.

World Data Center B for Solar Activity, S.I.D.
Attn : L. KRIVSKY,
Astronomical Institute of Czechoslovak Academy of Sciences,
Observatory Ondrejov, Czechoslovakia.

World Data Center C for Solar Activity, S.I.D.
Attn. : J. H. REID,
Dunsink Observatory, Co. Dublin, Ireland.

Sincerely yours,
J. Virginia LINCOLN.

ABBREVIATED CALENDAR RECORD

May-June 1964

The Abbreviated Calendar Record, is a summary chronological account of solar and geophysical activity and events. It is an abbreviated record, prepared mainly from provisional data reports, and is similar to the Calendar Record compiled for the I.G.Y. and I.G.C.-1959 (*Annals of the I.G.Y.*, Vol. XVI),

and those in preparation by I.U.W.D.S. for subsequent years. It is intended to give a back-ground for the early interpretation of solar-geophysical results of I.Q.S.Y. programs. Since it is compiled from provisional data, it should not be relied on for details of solar and geophysical events in preference to the standard publications such as those listed in *I.Q.S.Y. Instruction Manual*, No. 1, World Days, pp. 34-36. The compilation has been done by the I.Q.S.Y. Reporter for World Days from material assembled by the Deputy Secretary of the I.U.W.D.S. (Miss J. V. LINCOLN, C.R.P.L., Boulder, U. S. A.).

I.Q.S.Y. PROGRAMMES OF PARTICIPATING COUNTRIES

Australia

August 1964

At the IInd I.Q.S.Y. Assembly, it was recommended that the former ionospheric station at Kota Baru (Hollandia) should be reopened. This possibility was the subject of discussions between the Australian Ionospheric Prediction Service and the Indonesian Geophysical Section and it was decided that it would be more practicable to establish a new station at : Vanimo (Lat. 02°42'S ; Long. 141°18'E).

The station began operations in July 1964 and will adhere to Programme B (*I.Q.S.Y. Notes*, No. 3, p. 26). It will continue in operation at least until the end of 1965.

Address : Dr. R. G. GIOVANELLI, C.S.I.R.O. Division of Physics, University Grounds, City Road, Chippendale, N.S.W.

Federal Republic of Germany

The New Station at Tsumeb (S. W. Africa)

On July 31, 1964, the new ionospheric and magnetic station at Tsumeb was opened formally. It is named « Forschungsstation Jonathan Zenneck des Max-Planck-Instituts für Aeronomie » in honour of the late German pioneer in radio, and vice-president of U.R.S.I., Geheimrat Zenneck.

The buildings have a covered area of 1167 m². The antennas are supported by three masts of 120 m, four masts of 60 m, and

eleven masts of 30 m height. At present, vertical incidence measurements of very high quality covering the frequency range 1 to 16 Mc/s are carried out regularly. Oblique incidence pulse transmissions from Lindau sweeping the frequency range 4 to 45 Mc/s are recorded at Tsumeb on a routine basis. Vertical incidence soundings covering the frequency range 0.25 to 4 Mc/s will start in September 1964, and absorption measurements (A1) on two frequencies in October 1964. Subsequently, A3 measurements will commence using a CW transmitter on 3 Mc/s at a distance of 300 km.

The magnetic equipment consists of a set of La Cour instruments for the horizontal and the vertical component and the declineation with photographic recording. It has been provided by the geomagnetic observatory at Hermanus, Cape Province. In addition, two Askania balance with ink recorders are used to give instantaneous information.

Night-glow observations will start late in 1964, and combined D-region observations are planned for 1965.

N.B. This notice was received from the Director of the Max-Planck-Institut für Aeronomie at Lindau, Federal Republic of Germany, Prof. Dr. W. Dieminger.

Southern Rhodesia

August 1964

V. Ionosphere.

An automatically keyed radio transmitter has been installed, at a height of 1500 m above sea level (about 300 m above the surrounding country) at a site 40 km north of Salisbury. The transmitter sends out morse characters (QRA de ZEIAC) 24 hours per day with frequency shift keying (+200 c/s) on a frequency of 50.046 Mc/s with a r.f. power output of 40 watts using an omni-directional vertical aerial (see *I.Q.S.Y. Notes*, No. 8, p. 34). Long distance propagation of the signals via the ionosphere is being studied and reception reports will be welcomed by :

Mr. Ivan Wood, c/o E.S.C., P.O. Box 377, Salisbury, Southern Rhodesia.

COSPAR

Eighth Plenary Meeting and Sixth International Space Science Symposium

C.O.S.P.A.R. has issued the first Circular concerned with the above mentioned Meetings, which will be held in Buenos Aires respectively from May 10 to 21, 1965 and from May 13 to 19 ; 1965.

The Symposium will comprise several parts as follows :

(1) Parts devoted to special topics in the Physical Sciences

Topic 1. Galactic and Extragalactic Space Research, sponsored jointly by I.A.U. and C.O.S.P.A.R.,

Topic 2. Problems of the Atmospheric Circulation, sponsored jointly by I.U.G.G. and C.O.S.P.A.R. to which W.M.O. and the American Meteorological Society are being invited to join,

Topic 3. Southern Hemisphere Anomalies. I.U.P.A.P. is being invited to sponsor jointly with C.O.S.P.A.R.,

Topic 4. Optimization of Instrumentation of Space Experiments from the standpoint of Data Processing, sponsored jointly by U.R.S.I. and C.O.S.P.A.R.

(2) Life Sciences and Space Research, sponsored jointly by I.U.B., I.U.B.S., I.U.P.S. and C.O.S.P.A.R.

(3) Latest Significant results.

Further details on both meetings and on submission of papers to the Symposium are available at the C.O.S.P.A.R. Secretariat :

Executive Secretary : Mr. M. J. Gazin, C.O.S.P.A.R. Secretariat, 55, boulevard Malesherbes, Paris 8e, France.

National Activities

C.O.S.P.A.R. has published a special issue of the *C.O.S.P.A.R. Information Bulletin* (No. 19, October 1964) containing twenty five Reports of National Institutions on Space Research activities presented at the Seventh Plenary Meeting of C.O.S.P.A.R., Florence, Italy, May 1964.

SCIENTIFIC COMMITTEE ON ANTARCTIC RESEARCH (SCAR)

Upper atmosphere physics programme

(Abstract from *S.C.A.R. Bulletin*, nº 18, September 1964)

Ionosphere.

(*a*) Vertical incidence sounding. The programme should follow the principles suggested in the 1958 Edinburgh report of the U.R.S.I.-A.G.I. Committee. At least two stations on the Antarctic continent should be Class F (full) and the remainder should be Class P (patrol) stations and as many as possible should be continued for at least another half solar cycle.

(*b*) Special observations. (1) Measurements of atmospheric radio noise should be continued for a full solar cycle at a minimum of two stations. (2) Special studies should be made on whistlers and very low frequency emissions, absorption and scatter and low-level echoes which may be peculiar to the southern auroral zone or polar cap. These studies should be co-ordinated with special studies in other disciplines concerning the high atmosphere.

Aurora and airglow.

(*a*) The morphology of visual and sub-visual auroras, specific auroral and airglow emissions, and HF radio scattering regions. Location, shape and structural details of the southern auroral zone.

(*b*) The sources of energy producing geomagnetic and ionospheric disturbances, auroras and airglow in the Antarctic regions.

(*c*) The nature of the agencies causing excitation of auroral and airglow emission.

(*d*) The composition and physical state of the upper atmosphere.

(e) Search for, and explanation of, peculiarities in the space and time distribution of auroral and airglow features characteristic of the southern hemisphere.

Observational programmes should continue at stations well distributed in Antarctic regions using the several techniques available, such as visual observation, all-sky and parallatic photography, and photometric, spectrographic and radar techniques.

Cosmic rays.

(*a*) Sources and mechanism of generation of cosmic rays.

(*b*) Cause of changes of cosmic ray intensity which appear to be associated with changes in the distribution of matter and/or magnetic fields in interplanetary space.

(*c*) Form of the geomagnetic field at great distances from the earth .

These should be the subject of long-term observations from well-distributed stations.

General comments.

Attention is drawn to the possibility of gaining new information on the geomagnetic field in regions far from the earth by comparing Arctic and Antarctic observations on VLF radio emissions, auroras and cosmic ray variations. Such comparisons may also contribute to understanding the mechanism of production of auroras. This possibility should be considered before fixing the positions of any new Antarctic stations.

C. C. I. R.

Réunions Préliminaires de Commissions d'Etudes

Les Commissions d'Etudes ci-après tiendront des réunions intérimaires à l'adresse « Les Beaux-Arts », avenue de Monte Carlo, Monaco, aux dates indiquées :

— Commission d'Etudes IV — Systèmes spatiaux (Rapporteur principal : Prof. I. RANZI) du 10 février au 2 mars 1965.

— Commission d'Etudes VIII — Contrôle international des émissions (Rapporteur principal : Mr. G. S. TURNER) du 10 au 23 février 1965.

— Commission d'Etudes IX — Faisceaux hertziens (Rapporteur principal : Mr. E. DIETRICH) du 24 février au 12 mars 1965.

— Commission d'Etudes VII — Fréquences étalon et signaux horaires (Rapporteur principal : Mr. B. DECAUX) du 3 au 12 mars 1965.

Interim Study Group Meetings

The following C.C.I.R. Study Groups will hold interim meetings at « Les Beaux Arts », avenue de Monte Carlo. Monte-Carlo, Monaco, at the following dates :

— Study Group IV — Space systems (Chairman : Prof. I. RANZI) February 10-March 2, 1965.

— Study Group VIII — International monitoring (Chairman : Mr. G. S. TURNER) February 10-23, 1965.

— Study Group IX — Radio relay systems (Chairman : Mr. E. DIETRICH) February 24-March 12, 1965.

— Study Group VII — Standard frequencies and time signals (Chairman : Mr. B. DECAUX) March 3-12, 1965.

Xe Assemblée Plénière, Genève, 1963

Les documents ci-après viennent d'être publiés :

Vol. VI. — Liste des participants. Rapports à l'Assemblée Plénière, Résolutions d'ordre général, Siège de la XIe Assemblée Plénière, Participation aux travaux du C.C.I.R. Commissions d'Etudes du C.C.I.R., Commissions d'Etudes Mixtes, Liste des textes du C.C.I.R., Liste des Documents.

Vol. VII — Procès-verbaux des séances plénières.

Rapport 322. — Répartition mondiale et caractéristiques des bruits atmosphériques.

Xth Plenary Assembly, Geneva, 1963

The following publications have been issued :

Vol. VI. — List of participants, Reports to the Plenary Assembly, Resolutions of general nature, Place of the XIth Plenary, Participation in the work of C.C.I.R., Study Groups of the C.C.I.R., Joint Study Groups, List of texts of the C.C.I.R., List of documents.

Vol. VII. — Minutes of plenary meetings.

Report 322. — World distribution and characteristics of radio noise.

Commissions d'Etudes

Commissions d'études du C.C.I.R.

Dans l'intervalle qui sépare deux Assemblées plénières, les travaux du C.C.I.R. sont actuellement effectués par les quatorze Commissions d'études suivantes :

COMMISSION D'ÉTUDES I

(*Emetteurs*)

MANDAT :

1. Etude et présentation de propositions sur les questions relatives aux émetteurs ; de façon générale, synthèse et coordination de

toutes propositions visant à l'utilisation rationnelle et économique du spectre des fréquences radioélectriques.

2. Etude des rayonnements non essentiels des installations médicales, scientifiques et industrielles.

Rapporteur principal : Colonel J. LOCHARD (France).

Vice-Rapporteur principal : Professeur S. RYZKO (R. P. de Pologne).

COMMISSION D'ÉTUDES II

(Récepteurs)

MANDAT :

Détermination du choix et de l'importance pratique des différentes caractéristiques des récepteurs. Mesure de ces caractéristiques et relevé des valeurs typiques pour les différentes classes d'émission et les divers services. Recherche des améliorations à apporter aux récepteurs en vue de résoudre les problèmes rencontrés dans l'exploitation des radiocommunications.

Rapporteur principal : M. P. DAVID (France).

Vice-Rapporteur principal : M. Y. PLACE (France).

COMMISSION D'ÉTUDES III

(Systèmes utilisés dans le service fixe)

MANDAT :

1. Etude des questions relatives aux systèmes radioélectriques complets utilisés dans le service fixe (à l'exclusion des systèmes de relais radioélectriques) et dans les services connexes, avec leur appareillage terminal associé, et y compris les systèmes utilisant le mode de propagation par diffusion dans l'ionosphère, même s'ils fonctionnent sur des fréquences supérieures à 30 MHz.
2. Etude des applications pratiques de la théorie des communications.

Rapporteur principal : Dr. H. C. A. van DUUREN (Pays-Bas).

Vice-Rapporteur principal : Dr. S. NAMBA (Japon).

Commission d'études IV

(Systèmes utilisés dans les télécommunications spatiales et radioastronomie)

Mandat :

Etude des questions techniques relatives aux systèmes de télécommunications avec et entre les points de l'espace, et à la radioastronomie.

Rapporteur principal : Professeur I. Ranzi (Italie).
Vice-Rapporteur principal : M. W. Klein (Suisse).

Commission d'études V

(Propagation à la surface de la terre et dans les régions non ionisées de l'atmosphère)

Mandat :

Etude de tous les problèmes se rapportant à la propagation des ondes radioélectriques à la surface de la terre et dans les régions non ionisées de l'atmosphère, dans la mesure où ces problèmes intéressent les radiocommunications.

Rapporteur principal : Dr. R. L. Smith-Rose, C. B. E. (Royaume-Uni).
Vice-Rapporteur principal : Dr. A. Kalinin (U. R. S. S.).

Commission d'études VI

(Propagation ionosphérique)

Mandat :

Etude de toutes les questions relatives à la propagation des ondes dans l'ionosphère, dans la mesure où elles intéressent les radiocommunications.

Rapporteur principal : M. D. K. Bailey (Etats-Unis).
Vice-Rapporteur principal : Dr. E. K. Smith (Etats-Unis).

Commission d'études VII

(Fréquences étalon et signaux horaires)

Mandat :

Organisation d'un service mondial d'émission de fréquences étalon et de signaux horaires. Amélioration de la précision des mesures.

Rapporteur principal : M. B. DECAUX (France).
Vice-Rapporteur principal : Professeur M. BOELLA (Italie).

COMMISSION D'ÉTUDES VIII

(Contrôle international des émissions)

MANDAT :

Etude des problèmes techniques et d'exploitation dont la solution dépend principalement de considérations d'ordre technique relatives aux stations de contrôle participant au service de contrôle international des émissions en ce qui concerne :

1. en collaboration avec l'I.F.R.B., les moyens propres à vérifier et signaler les brouillages nuisibles, selon les dispositions de la Convention internationale des télécommunications et du Règlement des radiocommunications ;
2. la mise au point de méthodes et de procédures à utiliser dans les stations de contrôle en vue de déterminer l'occupation du spectre radioélectrique, les caractéristiques des émissions et de procéder à la localisation des sources d'émission par des méthodes radiogoniométriques ;
3. les spécifications relatives aux choix des emplacements, des antennes et autres équipements et appareillages.

Rapporteur principal : M. G. S. TURNER (Etats-Unis).
Vice-Rapporteur principal : M. Amaro VIEIRA (Portugal).

COMMISSION D'ÉTUDES IX

(Faisceaux hertziens)

MANDAT :

Etude, sous tous les aspects, des faisceaux hertziens et de l'appareillage fonctionnant sur des fréquences supérieures à 30 MHz environ, y compris les faisceaux hertziens employant le mode de propagation par diffusion troposphérique.

Raporteur principal : M. E. O. DIETRICH (R. F. d'Allemagne).
Vice-Rapporteur principal : M. J. H. H. MERRIMAN (Royaume-Uni).

Commission d'études X
(Radiodiffusion)

Mandat :

Etude des aspects techniques de l'émission et de la réception de la radiodiffusion sonore (à l'exception de la radiodiffusion tropicale), ainsi que des normes d'enregistrement et de reproduction du son destinées à faciliter l'échange international des programmes ; étude des aspects techniques de l'enregistrement de la télévision en liaison avec la Commission d'études XI.

Rapporteur principal : M. A. Prose Walker (Etats-Unis).

Vice-Rapporteur principal : Dr. H. Rindfleisch (R. F. d'Allemagne.)

Comission d'études XI
(Télévision)

Mandat :

Techniques de la télévision.

Rapporteur principal : M. E. Esping (Suède).

Vice-Rapporteur principal : M. G. Hansen (Belgique).

Commission d'études XII
(Radiodiffusion tropicale)

Mandat :

Normes pour assurer un service de bonne qualité dans la zone tropicale pour les systèmes de radiodiffusion tropicale ; brouillage dans les bandes partagées ; puissance permettant d'assurer un service acceptable ; spécification d'antennes appropriées à la radiodiffusion tropicale à courte distance ; conditions optimales pour l'utilisation des bandes de fréquences employées par la radiodiffusion dans la zone tropicale ; autres questions connexes.

Rapporteur principal : M. N. V. Gadadhar (Inde).

Vice-Rapporteur principal : sera élu lors de la prochaine réunion de la Commission d'études XII.

Commission d'études XIII
(Services mobiles)

Mandat :

Etude des questions techniques et d'exploitation intéressant les services mobiles aéronautique, maritime et terrestre, le service

de radiolocalisation et le service de radionavigation (à l'exception des services utilisant des satellites artificiels, lesquels relèvent actuellement du mandat de la Commission d'études IV).

Rapporteur principal : M. G. H. M. GLEADLE (Royaume-Uni).
Vice-Rapporteur principal : M. N. J. SOBERG (Norvège).

COMMISSION D'ÉTUDES XIV

(*Vocabulaire*)

MANDAT :

Etude, en coopération avec les autres Commissions d'études et, s'il y a lieu, avec le C.C.I.T.T., des questions qui touchent aux sujets suivants pour le domaine des radiocommunications : vocabulaire, répertoire des définitions, liste des symboles graphiques et littéraux, autres moyens d'expression, classification systématique, unités de mesure, etc.

Rapporteur principal : M. R. VILLENEUVE (France).
Vice-Rapporteur principal : M. A. FERRARI-TONIOLO (Italie).

Study Groups

C.C.I.R. Study Groups

The work of the C.C.I.R. between Plenary Assemblies is at present carried out by fourteen Study Groups, which are :

STUDY GROUP I

(*Transmitters*)

TERMS OF REFERENCE :

1. To make specific studies and proposals in connection with radio transmitters and generally to summarize and co-ordinate proposals for the rational and economical use of the radio spectrum.
2. To study spurious radiation from medical, scientific and industrial installations.

Chairman : Colonel J. LOCHARD (France).
Vice-Chairman : Professor S. RYZKO (P. R. of Poland).

Study Group II

(Receivers)

Terms of reference :

The selection and study of the more important characteristics of the various types of receivers. Measurement of these characteristics of receivers and tabulation of typical values for the different classes of emission and the different services. Investigations of improvement that might be made in receivers to solve problems encountered in radiocommunication.

Chairman : Mr. P. David (France).
Vice-Chairman : Mr. Y. Place (France).

Study Group III

(Fixed service systems)

Terms of reference :

1. To study questions relating to complete systems for the fixed and allied services and terminal equipment associated therewith (excluding radio-relay systems). Systems using the so-called ionospheric-scatter mode of propagation, even when working on frequencies above 30 Mc/s, are included.
2. To study the practical application of communication theory.

Chairman : Dr. H. C. A. van Duuren (Netherlands).
Vice-Chairman : Dr. S. Namba (Japan).

Study Group IV

(Space systems and radioastronomy)

Terms of reference :

To study technical questions regarding systems of telecommunication with and between locations in space.

Chairman : Professor I. Ranzi (Italy).
Vice-Chairman : Mr. W. Klein (Switzerland).

STUDY GROUP V

(*Propagation over the surface of the earth and through the non-ionized regions of the atmosphere*)

TERMS OF REFERENCE :

To study all matters relating to the propagation of radio waves over the surface of the earth and through the non-ionized regions of the atmosphere in so far as they concern radio-communication.

Chairman : Dr. R. L. SMITH-ROSE, C. B. E. (United Kingdom).
Vice-Chairman : Dr. A. KALININ (U. S. S. R.).

STUDY GROUP VI

(*Ionospheric propagation*)

TERMS OF REFERENCE :

To study all matters relating to the propagation of radio waves through the ionosphere, in so far as they concern radiocommunication.

Chairman : Mr. D. K. BAILEY (U. S. A.).
Vice-Chairman : Dr. E. K. SMITH (U. S. A.).

STUDY GROUP VII

(*Standard-frequencies and time-signals*)

TERMS OF REFERENCE :

Organization of a world-wide service of standard-frequency and ime-signal emissions. Improvement of measurement accuracy.

Chairman : Mr. B. DÉCAUX (France).
Vice-Chairman : Professor M. BOELLA (Italy).

STUDY GROUP VIII

(*International monitoring*)

TERMS OF REFERENCE :

To study technical and operating problems, the solution of which depends principally on considerations of a technical character relating to monitoring stations participating in the international monitoring system with regard to :

1. in collaboration with the I.F.R.B., ways in which harmful interference can be verified and reported, in accordance with

the International Telecommunication Convention and the Radio Regulations ;

2. the development of methods and procedures to be used by monitoring stations in determining occupancy of the radio-frequency spectrum and the characteristics of emissions and in locating the source of an emission by direction-finding techniques ;
3. specifications regarding the selection of sites, antennae and other equipment and instrumentation.

Chairman : Mr. G. S. Turner (U. S. A.).

Vice-Chairman : Mr. M. Amaro Vieira (Portugal).

Study Group IX

(*Radio-relay systems*)

Terms of reference :

To study all aspects of radio-relay systems and equipment operating at frequencies above about 30 Mc/s, including systems using the tropospheric-scatter mode of propagation.

Chairman : Mr. E. O. Dietrich (Federal Republic of Germany).

Vice-Chairman : Mr. J. H. H. Merriman (United Kingdom).

Study Group X

(*Broadcasting*)

Terms of reference :

To study the technical aspects of transmission and reception in the sound broadcasting service (except for tropical broadcasting), including standards of sound recording and sound reproduction to facilitate the international exchange of programme ; to study also the technical aspects of video recording in liaison with Study Group XI.

Chairman : Mr. A. Prose Walker (U. S. A.).

Vice-Chairman : Dr. H. Rindfleisch (Federal Republic of Germany).

Study Group XI

(Television)

Terms of reference :

Technical aspects of television.

Chairman : Mr. E. Esping (Sweden).

Vice-Chairman : Mr. G. Hansen (Belgium).

Study Group XII

(Tropical broadcasting)

Terms of reference :

To study standards required for good quality service in the tropical zone, and for tropical broadcasting systems ; interference in the shared bands ; power requirements for acceptable service ; design of suitable antennae for short-distance tropical broadcasting ; optimum conditions for the utilization of frequency bands used for broadcasting in the tropical zone ; other associated questions.

Chairman : Mr. N. V. Gadadhar (India).

Vice-Chairman : Open (to be elected by next meeting of Study Group XII).

Study Group XIII

(Mobile services)

Terms of reference :

To study technical and operating questions concerning the aeronautical, maritime, land mobile, radiolocation and radionavigation services (except services that involve the use of earth satellites which, at present, are the concern of Study Group IV).

Chairman : Mr. G. H. M. Gleadle (United Kingdom).

Vice-Chairman : Mr. J. Soberg (Norway).

Study Group XIV

(Vocabulary)

Terms of reference :

To study, in collaboration with the other Study Groups and, if necessary, with the C.C.I.T.T., the radio aspect of the following : vocabulary of terms and lists of definitions, lists of letter and graphical symbols and other means of expression, systematic classification, measurement units, etc.

Chairman : Mr. R. Villeneuve (France).

Vice-Chairman : Mr. A. Ferrari-Toniolo (Italy).

I. C. S. U.

La 2e réunion du Comité Exécutif

(Reprint from *I.C.S.U. Review of the World Science*, Vol. 6, nº 3, July 1964)

La 2e réunion du Comité Exécutif de l'I.C.S.U. s'est tenue, sous la présidence du Dr. H. W. Thompson, dans les locaux de la Royal Society à Londres, à Burlington House, du 15 au 17 juin 1964.

Avant les séances plénières, différents groupes s'étaient réunis pendant le week-end, tels que le Comité directeur, qui a mis au point l'ordre du jour, le Comité des finances, qui a examiné avec le Trésorier le budget 1965, le Groupe permanent de la libre circulation des hommes de science, qui a considéré les problèmes inhérents aux voyages des hommes de science de la République démocratique allemande et en a fait rapport au Comité Exécutif.

Ce dernier a commencé ses travaux le 15 juin après une allocution de bienvenue de Sir Howard Florey, Président de la Royal Society.

Etaient présents :

Membres : Dr. H. W. Thompson (Président), Prof. D. Blaskovic (Secrétaire Général), Ing. Gén. G. R. Laclavère (Trésorier), Prof. S. Horstadius (Président Sortant), Dr. Harrison Brown (Vice-Président), Prof. K. Chandrasekharan (Vice-Président), Dr. J. M. Harrison (Vice-Président), Prof. I. Malecki (Vice-Président), Prof. M. I. Agoshkov, Prof. J. D. Bernal, Prof. H. Boesch, Prof. J. W. Duyff, Prof. M. Florkin, Dr. R. V. Garcia, Prof. J. Kaplan, Prof. W. Klemm, Dr. D. F. Martyn, Prof. G. Polvani, Dr. S. Prawirohardjo, Prof. M. Roy, Mr. D. H. Sadler, Dr. R. L. Smith-Rose, Sir Gordon Sutherland, Prof. H. Taton, Prof. H. C. Waddington, Prof. J. T. Wilson, Dr. J. Yanney-Ewusie (excusé : Prof. Y. Fujioka).

Observateurs : Prof. W. J. G. Beynon (I.Q.S.Y.), Prof. P. Fleury (Enseignement des Sciences), Prof. G. D. Garland (Recherche Atmosphérique), Prof. N. Herlofson (Libre circulation), Dr. D. C. Martin (Royal Society), Prof. A. Marussi (Italie), Dr. A. Nyberg (O.M.M.), Dr. A. Perez-Vitoria (U.N.E.S.C.O.), Mme J. Poyen (Résumés analytiques), Prof. M. Stone (Enseignement des Sciences) ; Dr. Tha Hla (U.N.E.S.C.O.).

Membres du Secrétariat : Mr. A. E. Decae, Mr. F. W. G. Baker, Dr. C. M. Minnis and Mr. A. M. Rao.

Les principales décisions du 2e Comité Exécutif ont été les suivantes :

1) *Admission provisoire* de l'Académie des Sciences de Cuba comme Membre national (1).

Admission du Conseil national de la recherche de La Jamaique comme Associé national.

2) *Adoption* d'une requête du Groupe de travail permanent de la libre circulation des hommes de science (Herlofson rapporteur, Agoshkov, Brown, Blaskovic, Lecomte, Martin) adressée à la National Academy of Sciences de Washington, à la Royal Society de Londres et à l'Académie des Sciences de Paris, leur demandant d'intervenir auprès de leurs gouvernements respectifs afin que soit attirée l'attention du Bureau allié des Voyages de Berlin Ouest sur l'interprétation à donner aux récentes instructions de l'O.T.A.N. concernant les voyages des hommes de science, de telle sorte que soient rendus possibles les déplacements des hommes de science se rendant à des réunions scientifiques internationales, tant à titre individuel qu'à titre de membre d'une délégation d'institution scientifique.

3) *Création* d'un Comité ad hoc (Thompson rapporteur) chargé d'examiner les modalités selon lesquelles pourrait être modifiée la structure du Comité dirigeant le Conseil afin de lui permettre de faire face aux exigences de l'accroissement rapide des activités scientifiques.

4) *Création* d'un groupe de travail permanent (Harrison Brown rapporteur) chargé d'étudier les modalités d'extension des « Tables critiques ».

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(1) Les admissions définitives des Membres ne peuvent être prononcées que par l'Assemblée Générale.

5) *Création d'un Comité Scientifique de l'Eau* chargé d'étudier sous tous ses rapports le problème des ressources internationales en eau, d'élaborer et de réaliser un programme de recherche sur ce sujet et d'agir en tant qu'organe consultatif, au nom de l'I.C.S.U., auprès de l'U.N.E.S.C.O. et d'autres organismes intéressés (O.M.M., O.M.S., F.A.O., etc.) pour toutes questions concernant la Décade hydrologique internationale. Le Comité devra collaborer avec toutes les Unions intéressées, ainsi qu'avec d'autres organismes, en particulier avec les Comités compétents de l'Association internationale d'Hydrologie scientifique, et des Unions de Géodésie et Géophysique, de Géographie et de Géologie ainsi qu'avec le Programme Biologique International, et pourra créer à cet effet des groupes de travail spécialisés pour chaque domaine particulier.

L'activité du Comité sera financée principalement par des contributions volontaires des Membres nationaux de l'I.C.S.U., complétées par un subside de l'I.C.S.U. ; une subvention pourra être demandée à l'U.N.E.S.C.O. Afin que les travaux de ce Comité puissent débuter aussitôt que possible, le Comité Exécutif a demandé au Prof. A. Volker de vouloir bien le présider, et aux dirigeants de l'I.C.S.U. de désigner les autres membres du Comité, en prenant en considération les opinions exprimées lors de la réunion de Londres.

6) *Dissolution de la Commission inter-unions des Sciences atmosphériques*, conformément au vœu exprimé par cette Commission lors de sa réunion de Florence en mai 1964. Les attributions de cette Commission, créée en réponse à la résolution 1802 des Nations Unies du 14 décembre 1962, ont été confiées à l'Union de Géodésie et Géophysique, en collaboration étroite avec le Groupe de travail n° 6 de C.O.S.P.A.R. et avec l'Organisation Météorologique Mondiale.

7) *Création* d'un Groupe de travail du Bureau des résumés analytiques, chargé d'étudier les modalités d'un élargissement des fonctions de ce bureau et de faire des recommandations au Comité Exécutif à cet effet, étant bien entendu qu'aucun retard ne devra être apporté à l'exécution de toute recommandation que le Groupe considérerait particulièrement urgente.

8) *Création* d'un Groupe de travail (Harrison rapporteur, Kaplan, Klemm) chargé de conduire des consultations avec les

organismes de l'I.C.S.U. s'intéressant à la géochimie, ainsi qu'avec d'autres géochimistes éminents, en vue de recommander au Comité Exécutif toute action susceptible de faciliter les activités internationales en Géochimie.

9) *Création* d'un Groupe de travail des Lacs artificiels en Afrique chargé de préparer un programme précis des recherches rendues possibles par la création de nouvelles retenues d'eau, en collaboration avec le Comité Spécial du Programme Biologique et le Comité Scientifique de l'Eau.

10) *Demande* à la Commission inter-unions de l'Enseignement des Sciences de préparer un programme de travail précis et définitif devant comprendre la coordination des activités des différentes unions scientifiques dans ce domaine et l'étude, à l'échelon international, du problème de la coordination et des relations mutuelles des différents enseignements scientifiques ; cette requête était accompagnée d'une demande au Comité des finances d'examiner la possibilité de l'octroi d'un subside de l'I.C.S.U. à cette Commission.

11) *Elargissement des attributions* de la Commission inter-unions des allocations de fréquence, afin qu'elle acquière la possibilité d'assurer la protection de toutes les bandes de fréquence propres aux différentes disciplines scientifiques, sans se limiter à la radioastronomie et à la recherche spatiale (ont été mentionnées en particulier les fréquences utilisées pour les mesures de distance par procédés électromagnétiques).

12) *Acception* pour le Conseil de devenir l'organe consultatif de l'U.N.E.S.C.O., à l'invitation de ce dernier, et de participer à l'élaboration des programmes de son département des sciences naturelles.

13) *Choix* de Munich pour la 3e réunion du Comité Exécutif (avril 1965) et de Bombay pour la 4e réunion du Comité Exécutif et la 11e Assemblée Générale de l'I.C.S.U. (janvier 1966).

Le Président a levé la séance le 17 juin à 18 heures après avoir adressé les remerciements du Conseil à la Royal Society pour sa généreuse hospitalité.

List of I. C. S. U. Officers

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Prof. K. CHANDRASEKHARAN, Tata Institute of Fundamental Research, Colaba, Bombay 5, India.

Dr. Harrison BROWN, Foreign Secretary, National Academy of Sciences, 2101 Constitution Avenue, Washington 25, D.C., U. S. A.

Prof. I. MALECKI, Deputy Secretary General, Polish Academy of Sciences, Palace of Culture and Sciences, Warsaw, Poland.

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Prof. G. POLVANI, Presidente, Consiglio Nazionale delle Ricerche, Piazzale delle Scienze 7, Rome, Italy.

Prof. S. PRAWIROHARDJO, President, Madjelis Ilmu Pengetahuan, Indonesia, Post Box 250, Djakarta, Indonesia.

Dr. J. T. WILSON, Director, Institute of Earth Sciences, University of Toronto, Toronto, Ontario, Canada.

Dr. J. YANNEY-EWUSIE, Secretary, Ghana Academy of Sciences, P.O. Box M-32, Accra, Ghana.

UNION REPRESENTATIVES :

I.A.U. : Prof. J.-C. PECKER, Observatoire de Nice, Le Mont-Gros, Nice, France.

I.U.G.G. : Dr. J. KAPLAN, Department of Physics, University of California, Los Angeles 24, Cal. U. S. A.

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I.U.P.A.P. : Sir Gordon SUTHERLAND, The Master's Lodge, Emmanuel College, Cambridge, U. K.

I.U.B.S. : Prof. C. H. WADDINGTON, Institute of Animal Genetics, West Mains Road, Edinburgh 9, U. K.

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I.U.Cr. : Prof. J. D. BERNAL, Department of Physics, Birkbeck College, Malet Street, London, W.C. 1. U. K.

I.U.T.A.M. : Prof. M. ROY, 55, Boulevard Malesherbes, Paris 8e, France.

I.U.H.P.S. : Prof. R. TATON, 64, Rue Gay-Lussac, Paris 5e, France.

I.M.U. : Prof. K. CHANDRASEKHARAN, Tata Institute of Fundamental Research, Colaba, Bombay 5, India.

I.U.P.S. : Dr. J. W. DUYFF, Physiologisch Laboratorium der Rijksuniversiteit te Leiden, Wassenaarseweg 62, Leiden, Netherlands.

I.U.B. : Prof. M. Florkin, Laboratoire de Biochimie, Université de Liège, 17, Place Delcour, Liège, Belgium.

I.U.G.S. : Dr. J. M. Harrison, Geological Survey of Canada, Ottawa, Canada.

Names and Addresses

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November, 1964

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President : Prof. P. Swings, Directeur de l'Institut d'Astrophysique, Université de Liège, Cointe-Sclessin (Liège), Belgique.

Secretary-General : Prof. J.-C. Pecker, Observatoire de Nice, Le Mont-Gros, Nice, France.

I.U.G.G. :

President : Prof. J. Kaplan, Department of Physics, University of California, Los Angeles 24, California, U. S. A.

Secretary-General : Prof. G. D. Garland, Geophysics Laboratory, University of Toronto, Toronto 5, Ontario, Canada.

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President : The Rt. Hon. Lord Todd, University Chemical Laboratory, Lensfield Road, Cambridge, U. K.

Secretary-General : Dr. R. Morf, c/o Hoffman-La Roche Co. Ltd,. Grenzacherstrasse 124, 4002 Basle, Switzerland.

U.R.S.I. :

President : Prof. I. Koga, 254, 8-chome, Kami-Meguro, Tokyo, Japan.

Secretary-General : Ing. E. Herbays, 7, Place Emile Danco, Bruxelles 18, Belgique.

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President : Prof. L. Néel, Institut Fourier, Place du Doyen-Gosse, Grenoble, Isère, France.

Secretary-General : Prof. C. C. Butler, Physics Department, Imperial College, Prince Consort Road, London, S. W. 7. U. K.

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President : Prof. C. H. WADDINGTON, Institute of Animal Genetics, West Mains Road, Edinburgh 9, Scotland, U. K.

Secretary-General : Prof. D. S. FARNER, Dept. of Zoophysiology, Washington State University, Pullman, Washington, U. S. A.

I.G.U. :

President : Prof. S. P. CHATTERJEE, Calcutta University, Dept. of Geography, 35 Ballygunge Circular Rd., Calcutta 19, India.

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UNESCO

Une politique internationale de la science

Extrait de la *Chronique de l'UNESCO*, Vol. X, n° 7, juillet 1964

Le projet de programme de l'U.N.E.S.C.O. pour 1965-66 se caractérise avant tout par la volonté de donner à la science une impulsion comparable à celle qui a été imprimée à l'éducation en 1960, avec la conviction que dans l'un et l'autre domaines il est urgent de fournir une aide systématique de grande envergure aux pays en voie de développement. Comme le Directeur général le rappelait il y a peu de temps encore, « la science n'est pas seulement une lutte purement intellectuelle contre l'ignorance ; c'est aussi — mais à condition de s'en servir avec suffisamment de clairvoyance, de détermination et de ressources — l'éradication effective de la faim, de la misère et de la pauvreté ».

Une telle conception du programme ne se fonde pas seulement sur les décisions prises par la Conférence générale de l'Organisation lors de ses sessions les plus récentes. Elle résulte aussi de certaines des principales conclusions de la conférence que les Nations Unies convoquèrent à Genève en février 1963 ; ce fut, pour l'U.N.E.S.C.O., l'occasion de définir et de préciser les objectifs d'une politique internationale de la science par rapport aux problèmes que posent la croissance économique et le progrès social des Etats en voie de développement indépendant.

En conséquence, le programme pour les deux années à venir a été divisé en trois parties complémentaires : développement de l'infrastructure scientifique des Etats membres ; coopération internationale pour le progrès de la recherche et de la documentation scientifiques ; application de la science et de la technique au développement. Au financement des projets relatifs à cette application sont destinés plus des deux tiers de l'ensemble des crédits, y compris les ressources extrabudgétaires, que l'on se propose d'affecter aux

sciences exactes et naturelles. Mais l'U.N.E.S.C.O. n'en continuera pas moins à jouer son rôle traditionnel en matière de coopération scientifique internationale.

La coopération internationale pour le progrès de la recherche

« La science est en elle-même une société, déclarait l'année dernière à Genève, le Directeur général, une société qui comporte ceci de remarquable qu'elle a vocation universelle, et ainsi prépare et préfigure l'humanité de demain ». Depuis sa création, l'U.N.E.S.C.O. a toujours considéré la coopération scientifique internationale comme l'un des moyens les plus efficaces de promouvoir la paix universelle. En 1965-1966, on intensifiera les activités que l'Organisation exerce traditionnellement pour favoriser cette coopération dans le domaine de la recherche et de la documentation, notamment en ce qui concerne les sciences fondamentales, les sciences de la terre et les sciences de la vie.

La mise en œuvre de cette seconde partie du programme sera assurée principalement avec le concours des organisations scientifiques internationales non gouvernementales et, en particulier, de celles qui constituent le Conseil international des unions scientifiques (I.C.S.U.). On continuera d'accorder une aide financière à ces unions, afin de renforcer l'action internationale concertée pour le développement des recherches en mathématiques, en physique, en géologie, en hydrologie et en océanographie.

Un plan à long terme a commencé d'être appliqué en 1963-1964 en vue d'apporter des solutions pratiques aux multiples problèmes qui se posent à propos de la documentation scientifique et technique. Durant le prochain exercice, le Secrétariat contribuera à la création de centres de traduction et de conseils de coordination chargés d'assurer le rassemblement et l'échange de données à l'échelon régional et international. Deux cours de formation et un stage d'études auront lieu, les uns en Europe et l'autre en Afrique.

En ce qui concerne les sciences fondamentales, on se propose de collaborer avec l'Organisation européenne pour la recherche nucléaire, installée à Genève, avec le Centre international de calcul, fixé à Rome, et de participer au fonctionnement du Centre international de physique théorique situé à Trieste. L'U.N.E.S.C.O.

accordera son aide aux centres latino-américains de mathématiques (Buenos Aires), de physique (Rio de Janeiro) et de chimie (Mexico) ; elle favorisera, dans la même région, la création d'un centre des sciences biologiques. Un centre de recherche interdisciplinaire sera établi en Asie, et l'on préparera l'installation de deux instituts de recherches sur les ressources naturelles, l'un en Afrique et l'autre dans les Etats arabes.

L'Organisation continuera de soutenir le programme de recherches astronomiques et géophysiques connu sous le nom d' « Années internationales du soleil calme » ; elle facilitera le développement de travaux de cette nature sur le plan national, grâce à l'envoi d'experts, à l'attribution de bourses et de matériel d'équipement. Une Décennie hydrologique internationale sera ouverte en 1965. L'U.N.E.S.C.O. assurera le secrétariat de cette entreprise de caractère intergouvernemental. Elle recueillera et diffusera des informations sur les recherches, facilitera les contacts entre les spécialistes, accordera une attention particulière à la formation des hydrologues et aidera ses Etats membres à créer ou à renforcer les services appropriés.

L'application de la science et de la technique au développement

Quant à la troisième partie de ce programme, elle vise à permettre l'identification, l'évaluation et la solution des problèmes scientifiques et techniques qui se posent aux Etats membres en voie de développement. Elle se fonde sur l'idée — admise d'un commun accord par les experts qui ont participé à la Conférence de Genève, l'année dernière — qu'une application efficace de la science et de la technique peut accélérer sensiblement le développement économique.

L'intérêt particulier que l'U.N.E.S.C.O. accorde de plus en plus à l'application de la science et de la technique au développement se reflète en outre dans les modifications qui seront apportées à l'organisation de ses activités régionales. Les postes de coopération scientifique, qui ont si clairement prouvé leur utilité, seront renforcés et dotés d'un personnel plus nombreux. Cet effort de décentralisation vise à adapter, aussi étroitement que possible, les entreprises de l'U.N.E.S.C.O. aux conditions existant dans les différentes par-

ties du monde. Désormais, les centres régionaux de science et de technologie assumeront la pleine responsabilité de la mise en œuvre du programme scientifique de l'Organisation dans leur zone d'influence, le siège se bornant à donner une orientation générale à leur action.

Edification du potentiel scientifique et technique de ses Etats membres, mise en œuvre de programmes de recherches scientifiques de portée socio-économique à trois niveaux — national, régional et international — telles sont les tâches principales de l'U.N.E.S.C.O. en matière de science et de technologie au sein du système des Nations Unies. L'exercice 1965-1966 est destiné à marquer une étape décisive dans le développement de cette action.

UNESCO

An international science policy

Abstract from *U.N.E.S.C.O. Chronicle*, Vol. X, nº 7, July 1964

The most striking feature of U.N.E.S.C.O's. draft programme for 1965-66 is the desire to give science the same sort of impetus as was imparted to education in 1960, in the belief that, in science as in education, systematic aid on a large scale must be provided, as a matter of urgency, to the developing countries. As the Director-General recently reiterated, « science is not only a purely intellectual struggle against ignorance ; it is also — provided it is used with sufficient perspicacity, determination and resources — an effective means of overcoming hunger, destitution and poverty ».

Such a conception of the programme does not derive solely from the decisions taken by the General Conference of U.N.E.S.C.O. at its most recent sessions, but also reflects some of the main conclusions of the conference convened by the United Nations at Geneva in February 1963 ; this conference gave U.N.E.S.C.O. the opportunity to define and specify the objectives of an international science policy with regard to the problems arising in connexion with the economic growth and social progress of the independently developing States.

The programme for the next two years is accordingly presented in three complementary parts, concerned respectively with : development of the basic organization of science in Member States ; international co-operation for the advancement of scientific research and documentation ; application of science and technology to development. Over two-thirds of the total funds, including extra-budgetary resources, proposed for the natural sciences programme are engaged in projects concerned with the application of science and technology to development ; but U.N.E.S.C.O. will still continue to play its traditional role with regard to international scientific co-operation.

International co-operation for the promotion of research

As the Director General said last year, in Geneva, « Science is in itself a society — a society which is remarkable in that it has a universal mission and thus prepares and prefigures the mankind of tomorrow ». Ever since its inception, U.N.E.S.C.O. has regarded international co-operation in science as one of the most effective means of promoting universal peace. In 1965-66, U.N.E.S.C.O.'s traditional role in the advancement of such co-operation in scientific research and documentation (particularly in the basic sciences, earth sciences, and life sciences) will be further strengthened.

This second part of the programme will be largely carried out in co-operation with international scientific non-governmental organizations, particularly with those constituting the International Council of Scientific Unions (I.C.S.U.). Financial assistance to unions will continue in order to strengthen international co-operative efforts for the development of research in mathematics, physics, geology, hydrology and oceanography.

In 1963-64, a long-range plan was initiated with a view to providing practical solutions to the many problems arising in connexion with scientific and technical documentation. During the next financial period, the Secretariat will assist in the establishment of translation centres and co-ordinating boards for the collection and exchange of materials at the regional and international level. Two training courses and a seminar will be held, the former in Europe and the latter in Africa.

With regard to the basic sciences, it is proposed to co-operate with the European Centre for Nuclear Research in Geneva and with the International Computation Centre in Rome, and to assist in the operation of the International Centre for Theoretical Physics at Trieste. U.N.E.S.C.O. will provide assistance to the Latin American Centres for Mathematics (Buenos Aires), for Physics (Rio de Janeiro) and for Chemistry (Mexico City) ; it will promote the establishment of a Centre for Biological Sciences in the same region. A multidisciplinary scientific research centre will be established, in Asia and preparatory work will begin for the establishment of two institutes for natural resources research, one in Africa and the other in the Arab States.

The Organization will continue to support the research programme in astronomy and geophysics known as the « International Years of the Quiet Sun »; it will promote the development of astronomical and geophysical work at the national level by sending out experts, awarding fellowships and providing equipment. An International Hydrological Decade will begin in 1965. U.N.E.S.C.O. will provide the secretariat for this inter-governmental programme. It will collect and circulate information concerning research, facilitate contacts among specialists, give special attention to the training of hydrologists, and assist Member States in the creation or strengthening of the appropriate services.

Application of science and technology to development

The third part of the science programme is oriented towards the identification, assessment and solution of scientific and technological problems encountered by developing Member States. It is formulated on the basis of the general consensus reached by the conference held in Geneva last year, that the effective application of science and technology can accelerate economic development to a marked extent.

U.N.E.S.C.O.'s increasing emphasis on the application of science and technology to development is further reflected in the new structure proposed for the Organisation's regional activities. The Science Co-operation Offices, which have so amply proved their usefulness (and which will henceforth be called Regional Offices for Science and Technology), will be strengthened and their staff increased. This trend of decentralization is pursued in order to correlate as closely as possible U.N.E.S.C.O.'s activities with the realities of the different regions. These offices will be given full responsibility for implementation of the U.N.E.S.C.O. science programme within their respective regions, supervision from Headquarters being limited to general policy guidance.

The building up of the scientific and technical potential of its Member States and the implementation, at three levels (national, regional and international), of scientific research programmes with a bearing on social and economic matters, are U.N.E.S.C.O.'s main tasks as regards science and technology within the United Nations system. The financial period 1965-66 is destined to mark a decisive stage in the development of such activities.

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Abréviations — Abbreviations

Pr.	Président President
V. Pr.	Vice-Président Vice-President
Sec.	Secrétaire Secretary
Pr. H.	Président d'honneur Honorary President
M.	Membre Member
M. O.	Membre Officiel Official Member
(I, II, III...VII)	Commission I, II, ...VII
CIG	Comité de l'URSI pour la Coopération Internationale en Géophysique URSI Committee for International Co-operation in Geophysics
SRR	Comité de l'URSI pour les Recherches Radioélectriques dans l'Espace URSI Committee for Space Radio Research
CCIR	Comité de l'URSI pour les travaux du CCIR URSI Committee for CCIR Work
C. N.	Comité National National Committee
IUWDS	Service International des Ursigrammes et des Journées Mondiales International Ursigram and World Days Service
IUCI	Commission Inter-Unions de l'Ionosphère Inter-Union Commission on the Ionosphere
IUCRM	Commission Inter-Unions de Radiométéorologie Inter-Union Commission on Radio Meteorology
IUCSTR	Commission Inter-Unions des Relations Solaires-Terrestres Inter-Union Commission on Solar-Terrestrial Relationships
IUCAF	Commission Inter-Unions pour l'Attribution de Fréquences pour la Radioastronomie et la Science Spatiale. Inter-Union Commission on Frequency Allocations for Radio Astronomy and Space Science

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Abréviations — Abbreviations

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V. Pr.	Vice-Président Vice-President
Sec.	Secrétaire Secretary
Pr. H.	Président d'honneur Honorary President
M.	Membre Member
M. O.	Membre Officiel Official Member
(I, II, III...VII)	Commission I, II, ...VII
CIG	Comité de l'URSI pour la Coopération Internationale en Géophysique URSI Committee for International Co-operation in Geophysics
SRR	Comité de l'URSI pour les Recherches Radioélectriques dans l'Espace URSI Committee for Space Radio Research
CCIR	Comité de l'URSI pour les travaux du CCIR URSI Committee for CCIR Work
C. N.	Comité National National Committee
IUWDS	Service International des Ursigrammes et des Journées Mondiales International Ursigram and World Days Service
IUCI	Commission Inter-Unions de l'Ionosphère Inter-Union Commission on the Ionosphere
IUCRM	Commission Inter-Unions de Radiométéorologie Inter-Union Commission on Radio Meteorology
IUCSTR	Commission Inter-Unions des Relations Solaires-Terrestres Inter-Union Commission on Solar-Terrestrial Relationships
IUCAF	Commission Inter-Unions pour l'Attribution de Fréquences pour la Radioastronomie et la Science Spatiale. Inter-Union Commission on Frequency Allocations for Radio Astronomy and Space Science

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