Bulletin nº 131 Mars-Avril 1962

U. R. S. I.

TABLE DES MATIÈRES — CONTENTS

COMITÉS NATIONAUX

France

COMPOSITION DU BUREAU

Au cours de sa récente Assemblée Générale, le Comité National Français a renouvelé son Bureau et son Conseil.

Le Bureau qui restera en fonctions jusqu'en décembre 1964 est composé comme suit :

Président : M. VASSY.

Vice-Présidents : MM. BESSON,
BLANC-LAPIERRE,
RIVAULT.

Secrétaire Général : M. VOGE.

Secrétaire Général Adjoint : M. THUÉ.

Trésorier : M. ABADIE.

INDIA

I. G. Y. SYMPOSIUM

A. P. MITRA
National Physical Laboratory, New Delhi

(Reprinted from the *Journal of Scientific and Industrial Research*, 1961, Vol. 20A, No. 8, pp. 409, 410)

The first comprehensive symposium on the activities of India during the International Geophysical Year of 1957-1958 and the International Geophysical Cooperation that followed was held at the National Physical Laboratory, New Delhi, during 13-16 February 1961. India's contribution to the I.G.Y., which has been

described as « the single most significant peacetime activity of mankind since the Renaissance », has been considerable and comparable to that of many of the leading European countries.

The symposium was divided into four sessions, each concerned with one or more major I.G.Y. fields. Session I, held on 13 February was on Cosmic Rays, Geomagnetism, Solar Activity and Outer Space ; Session II on 14 February was on Ionosphere ; Session III on 15 February was on Meteorology, Ozone and Airglow and Session IV on 16 February was on the Surface and Interior of the Earth, involving the I.G.Y. disciplines Latitudes and Longitudes, Oceanography, Glaciology, Seismology and Gravimetry. For each session an opening speaker was invited to outline the highlights of the I.G.Y. achievements in the relevant fields, and also to serve as chairman of the session. The opening speakers were : Dr. Vikram Sarabhai (Session I), Dr. A. P. Mitra (Session II), Prof. H. R. Ramanathan (Session III) and Prof. M. S. Krishnan (Session IV). During the evenings special talks were given by Prof. K. S. Krishnan (Earth's Magnetic Field), Prof. K. R. Ramanathan (Middle Atmosphere) and Shri P. R. Krishna Rao (Meteorology of the Lower Stratosphere over India). Invited talks were also given by Dr. Vainu Bappu on Solar Activity, including the work of the Kodaikanal Observatory during the I.G.Y. and by Dr. Lal who spoke on the use of artificial tracer elements in the study of meteorology and oceanography, and by Dr. Sinvahl on the operation of the satellite tracking camera and the Markowitz moon camera at Naini Tal.

In addition to these invited talks, some eighty papers were presented on various aspects of Indian work in the field of Meteorology, Ionosphere, Cosmic Rays, Solar Activity, the Earth Sciences, Nuclear Radiation and Outer Space. The contributions came from the universities of Andhra, Allahabad, Banaras, Calcutta, Delhi, Jadavpur, Osmania and Poona, and from specialized organizations such as the All-India Radio, Atomic Energy Commission, India Meteorological Department, Indian Institute of Science (Bangalore), National Physical Laboratory (New Delhi), Physical Research Laboratory (Ahmedabad), Survey of India, U. P. State Observatory (Naini Tal), Defence Science Laboratory (Delhi), Tata Institute of Fundamental Research (Bombay) and the Bengal Engineering College (Sibpur).

Ionosphere

The largest number of communications concerned the I.G.Y. study of the ionosphere. Results were presented on the morphology of the ionospheric layers and the anomalies in the equatorial regions (especially at stations near the geomagnetic equator), the diurnal and seasonal variation of ionospheric absorption at different frequencies and using different techniques (e.g. the pulse method and the cosmic noise method), the detailed analysis of ionospheric parameters using « true heights profiles », ionospheric drifts and the effects of solar flares and magnetic storms in the ionosphere.

Meteorology

In the field of meteorology, papers were presented on : upper air circulation over India, the potential gradients over Poona and New Delhi, the measurements of total radiation from sun and sky in India, measurements of ozone and airglow and certain aspects of sferics studied at Poona. The use of radioactive tracer elements in the study of atmospheric circulation was discussed.

Geomagnetism

In papers contributed by workers from the Alibag and Colaba Observatory, the variations of the earth's magnetic field at the Indian stations, Alibag, Annamalainagar and Trivandrum, were discussed, and effects of geomagnetic storms such as those of July 1959 and of solar flares producing geomagnetic crochets were outlined. Evidences were presented to show that the levels responsible for the S_q current system and for the S_f current system responsible for crochets are different — a result of considerable importance to geophysicists. A new theory of the origin of the earth's magnetic field based on magnetic disturbances was outlined by J. S. Chatterjee

The surface and interior of the earth

Various aspects of the solid and liquid earth were discussed in a number of papers. Results indicating close association of microseisms with weather conditions were presented by workers of the India Meteorological Department indicating the feasibility of using microseisms in locating and tracking storms on the Indian seas with certain limitations. Research workers from the Survey of India presented results on latitude variation and earth tides at

Dehra Dun, tidal variations of gravity in India and the Indian mean sea level, and introduced a new method of determination of the variation of latitude. Papers submitted by workers from the Osmania University presented results of study of earth tides at Hyderabad and of the elasticity of Indian rocks. The introduction of a permanent Time and Frequency Service at the National Physical Laboratory (N.P.L.), New Delhi, and its value in electronics and geophysical services were outlined. Results of observation with the Markowitz moon camera were briefly described.

Extraterrestrial radiations and outer space

There were several papers on the study of outer space and on the radiations that continually impinge on the earth. The precision optical tracking camera installed at the U. P. State Observatory at Naini Tal, in association with the Smithsonian Observatory of U. S. A., has been of valuable help in the calculation of satellite orbits. A new method of determining the ionization of the outer ionosphere has been developed at N.P.L. by combining results of an automatic ionospheric recorder and measurements of cosmic radio noise. Cosmic ray observations in Explorer VII have been telemetered at Ahmedabad.

Results of observation of the electromagnetic and corpuscular radiation from the sun, under quiet and disturbed conditions in both optical and radio wavelengths, were presented. A valuable operation during the I.G.Y. was the continuous patrol of the sun by optical means at Kodaikanal and Nizamiyah observatories and by radio techniques at N.P.L., A.I.R., Kodaikanal and Ahmedabad. Cosmic ray observations carried out at the Physical Research Laboratory, Ahmedabad, were presented in detail.

The vast material collected during the I.G.Y. has only begun to be analysed. The results presented in the symposium showed that such material will eventually provide results of great interest to scientists, and provide the basis for improvement in several important services, especially in the predictions of weather, tides and radio propagation conditions.

Future of I. G. Y. programme

The Indian I.G.Y. programme was initially organized in the light of our Five-Year Plans, and most of the programme undertaken forms part of the development programme of the government and

the research institutions and universities. As a result, unlike many other countries, the Indian I.G.Y. programme has been continuing, virtually unchanged, even after the completion of the I.G.Y. and I.G.C., and will continue for some time to come. In the years to come several important international scientific programmes are scheduled. Of these the more important are : (i) the World Magnetic Survey (W.M.S.) during 1961-1965, a period of subdued sunspot activity ; (ii) the Indian Oceanographic Expedition during 1962-1963 ; and (iii) the International Quiet Sun Year (I.Q.S.Y.).

It is expected that India will participate in these programmes. Observations during W.M.S. and I.Q.S.Y. will be of particular interest to I.G.Y. observations, since these will refer to low sunspot activity whereas the I.G.Y. was a period of unprecedented solar activity.

U. S. A.

1962 SPRING MEETING

The 1962 Spring Meeting of the U. S. A. National Committee will be held in Washington D. C., April 30-May 3, with the sponsorship of the I.R.E. Professional Groups on Antennas and Propagation, on Circuit Theory, on Information Theory, on Instrumentation and on Microwave Theory and Techniques.

Supplementary information available by Prof. M. G. Morgan, Secretary of the U. S. A. National Committee of U.R.S.I., Dartmouth College, Hanover, New Hampshire.

1961 FALL MEETING

The joint meeting of the U. S. A. National Committee and the Institue of Radio Engineers (Professional Groups on Antennas and Propagation, Circuit Theory, Information Theory, Instrumentation, and Microwave Theory and Techniques) was held in Austin, U. S. A., October 23-25, 1961.

The meeting was preceeded by a two day conference on telluric and geomagnetic field variations.

The joint meeting was opened by a Report on September 1961 U.R.S.I. Paris Symposium on Space Communications.

The following papers were submitted to the meeting :

COMMISSION 2 OF THE U. S. A. NATIONAL COMMITTEE ON TROPOSPHERIC RADIO PROPAGATION

Surface Scattering and Radiation.

Upwind-Downwind Ratio of Radar Return Calculated From Facet Size Statistics of a Wind Disturbed Water Surface — Allen H. SCHOOLEY, U. S. Naval Research Laboratory.

Bistatic Reflectivity of the Ocean Surface — Isadore KATZ, Applied Physics Laboratory, The Johns Hopkins University.

Report on Terrain Return — George HAGN, Stanford Research Institute.

Acoustic Simulation of Moon-Echoes — H. S. HAYRE, W. W. KOEPSEL, R. J. TILLERY, and D. W. BOONE, University of New Mexico.

Apparent Temperatures of Smooth and Rough Terrain — Sinclair N. C. CHEN and William H. PEAKE, The Antenna Laboratory, The Ohio State University.

Subsurface and Transhorizon.

D. C. Signalling in Conducting Media — Charles R. BURROWS, Datatronics Engineers, Inc.

Air-to-Undersea Communication : Electromagnetic Fields in the Two Media, Caused by Vertical and Horizontal Electric Dipoles in Air — S. H. DURRANI, Engineering Experiment Station, University of New Mexico.

Quasi-Static Response of a Magnetic Dipole Near the Air-Earth Interface — K. R. COOK and R. D. KELLY, Engineering Experiment Station, University of New Mexico.

Interpretation of Tukizi's Calculations of Twilight Propagation — Thomas J. CARROLL, Bendix Radio.

Transhorizon Propagation in Stratified Scattering Atmospheres — W. S. AMENT, U. S. Naval Research Laboratory.

Initial Results of a Scaled, Three-Frequency Transhorizon Propagation Experiment — Ralph BOLGIANO, Jr., Cornell University.

On the Reflection of Radio Waves from an Undulating Atmospheric Layer — A. T. WATERMAN, Jr., Stanford Electronics Laboratories.

Line-of-Sight.

Statistics of Phase Quadrature Components of Microwave Field Transmitted Through a Random Medium — C. I. BEARD, Electronic Defence Laboratories, Sylvania Electronic Systems.

Tropospheric Signal Characteristics at X-Band for a Within-the-Horizon Propagation Path — A. P. Barsis and A. F. Barghausen, Central Radio Propagation Laboratory, N.B.S.

Comparison of Measured and Calculated Total Atmospheric Refraction and Atmospheric Transmission Coefficient at 8.7 mm and 1.85 cm — G. D. Phillips and A. C. Anway, Collins Radio Company.

The empirical Determination of Total Atmospheric Refraction at 2 cm Wavelength by Radiometric Means — A. C. Anway, Collins Radio Company.

Commission 3 of the U. S. A. National Committee, on Ionospheric Radio

H.F. Propagation.

Phase Stability of H.F. Signals over a 1600 kilometer Link — W. B. Smith and D. H. Pratt, Lincoln Laboratory, M.I.T.

Investigation of Variations in the Ionosphere with the Use of Phase Coherent Backscatter Techniques — H. Hoogasian, D. B. Odom and J. F. Roche, Raytheon Company.

Sudden Frequency Shift Observed at H.F. During Ionospheric Disturbances — L. C. Edwards and G. D. Thome, Raytheon Company.

On the Time Variation of the Altitude at Which Solar-Flare-Induced Ionization is Released — D. P. Kanellakos and O. G. Villard, Jr., Radioscience Laboratory, Stanford University.

On the Fluctuations of the Angle of Arrival of H.F. Waves — Demetri P. Kanellakos and O. G. Villard, Jr., Radioscience Laboratory, Stanford University.

Measurements of Around-the-World High Frequency Propagation — R. B. Fenwick, and O. G. Villard, Jr., Radioscience Laboratory, Stanford University.

Ionospheric Mapping and Prediction; Ionospheric Propagation; Meteor Propagation.

Ionospheric Mapping by Numerical Methods. I. The representation of ionospheric characteristics : *fo*F2, M3000F2, N-max, H-max, and SCAT — W. B. Jones, M. PoKempner and M. Hinds, Central Radio Propagation Laboratory, N.B.S.

Ionospheric Mapping by Numerical Methods. II. Ionospheric forecasting — W. B. Jones and R. M. Gallet, Central Radio Propagation Laboratory, N.B.S.

A Method for the Determination of Lower Ionosphere Properties by Means of Field Measurements on Sferics — F. B. Harris and R. L. Tanner, Stanford Research Institute.

A Method for the Determination of Layer Peaks in Electron Density Profile Analyses — Adolf K. PAUL, Ionosphären Institut, Breisach/Rhein, Germany, and J. W. WRIGHT, Central Radio Propagation Laboratory, N.B.S.

Quantitative Calculations of Field Strength Intensity by Pedersen Ray Transmission at Large Distances. Comparison with Experimental Data — L. D. SCHULTZ and R. M. GALLET, Central Radio Propagation Laboratory, N.B.S.

Bivariate Amplitude Distribution for Two Time-Displaced Radio Signals Reflected by Meteor Trails — Albert D. WHEELON, Space Technology Laboratories, Inc.

High Latitude Ionosphere; E Scatter; LF Propagation; Equatorial F Region.

Further Observations of 2.89 Mc/s Equivalent Antenna Temperatures at the Auroral Zone — R. PARTHASARATHY, Geophysical Institute, University of Alaska, and C. G. LITTLE and G. M. LERFALD, Central Radio Propagation Laboratory, N.B.S.

High Latitude Radio Studies of the Ionosphere During Active Aurora — Leif OWREN, Geophysical Institute, University of Alaska.

Thunderstorms and Sporadic E Layer Ionization at High Latitudes — R. G. RASTOGI, High Altitude Observatory, University of Colorado.

Further Experimental Data on E Region Field Aligned Scattering at VHF — J. L. HERITAGE, W. J. FAY and E. D. BOWEN, Smyth Research Associates.

Oblique Incidence Pulse Measurements at 100 KC — R. H. DOHERTY, Central Radio Propagation Laboratory, N.B.S.

The Equatorial F Region — R. B. NORTON and T. E. VAN ZANDT, Central Radio Propagation Laboratory, N.B.S.

Other papers submitted to Commission 3

Wavelength Dependence and Aspect Sensitivity of VHF and UHF Auroral Radar Reflections — M. J. BARON, R. L. LEADABRAND, J. C. SCHLOBOHM, R. I. PRESNELL, R. E. WINKELMAN and R. B. DYCE, Stanford Research Institute.

Abnormal Variations in the Earth's Magnetic Field and the Ionizations in the F2 and Es Regions of the Ionosphere Over Central Africa — R. G. RASTOGI, High Altitude Observatory, University of Colorado.

The Effect of High Latitude Absorption on the Propagation of Meteor-Burst Signals — Louis D. BREYFOGLE, Central Radio Propagation Laboratory, N.B.S.

Concerning the Visibility of Atmospheric Effects on Satellite Radio Transmissions — H. J. A. CHIVERS, Central Radio Propagation Laboratory, N.B.S.

Applications of the Ray-Tracing Computer Program to Ionospheric Problems — Victor H. Gonzalez, University of Illinois.

Use of a Phase-Sensitive Backscatter Sounder to Deduce Ionospheric Changes Associated with a Solar Flare — George H. Barry and Paul R. Widess, Radioscience Laboratory, Stanford University.

Observation of Large-Scale Traveling Ionospheric Disturbances by Their Effect on the Instantaneous Received Frequency of Stable H.F. Transmissions Propagated Over Geographically-Separated Long-Distance Paths — K. L. Chan and O. G. Villard, Jr., Radioscience Laboratory, Stanford University.

Aircraft Investigation of Aspect Sensitivity of 200 Mc Scatter from Field Aligned Ionization — Lee A. Morgan and Steven Weisbrod, Smyth Research Associates.

Commission 4 of the U. S. A. National Committee on Magnetospheric Radio

Magnetosphere I.

Recent Measurements of the Precipitation of Energetic Electrons from the Geomagnetic Field — John R. Winckler, School of Physics, University of Minnesota.

Latitudinal Variations in the Protonosphere — Francis S. Johnson, Lockheed Missiles and Space Company.

Upper-Atmosphere Helium Ions — W. B. Hanson, Lockheed Missiles and Space Company.

The Distribution of Hydrogen and Helium Ions at High Altitudes — P. Mange, U. S. Naval Research Laboratory.

Interaction of West Ford Needles with the Earth's Magnetosphere — S. F. Singer, Department of Physics, University of Maryland.

Magnetosphere II.

Conjugate VLF Emissions — L. H. Martin and R. A. Helliwell, Radioscience Laboratory, Stanford University.

A Theory of Coupling Between Geomagnetic Ducts and the Earth-Ionosphere Waveguide at Very Low Frequencies — R. A. Helliwell, Radioscience Laboratory, Stanford University.

The Relation Between the Diurnal Variation of Whistler Incidence, Thunderstorms and Spread F — N. D. Clarence and P. A. O'Brien, University of Natal, Durban, South Africa.

The Increase in Dispersion of Components of a Multiple Stroke Whistler — N. D. Clarence and P. A. O'Brien, University of Natal, Durban, South Africa.

COMMISSIONS 3 AND 4

Electron Content and Profiles; Radio Star Scintillations; Solar Cosmic Rays; Diffusive Equilibrium.

Impedance Probe Measurement of Electron Densities with High Altitude Vehicles — James C. ULWICK and Wolfgang PFISTER, Geophysics Research Directorate, Air Force Cambridge Research Laboratories.

Pulsed Radio Soundings of the Topside of the Ionosphere — R. W. KNECHT and T. E. VAN ZANDT, Central Radio Propagation Laboratory, N.B.S., and S. RUSSELL, Airborne Instruments Laboratory.

Ionospheric Electron Content and its Latitudinal Variation Measured with Doppler-Faraday Techniques — F. DE MENDONCA, Radioscience Laboratory, Stanford University.

A Comparison of Radio Star Scintillations at 1390 Mc/s and 79 Mc/s — H. J. A. CHIVERS, Central Radio Propagation Laboratory, N.B.S. and R. D. DAVIES, Nuffield Radio Astronomy Laboratories, Jodrell Bank, England.

Some Statistics on the Solar Cosmic Rays Produced by Solar Eruptions Associated with Type IV Outburts — Yukio HAKURA, Central Radio Propagation Laboratory, N.B.S.

Some Aspects of Diffusive Equilibrium in the Thermosphere — S. A. BOWHILL, Ionosphere Research Laboratory, The Pennsylvania State University.

Radar Aurora.

The Occurrence and Characteristics of Radar Aurora at UHF — B. C. BLEVIS, Defence Research Telecommunications Establishment, Ottawa, Canada.

The Geometry, Time Dependence, Strength, Relative Occurrence and Position in Space of VHF and UHF Radar Auroral Echoes — R. L. LEADABRAND, J. C. SCHLOBOHM, M. J. BARON, R. I. PRESNELL, R. E. WINKELMAN, and R. B. DYCE, Stanford Research Institute.

Spectral Characteristics of UHF Radar Auroral Echoes and the Correlation of Auroral Echoes with Magnetic Activity — J. C. SCHLOBOHM, R. L. LEADABRAND, M. J. BARON, R. I. PRESNELL, R. E. WINKELMAN, and R. B. DYCE, Stanford Research Institute.

Long Distance VHF Propagation Via Auroral Scattering — D. S. PRATT, K. TOMAN, and A. M. PETERSON, Radioscience Laboratory, Stanford University and Geophysics Research Directorate, Air Force Cambridge Research Laboratories.

Preliminary Results of Simultaneous Luminous Aurora and Auroral Radar Observations — R. S. LEONARD, G. J. ROMICK and A. E. BELON, Geophysical Institute, University of Alaska.

Diffuse Auroral Ionization Detected at HF and VHF — Howard F. BATES, Geophysical Institute, University of Alaska.

COMMISSION 6 OF THE U. S. A. NATIONAL COMMITTEE ON RADIO WAVES AND CIRCUITS

Data Processing and Circuit Theory.

The Dynamic Range of Pumped Varactor Circuits — B. J. LEON, Hughes Research Laboratories and D. R. ANDERSON, Jet Propulsion Laboratory.

A theory for Noisy Two-Ports — N. DeCLARIS and K. R. KLECKNER, Cornell University.

Ambiguity Function of Random Frequency Modulated Signal — Hiroshi MIYAKAWA, Electronics Research Laboratories, Columbia University.

Radar Reflections from the Sun at VHF — W. G. ABEL, J. H. CHISHOLM, P. L. FLECK, and J. C. JAMES, Lincoln Laboratory.

Plasma.

Unidirectional Surface Wave Along a Perfectly Conducting Plane in a Plasma in the Presence of a dc Magnetic Field — Akira ISHIMARU, Department of Electrical Engineering, University of Washington.

Field of an Annular Slot Covered with Plasma — G. TYRAS, The Boeing Company.

Radiation from Line Sources in Magnetoplasma with a Boundary — G. TYRAS, the Boeing Company and A. ISHIMARU and H. A. SWARM, Department of Electrical Engineering, University of Washington.

The Influence of Complex Waves on the Radiation Field of a Source-Excited Plasma Slab — T. TAMIR, and A. A. OLINER, Polytechnic Institute of Brooklyn.

Antennas and Scattering.

Multiple-Target Response of Data Processing Antennas — A. KSIENSKI, Hughes Aircraft Company.

Beam Broadening by Element Phasing — A. E. BLUME, General Electric Company, Schenectady.

Optimum Parameters for a Class of Surface Wave Antennas — J. KANE, University of Rhode Island.

NOTE : *Summaries of the above mentioned papers are available at the Secretariat of the U. S. A. National Committee, National Research Council,* 2101 *Constitution Avenue, Washington* 25, *D. C., U. S. A.*

COMMISSIONS AND COMMITTEES

Commission II. — On Radio and Troposphere

COMMISSION II COVERAGE

Attention of the members of Commission II should be called to the following note included in the « First Announcement and Call for Papers » for the 1962 Spring Meeting of the U. S. A.National Committee.

« The membership of U. S. A. Commission 2 has considered a revised definition of its fields of interest within U.R.S.I. and was authorized by the National Committee at its 1961 Fall Meeting to solicit papers from a broader scope of interest for the 1962 Spring Meeting. These fields transcend the troposphere. Broadly, they include all natural non-ionized media as related to the propagation of electromagnetic waves. Thus in addition to the refraction, absorption, and scintillation of radio waves within line of sight, and the diffraction and scattering of waves beyond line of sight, they cover propagation along and below the earth's surface as well as backscattering from that surface. They overlap the fields of radiometeorology, satellite communications and signal statistics insofar as these subjects pertain to propagation and its mechanisms. In the case of non-terrestrial environments, as for example in the consideration of backscatter from lunar and planetary surfaces, and refraction and absorption in non-ionized planetary atmospheres, Commission 2 can assist Commission 5 ».

CONTRIBUTION DU GROUPE D'ETUDE V DES E. U. A. AU C.C.I.R.

Des exemplaires du Document du C.C.I.R. V/23-E « Prévision de l'affaiblissement des Ondes Troposphériques en Transmission » qui sera présenté à la Conférence de Genève (25 avril-7 mai 1962) en tant que contribution du Groupe d'Etude V des E. U. A., peuvent être obtenus au Secrétariat Général de l'U. R.S.I.

CONTRIBUTION OF THE U. S. A. STUDY GROUP V TO C.C.I.R.

Copies of C.C.I.R. Document V/23-E « Tropospheric Wave Transmission Loss Prediction » which is to be presented at the Conference in Geneva, 25 April to 7 May 1962, as a contribution of U. S. A. Study Group V, are available at the General Secretariat of U.R.S.I.

Commission III. — Radioélectricité ionosphérique

DOCUMENTATION

L'attention des lecteurs est attirée sur les articles ci-après :

dans la *Revue de l'U.E.R.*, nº 71-A Technique, février 1962 :

Etude de la propagation ionosphérique en ondes longues et moyennes ;

Propagation ionosphérique en ondes longues et moyennes — Résultats des travaux entrepris par l'Union Européenne de Radiodiffusion, W. EBERT ;

dans le *Journal de l'U.I.T.*, Vol. 29, nº 4 (avril 1962), pp. 113-116 :

Méthode de prévision rapide de la propagation, par E. WOYK (E. CHVOJKOVA).

BIBLIOGRAPHY

The attention of the readers is called to the following articles :

in the *E.B.U. Review*, nº 71-A Technical, February 1962 :

Research on long- and medium-wave ionospheric propagation ;

Ionospheric propagation on long and medium waves — Results of investigation organised by the European Broadcasting Union, W. EBERT ;

in the *Telecommunication Journal*, Vol. 29, nº 4 (April 1962), pp. 113-116 :

A rapid method of propagation prediction, by E. WOYK (E. CHVOJKOVA).

D.S.I.R. RADIO RESEARCH STATION, SLOUGH, U. K.

Memorandum No 1 on revised prediction service, change in policy

1. After the issue of Bulletin A.183 for May 1962 D.S.I.R. will stop issuing further Predictions of Radio Wave Propagation conditions. Starting with the June 1962 predictions the users of the D.S.I.R. prediction service will need to adopt a new procedure based on linear interpolation between « sunspot-minimum » and « sunspot-maximum » charts.

2. It is the purpose of this memorandum (*a*) to give warning of this change in D.S.I.R. policy, (*b*) to explain which charts are needed, (*c*) to notify the users of a change in the form of charts to be issued after A.183, (*d*) to explain the revision of the D.S.I.R. Prediction Service.

3. The procedure of linear interpolation will be described in a Memorandum nº 2 to be issued shortly. Errors arising from the new procedure will also be discussed.

4. « *Sunspot-maximum* » *Charts.*

   These charts are in Bulletins A.141-152 for November 1958 to October 1959 inclusive. They were based [1] on data obtained during 1956-1958 (a « sunspot-maximum » period) from the world-wide network of ionosondes.

   Bulletin A-Special Issue nº 4, which contained « once-for-all » charts for « sunspot-maximum » conditions, was circulated in July 1959 and may also be used. Of those charts the equinox and December ones are the same as A.145 and A.142 respectively, while the June charts are nearly the same as A.148.

5. « *Sunspot-minimum* » *Charts.*

   Bulletin A Special Issue nº 3, circulated in September 1958, contains charts for March, June and December which were based on world-wide ionosonde data obtained during the year 1954, a « sunspot-minimum » period.

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[1] « A New Method of Ionospheric Forecasting » by R. NAISMITH, H. C. BEVAN and P. A. SMITH. *Proc. I.E.E.*, Vol. 109, nº 44 (March 1962).

Charts based on the remaining months of 1954 (except, perhaps April) will be issued as a series of Bulletin A Special Issues, starting with Special Issue nº 5. These charts will be called « World Ionosphere Charts based on Measured Data ». The first issue will be for July conditions. It is expected that the last Special Issue (nºs 11 or 12) will be made before the end of 1962.

6. *Revision of D.S.I.R. Prediction Service.*

After the issue of Bulletin A Special Issue nº 11 (or 12), the function of the D.S.I.R. Prediction Service will be confined solely to the issue of forecasts of the Solar Activity Index I_{F2} for periods up to six months ahead. Details of I_{F2} are in the *Journal of Atmospheric and Terrestrial Physics*, Vol. 18, pp. 297-305 (1960). The Index I_{F2} is required before the new interpolation procedure can be carried out. The forecasts will be revised shortly after the beginning of each month, starting in March 1962, and at the same time a new provisional (bracketed) forecast of I_{F2} for the sixth month ahead will be given.

7. *Application for Forecasts of I_{F2} and for Past Charts.*

Users of the prediction service requiring copies of any of the past charts detailed in paragraphs 4 and 5 of this Memorandum should apply at once to the Director at the address below, so that orders can be placed with H. M. Stationery Office. *Requests received after 9th April* 1962 *may be subject to considerable delay.* Special Issues nºs 5-11 (or 12) will be sent to all those users at present on the circularization list, and need not be specially applied for.

Forecasts of I_{F2} will only be sent to those who apply to be put on a regular list. Particular I_{F2} forecasts can however be obtained on demand.

D.S.I.R., Radio Research Station.
Ditton Park, Slough, Bucks, England.

Memorandum No. 2 on revised prediction service. Linear interpolation.

1. In paragraph 1 of Memorandum nº 1, dated 5th March 1962, users of the D.S.I.R. prediction service were told that they will in future need to make their own predictions using linear inter-

polation between the « Sunspot-minimum » and « Sunspot-maximum » charts issued by this Station.

2. The purpose of this further memorandum is to describe the method and note some errors that may arise. Details of the method are in paragraphs 3-6, while an Appendix describes certain error-limits.

3. *The Basis of the Method*

Minnis and Bazzard (1) have examined the monthly median values of *fo*F2 and M-3000-F2 measured at a large number of ionosphere observatories throughout the world. They found that when *fo*F2 or M-3000-F2 for a given month and hour are plotted against the measured monthly Solar Activity Index, I_{F2}, the result for a particular observatory approximates closely to a straight line, the slope and intercept of this line varying with the month, location and time of day.

Thus if median *fo*F2 or M-3000-F2 at a particular location are known for two values of I_{F2}, I_{max} and I_{min} (say), then median *fo*F2 or M-3000-F2 for any intermediate value of I_{F2} can be found sufficiently accurately by simple linear interpolation between the max. and min. values.

The authors also showed that F2-layer conditions depended more closely on the Index I_{F2} than on Sunspot number.

It so happens that all D.S.I.R. prediction charts starting with Bulletin A.140, and including Special Issues nos 3 and 4, have been based (2) on values of *fo*F2 or MUF as measured by the world-wide ionosonde network. The measured values of I_{F2} appropriate to each of these Bulletins are also known. The data in them can therefore be used to provide the upper and lower frequency limits for the interpolation process. (For a note on the error of assuming that MUF and I_{F2} are linearly related, see Appendix).

4. *The Bulletins Required.*

The critical frequency (or MUF factor) versus I_{F2} plot does not result in a perfect straight line, i. e. there is some scatter about a « best fit » straight line. To reduce interpolation errors caused by this scatter, only those charts should be used which are for I_{max} and I_{min} conditions. These recommended charts

are listed in Table I below. The user is asked to mark each Bulletin with the corresponding I_{F2} figures.

Recommended Bulletins

Month	Minimum Charts		Maximum Charts		I_{max}-I_{min}
	Bull. No.	Measured $I_{F2(min)}$	Bull. No.	Measured $I_{F2(max)}$	
January	S.I. 10	2	A. 143	154	152
February	11	— 2	144	150	152
March	3	— 2	145 (1)	151	153
April	12	2	146	154	152
May	A. 183	6	147	168	162
June	S.I. 3	—14	148 (1)	168	182
July	5	— 8	149	146	154
Augustus	6	0	150	157	157
September	7	—10	151	184	194
October	8	—10	152	183	193
November	9	— 7	141	175	182
December	3	—15	142 (1)	182	197

S.I. means « Special Issue ».

(1) S.I. No. 4 may be used instead.

TABLE I

All the Bulletins in Table I have now been issued except S.I. Nos. 5-12, which are now being prepared and *will be issued without demand to all users who normally receive Bulletin A.*

5. *The Interpolation Procedure.*

As stated in paragraph 6 of Memorandum n° 1, D.S.I.R. will issue forecasts of I_{F2} for the periods one to six months ahead. Suppose that, for a particular month, the forecast I_{F2} is I. The predicted MUF for a given hour is then :

$$\text{MUF} = (\text{MUF at } I_{min}) + \frac{I - I_{min}}{I_{max} - I_{min}} \times (\text{MUF at } I_{max} - \text{MUF at } I_{min}) \qquad (1)$$

where ($I_{max} - I_{min}$) is given in the last column of Table I above.

The general procedure is therefore :

5.1. Plot the circuit MUF-versus-time curve from the Maximum charts for the month concerned ;

5.2. Repeat 5.1 using the Minimum charts ;

5.3. Compute the answer to eqn. (1) above (or interpolate graphically).

Alternatively eqn. (1) may be evaluated for regular intervals of I (I = 0,20,40, etc.) and the results plotted to give a once-for-all set of circuit MUF predictions from which the MUF for any forecast values of I_{F2} can be quickly read.

The same procedure may be used whether the circuit MUF is controlled by the E, F1, or F2-layers, and applies equally to critical frequencies and OWFs. It should not be applied to LUHF curves or to MUFs based on sporadic-E ionization. It applies to short ($\leqslant 4000$ km) or long (> 4000 km) circuits, but for long circuits the contents of paragraph 6 below should be noted.

6. *Long Circuits* (> 4000 km).

For circuits having two control points there is one important limitation to bear in mind when interpolating. The approximately linear relation between MUF and I_{F2} applies *only* at a fixed location. If, at any time of day, the I_{max} control-point location differs from the I_{min} control-point location, the interpolation will give the wrong MUF. This can happen, for example, when the control-point switches from one end of the circuit to the other on the I_{max} charts but not on the I_{min} or when the I_{max} charts show E-layer control while the I_{min} show F-layer control. The simplest way to avoid the error is to plot overlapping « MUF-time » curves for both control-points for an hour or two on each side of the switch-over times. Interpolation can then be made between corresponding maximum and minimum curves, the lower MUF being chosen as usual.

7. *References* :

1. *Journal of Atmospheric and Terrestrial Physics*, Vol. 18, pp. 297-305 (1960).

2. « A New Method of Ionospheric Forecasting » by R. NAISMITH, H. C. BEVAN and P. A. SMITH. *Proc. I.E.E.*, Vol. 109, nº 44 (March 1962).

D.S.I.R., Radio Research Station, Ditton Park, Slough, Bucks, England.

Appendix

Discussion of errors

8. The quantity « predicted MUF » derived from prediction charts is simply an estimate of the quantity (f_oF2) × (M -4000-F2) which would be measured by a vertical-incidence ionosonde at the control-points of the communications circuit. This « MUF » may sometimes differ considerably from the observed circuit MUF, i. e. the operational MUF measured by oblique-path ionosondes at the circuit terminals. In this Appendix the term « MUF » means « predicted MUF » in the above sense.

The term « error » is used similarly to denote « error in predicted MUF » ; it does not mean « differences between predicted and observed circuit MUFs ».

9. *Symbols* :

$I = I_{F2}$

f = ordinary ray critical frequency

M = MUF factor

F = predicted MUF $= f \times M$

E = error

Subscripts $_M$ and $_m$ indicate values of quantities concerned at I_{max} and I_{min} respectively.

10. *Error in assuming linear relation between F and I.*

Since f and M are each linearly related to I, their product, F, is related to I by a quadratic expression.

The error made in finding F by linear, instead of curvilinear, interpolation is :

$$E = (\text{predicted MUF}) - (\text{interpolated MUF})$$
$$= \frac{(I - I_m)(I_M - I)}{(I_m - I_M)^2} (f_M - f_m)(M_m - M_M) \text{ Mc/s} \qquad (2)$$

The last factor of eqn(2), $M_m - M_N$, is in practice a small positive quantity.

The maximum error occurs when $I = \frac{I_M + I_m}{2}$ and then becomes :

$$E_{max} = \frac{(f_M - f_m)(M_m - M_M)}{4} \text{ Mc/s} \qquad (3)$$

E_{max} is unlikely to exceed 1 Mc/s, and is usually much less. The MUF found by linear interpolation is thus slightly less than the predicted MUF.

11. *Error due to « scatter »*.

This error is mentioned in paragraph 4. It arises because the data on which the reommended charts were based may be displaced from the « best fit » straight line relating f(or M) to I. The use of these charts therefore implies the use of a straight line wich may differ slightly from the « best fit « line.

Examination of a large amount of data to compare the scatter of f about the « best fit » lines with its scatter about the lines defined by the recommended charts gives the following result :

Average r.m.s. deviation from « best fit » lines = 0.43 Mc/s (σ = 0.22 Mc/s).

Average r.m.s. deviation from « recommended lines » = 0.62 Mc/s (σ = 0.30 Mc/s).

The errors due to scatter have therefore not been unduly increased by using the recommended charts. These errors may however become much larger if charts other than those recommended are used.

12. *Errors in linear interpolation of E and F1-layer MUFs.*

These errors have been examined both theoretically and practically. The results are about the same. To quote a typical practical result :

If f measured at Washington, U. S. A., for each daylight hour during March over the years 1946 and 1950-1961 is plotted against measured I_{F2}, the average r.m.s. deviation from the recommended straight lines is 2-3 % only. The same error should also apply to E-layer MUFs and, approximately, to F1-layer MUFs.

13. *Chart « errors ».*

The raw data used in preparing MUF contour charts usually consist of two sets of 70-100 figures (a set of *fo*F2 data and a set of M-4000-F2 data) on a Mercator projection of the world's surface. The location of these figures is that of the ionosonde network, and hence there are large areas of the world for which no data exists. Self-consistent MUF contours can therefore be drawn in a number of different ways all of which are equally « plausible ». Inevitably this means that comparison of MUF charts for the same month but in widely separated years will show anomalies. These chart anomalies have always been present and the new procedure can be expected to uncover them. Unfortunately there is no way of knowing which of two charts is more accurate since even comparison of predicted MUFs and operational MUFs is not conclusive (see para 8 above).

Commission VI. — Ondes et Circuits Radioélectriques

THÉORIE DE L'INFORMATION ET DES COMMUNICATIONS

L'attention des lecteurs est attirée sur l'article suivant publié dans le *Journal des Télécommunications*, Vol. 29, n° 3 (mars 1962), p. 79 : La question de fiabilité, par E. R. Jervis.

Commission VI. — On Radio Waves and Circuits

INFORMATION AND COMMUNICATION THEORY

Attention of the readers is called to the following paper published in the *Telecommunication Journal*, Vol. 29, n° 3 (March 1962), p. 79 : Reliability, by E. R. Jervis.

Comité U.R.S.I.-C.I.G.

EXTRAITS DU PROCÈS-VERBAL DE LA DEUXIÈME RÉUNION

Nice, le 16 décembre 1961

(See English text, p. 27)

3. — Plans concernant l'Année Internationale du Soleil Calme (I.Q.S.Y.).

3.1. — Au cours du symposium, la discussion a porté sur les observations ionosphériques à entreprendre au cours de l'Année Internationale du Soleil Calme (A.I.S.C.) dans les domaines suivants : sondages à incidence verticale, absorption A1 et mouvements. Les résolutions préparées par les sous-rapporteurs ont été confirmées ; les grandes lignes en sont exposées ci-dessous :

I. — *Sondages à incidence verticale pendant l'A.I.S.C.*

Des résolutions ont été formulées sur les points suivants :

(1) Programme d'observation.

(2) Techniques d'observation.

(3) Répartition des stations (généralités, chaînes méridionales, autres stations, Antarctique, zones océaniques, chaînes denses spéciales, stations sur glaces flottantes).

(4) Envoi des données aux Centres Mondiaux (données des sondages à incidence verticale, y compris les programmes recommandés pour la réduction des ionogrammes et la présentation des données, données des sondages par le haut).

II. — *Observations des mouvements ionosphériques pendant l'A.I.S.C.*

Les méthodes de mesure des mouvements ionosphériques ont été classées selon les catégories suivantes :

D-1 Comparaison d'évanouissements au moyen de trois antennes ou plus, avec espacement d'environ une longueur d'onde.

D-2 Observation radioélectrique des traînées météoriques en mouvement.

D-3 Evanouissement d'étoiles radioélectriques ; trois antennes ou plus, distantes d'environ 10 km l'une de l'autre.

Des résolutions ont été formulées sur les points suivants :

(1) Programme d'observations (synoptiques ; projets spéciaux).

(2) Répartition des stations.

(3) Comparaison des différentes méthodes.

III. — *Mesures de l'absorption ionosphérique pendant l'A.I.S.C.*

Les méthodes pour la mesure de l'absorption ionosphérique sont réparties dans les principaux groupes suivants :

A-1 Mesure des amplitudes des pulsations réfléchies par l'ionosphère.

A-2 Mesure de l'absorption du bruit radioélectrique d'origine extra-terrestre.

A-3 Mesure de l'intensité de champ de signaux d'ondes d'espace à incidence oblique.

De plus, la mesure qualitative des changements relatifs dans l'absorption peut s'effectuer au moyen de paramètres d'ionogrammes, en particulier *f*-min.

Des résolutions ont été formulées sur les points suivants pour ce qui concerne la méthode A-1 :

(1) Programme d'observations.

(2) Répartition des stations.

3.2. — Une brève discussion a eu lieu sur les observations ionosphériques dans d'autres domaines d'intérêt pendant l'A.I.S.C., et il a été décidé que le Secrétaire sollicite, par correspondance, l'opinion des autres sous-rapporteurs (absorption A-2, bruit radioélectrique atmosphérique, et sifflements).

3.3. — Toutes les résolutions seront communiquées par le Dr W. Dieminger (Rapporteur du C.I.G. pour l'Ionosphère) à la réunion du C.I.G. consacrée à l'Année Internationale du Soleil Calme qui se tiendra à Paris en mars 1962, et le texte complet de ces résolutions sera inclus au procès-verbal de cette réunion. Il sera publié dans le *Bulletin d'Information de l'U.R.S.I.*

3.4. — La possibilité d'une revision des Manuels d'Instructions sur l'Ionosphère de l'A.G.I. a été soulevée à propos de la prochaine Année Internationale du Soleil Calme. Le remplaçant du Président a rappelé que la Monographie de l'U.R.S.I. sur l'interprétation des ionogrammes, éditée par M. Piggott et le Dr Rawer, a été publiée et que ce volume donnait des instructions très détaillées à l'intention de ceux qui procèdent aux sondages verticaux. Il peut sembler souhaitable de préparer des manuels analogues pour l'absorption et les mouvements ; la décision en est laissée aux sous-rapporteurs pour ces disciplines.

4. — Fonctionnement des Centres Mondiaux de Données.

M. A. H. Shapley a dit qu'actuellement le mécanisme était insuffisant pour mettre en œuvre les diverses recommandations formulées au sujet du fonctionnement des Centres Mondiaux de Données. Il a proposé, avec l'approbation du Comité, que le Président soit invité à examiner l'opportunité de créer un petit sous-comité composé de personnes chargées du fonctionnement des Centres Mondiaux, afin d'établir la liaison nécessaire.

5. — Manuel de l'U.R.S.I. des Stations Ionosphériques.

Le remplaçant du Président a exprimé les remerciements du Comité à M. J. Beagley et au Prof. R. W. H. Wright qui ont rassemblé les correctifs et additifs au Manuel des Stations Ionosphériques, et il a invité les stations qui n'auraient pas encore présenté leurs corrections à le faire dans le plus bref délai possible. L'espoir a été formulé que le Manuel serait complété par la publication d'un supplément qui sera préparé par le Colonel E. Herbays et M. G. M. Brown.

6. — Le Secrétaire Général de l'U.R.S.I., le Colonel Herbays, a exprimé les remerciements de l'U.R.S.I. à tous ceux qui ont orga-

nisé et rendu possible le symposium de Nice. Un hommage spécial a été rendu au Comité National Français de l'U.R.S.I., particulièrement au Professeur et à Mme Vassy, à la Ville de Nice, au Centre Universitaire Méditerranéen et au Sous-Comité des Sondages Ionosphériques à l'échelle mondiale.

G. M. BROWN,
Secrétaire du Comité U.R.S.I.-C.I.G.

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

MINUTES OF SECOND MEETING

An informal meeting of the U.R.S.I.-C.I.G. Committee was held on 16 December 1961 at Nice, France, at the termination of the Symposium on Ionospheric Soundings in the I.G.Y./I.G.C. organized by the World Wide Soundings Sub-Committee.

The following Committee members or their representatives were present :

Madame BENKOVA (representing Dr. PUSHKOV),
Mr. G. M. BROWN (*Secretary, acting-chairman*),
Dr. W. DIEMINGER,
Col. E. HERBAYS (*Secretary-General* of U.R.S.I.),
Dr. I. KASUYA (representing Mr. AONO).
Mr. W. R. PIGGOTT,
Dr. K. RAWER,
Dr. O. SANDOZ (representing Dr. HINES),
Dr. C. SEDDON (representing Dr. NEWELL),
Mr. A. H. SHAPLEY,
Mr. J. VOGE,

and the following also attended by invitation :

Mr. M. BAKER (representing C.I.G.)
Dr. W. BECKER
Dr. A. HAUBERT
Dr. P. HERRINCK
Dr. J. HEWITT
Dr. R. W. KNECHT
Dr. C. M. MINNIS
Dr. E. R. SCHMERLING
Dr. H. SCHWENTEK
Mr. J. TURNER
Dr. G. UMLAUFT
Dr. H. J. A. VESSEUR
Dr. J. W. WRIGHT
Prof. R. W. H. WRIGHT

1. — The Acting-Chairman, Mr. G. M. Brown, referred to the absence of the Chairman, Professor W. J. G. Beynon, and it was agreed that the best wishes of all present should be conveyed to him by the Secretary-General. It was also agreed that a similar message should be sent to Mr. Aono who had recently been unwell.

2. — Publication of Symposium Papers.

Brief mention was made of the plans for the publication of the papers presented at the Symposium. The Acting-Chairman referred to earlier decisions of the U.R.S.I.-A.G.I. Committee to publish I.G.Y. ionospheric absorption and drift data in the *Annals of the I.G.Y.* Subsequently, the sub-reporters for these subjects had concluded that the raw data were probably not suitable for publication without interpretative discussions, such as those provided in the papers at the present symposium.

Accordingly, the following proposals were endorsed :

(i) All papers on absorption and drifts which were primarily concerned with the interpretation of I.G.Y. data should be published, together with the relevant data, where possible, in the ionosphere data volumes of the *Annals of the I.G.Y.*

(ii) All other papers on absorption and drifts, and all papers on vertical soundings which have not been published elsewhere will be published in an U.R.S.I. Monograph.

3. — Plans for the I.Q.S.Y.

3.1. — During the Symposium there had been considerable discussion of ionospheric work to be undertaken in the fields of vertical soundings, absorption A1, and drifts during the forthcoming International Year of the Quiet Sun (I.Q.S.Y.). Detailed resolutions had been prepared by the sub-reporters, and these were endorsed, according to the following outline :

I. — *Vertical Soundings during I.Q.S.Y.*

Resolutions were formulated on the following topics :

(1) Observing programme.

(2) Observing techniques.

(3) Distribution of stations (general ; meridional chains ; other stations ; Antarctica ; ocean areas ; special closely-spaced chains ; floating ice stations).

(4) Data flow to W.D.C.s (vertical soundings data, including recommended programmes of ionogram reduction and presentation of data ; topside sounding data).

II. — *Ionospheric Drift Observations during I.Q.S.Y*

The methods of measurement of ionospheric drifts have been classified into the following categories :

D-1 Fading intercomparison at three or more antennae spaced by about one wavelength.

D-2 Radio observation of drifting meteor trails.

D-3 Radio star fading with three or more antennae spaced by about 10 km.

Resolutions were formulated on the following topics :

(1) Observing programme (synoptic ; special projects).

(2) Distribution of stations.

(3) Intercomparison of different methods.

III. — *Ionospheric Absorption measurements during I.Q.S.Y.*

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

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

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

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

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

Resolutions were formulated on the following topics with regard to the A1 method :

(1) Observing programme.

(2) Distribution of stations.

3.2. — There was a short discussion of ionospheric observations in other fields of interest during the I.Q.S.Y., and it was decided that the Secretary obtain the views of the other sub-reporters by correspondence.

3.3. — All the resolutions will be communicated by Dr. Dieminger (C.I.G. Reporter for Ionosphere) to the C.I.G. meeting on I.Q.S.Y. to be held in March 1962, and the full texts will be included in the minutes of that meeting. They will be published in the *U.R.S.I. Information Bulletin.*

3.4. — In connection with the forthcoming I.Q.S.Y. the question of possible revision of the I.G.Y. Ionosphere Instruction Manuals was raised. The Acting-Chairman recalled that the U.R.S.I. Monograph on ionogram interpretation, edited by Mr. Piggott and Dr. Rawer, had now been published, and this volume gave very detailed instructions to those concerned with vertical soundings. It may be deemed desirable to prepare similar handbooks for absorption and drifts, and a decision on this matter was left to the sub-reporters for these subjects.

4. — Operation of W.D.C.s.

Mr. A. H. Shapley mentioned that at present there was little machinery for giving effect to the various recommendations which have been passed concerning the operation of World Data Centres. He proposed, and the Committee agreed, that the Chairman be asked to consider the desirability of forming a small sub-committee amongst the W.D.C. operators in order that the necessary liaison may be established.

5. — U.R.S.I. Manual of Ionospheric Stations.

The Acting-Chairman accorded the thanks of the Committee to Mr. J. Beagley and Prof. R. W. H. Wright for their work on the collection of revisions and additions to the U.R.S.I. Manual of Ionospheric Stations, and he urged any station operators who had not yet submitted their corrections to do so as soon as possible. It is hoped that the Manual will be brought up to date by the issue of a supplement to be prepared by Colonel Herbays and Mr. G. M. Brown.

6. — The thanks of the officers of U.R.S.I. were expressed by the Secretary-General, Colonel Herbays, to all those who had organized and made possible the symposium in Nice. Especial acknowledgment was made to the French National Committee of U.R.S.I. and particularly to Professor and Mrs. Vassy, to the City of Nice, to the Centre Universitaire Méditerrannéen, and to the World Wide Soundings Sub-Committee.

G. M. BROWN,
Secretary of URSI-CIG Committee

Comité pour les Recherches Radioélectriques dans l'espace

DOCUMENTATION

L'attention des lecteurs est attirée sur les articles suivants :

— La N.A.S.A. : Programme de satellites de télécommunication, par L. JAFFE ;

— Où va l'U.I.T. dans l'espace ?, par J. PERSIN ;
publiés dans le *Journal des Télécommunications*, Vol. 29, n° 3 (mars 1962), p. 71 et p. 85, et

— Etude sur les communications par satellites, par S. G. LUTZ, publié dans ce même journal, Vol. 29, n° 4 (avril 1962), pp. 107-112.

Committee on Space Radio Research

Attention of the readers is called to the following papers :

— The N.A.S.A. Communication Satellite Programme, by L. JAFFE,

— Whether the I.T.U. in Space ?, by J. PERSIN,
published in the *Telecommunication Journal*, Vol. 29, n° 3 (March 1962), p. 71 and p. 85, and

— A Survey of Satellite Communication, by S. G. LUTZ,
Vol. 29, n° 4 (April 1962), pp. 107-112.

SERVICES PERMANENTS

I.U.W.D.S.

Il convient de rappeler que les services permanents de l'U.R.S.I. (Ursigrammes et Journées Mondiales) ont été groupés en un seul, appelé Service International des Ursigrammes et des Journées Mondiales (I.U.W.D.S.).

I.G.Y. Calendar Record

Ce calendrier a été publié dans les *Annales de l'A.G.I.*, Vol. XVI, Part I.

PERMANENT SERVICES

I.U.W.D.S.

It should be recalled that U.R.S.I. Permanent Services (Ursigrams and World Days) have been amalgamated into one single service : International Ursigrams and World Days Service (I.U.W.D.S.).

I.G.Y. Calendar Record

The I.G.Y. Calendar Record has been published in the *I.G.Y. Annals*, Vol. XVI, Part I.

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

International Year of the Quiet Sun

From I.U.C.G. Chronicle, nº 42 (Feb. 1962)

The formal proposal for a programme of geophysical research at the time of the next sunspot minimum epoch was made at a meeting of C.I.G. in August 1960. The need for such an enterprise in the radio field was discussed by the U.R.S.I.-A.G.I. Committee at its 1958 meeting in Edinburgh, and again by the U.R.S.I.-C.I.G. Committee meeting in London in September 1960.

The case for a renewed geophysical effort in certain disciplines at a period of minimum solar activity is abundantly clear. In the disciplines of geomagnetism, aurora and airglow, ionosphere, aeronomy, solar activity, cosmic rays and space research the results obtained during the maximum solar activity period of the I.G.Y. can only be brought to full fruition by a complementary, if smaller, programme at the forthcoming period of minimum activity.

It is to be emphasized that the sunspot minimum programme is not to be regarded merely as a smaller scale repetition of the I.G.Y. but it is intended that full advantage shall be taken of the new knowledge of solar-terrestrial relationship gained during the I.G.Y. and also of the improved and new techniques for geophysical research which have been, and will be, developed in the intervening years.

C.I.G. invites all those stations which helped to ensure the great success of the I.G.Y. and every other nation to cooperate again in the complementary effort in those branches of geophysics which are profoundly influenced by solar phenomena.

In selecting dates for the commencement and termination of the enterprise the Committee appreciated the difficulties inherent in predicting, with certainty, the dates of minimum solar activity and the additional complication that the minimum of magnetic activity is delayed on that of solar activity by some months. After a full discussion of the problem, in which consideration was given to communications received from Prof. M. Waldmeier and Miss J. V. Lincoln, the Committee agreed that the project should be planned for the period 1 April 1964 to 31 December 1965.

Recommendation of I.C.S.U.

The International Council of Scientific Unions (I.C.S.U.) after discussing the proposal on I.Q.S.Y. submitted by the C.I.G. adopted the following recommendation at its IX General Assembly, London, September, 1961 :

« The General Assembly of I.C.S.U. :

Noting that the need for a geophysical programme during sunspot minimum was emphasised in 1958 by the International Scientific Radio Union - International Geophysical Year Committee and that the Comité International de Géophysique, at its meeting in January 1961 in Paris, discussed the project in some detail and agreed it should be planned for the period April 1, 1964, to December 31, 1965 ;

Considering the International Geophysical Year was deliberately planned for a sunspot maximum period and that if the International Geophysical Year is to be brought to full fruition, a comparable and complementary set of measurements is needed at solar minimum activity ;

Considering further the real advantage in making these measurements at the next solar minimum which is expected in 1964-1965 ;

Realizing that the Comité International de Géophysique is now in possession of invaluable experience from the International Geophysical Year ; that most of the new stations established for the I.G.Y. are still operating and that it would be advisable on economic and scientific grounds to use these stations in 1964-1965 ;

Desiring that the International Year of the Quiet Sun should not be a simple repetition of International Geophysical Year

observations but that fullest possible use be made of all new and improved techniques developed during and since the International Geophysical Year ;

Considering the universally acknowledged success of the International Geophysical Year and the world-wide fund of goodwill for international co-operation in geophysics which it established,

Unanimously resolves that approval be given to the proposal by the Comité International de Géophysique for a further international geophysical programme in 1964-1965 to be known as the International Year of the Quiet Sun, and recommends the fullest participation in it by all Scientific and National Members. »

First I.Q.S.Y. Meeting

The first meeting to discuss the programmes of the nations participating in the International Year of the Quiet Sun (I.Q.S.Y.) is being held in Unesco House, Paris from 26 to 29 March 1962. The first session is to be opened by P. I. Erchov, Assistant Director General of U.N.E.S.C.O., in Room II.

The Agenda of the meeting are as follows :

1. Approval of Agenda.
2. Organization of the Committee and election of Working Groups and Resolutions Committee.
3. Programme to be undertaken.
4. Examination of programmes of participating countries and Unions.
5. Collaborative programmes :
   (*a*) Geographic : Antarctica, Arctica, Tropical countries.
   (*b*) Scientific : Alerts and Special Warnings, Sq, Solar patrol.
6. Geographical Distribution of Stations.
7. Collection and Distribution of Data.
8. Finances.
9. Publications :
   (*a*) New or revised manuals.
   (*b*) Revised W.D.C. Guide Data Publication.

10. Preparation of report on observations required and observations proposed in national and Union programmes.
11. Organization of a Permanent Secretariat.
12. Resolutions.

PROGRAMME TO BE UNDERTAKEN

At the fourth meeting of the Comité International de Géophysique in Paris, January 1961, the following preliminary programmes were drawn up by a small Working Group :

I. — World Days

(1) The *World Days* programme was initiated under the auspices of C.S.A.G.I. for 1957-1959 and has continued since then under the auspices of the International World Day Service. For the I.Q.S.Y., it is anticipated that the World Days activities will be similar to that of the I.G.Y./I.G.C. 1959 and the interim year as outlined in the following paragraph.

(2) *International Geophysical Calendar.* — It is expected that a calendar for 1964 and 1965 will be issued well in advance and will include (*a*) Regular World Days (R.W.D.), one principal and two others consecutively each month, in mid-month, mid-week, and preferring moonless nights for I.Q.S.Y. programs which are suitable for execution on one or three days each month throughout the I.Q.S.Y., (*b*) Regular World Intervals (R.W.I.), 10 consecutive days each quarter including the equinoctial and solsticial days, for I.Q.S.Y. programs appropriate to this kind of coverage ; (*c*) World Meteorological (Rocket) Intervals, 10 consecutive days each quarter, set approximately one month after equinox and solstice, for I.Q.S.Y. program, for which the change of (meteorological) seasons are important ; and miscellaneous days such as days of solar eclipses, principal days of meteor activity, etc. The calendars for the I.Q.S.Y. period, 1964-1965, should be issued and distributed at the latest by mid-1963. The I.W.D.S. is invited to take appropriate action in consultation with C.I.G.-I.Q.S.Y. Reporters and C.O.S.P.A.R.

(3) *Alerts.* — The I.W.D.S. system of geo-alerts and solar-alerts, both advance and regular, regional and worldwide, should be in operation during I.Q.S.Y. The cooperation of the meteorological

communication network coordinated by World Meteorological Organization, and of the various meteorological communication networks is invited for the prompt distribution of Alert messages to stations participating in the program for I.Q.S.Y. These alerts are prompt notifications to participating stations that a specific outstanding solar or geophysical event has occurred. The stations are thus alerted to modify or extend their programs as appropriate to the discipline involved.

(4) *Special World Intervals.* — S.W.I. should be called from time to time on an immediate schedule. These may be, as appropriate, in anticipation of or immediately after recognition of unusually significant geophysical or geomagnetic disturbances during which it will be clearly desirable that certain geophysical stations make more detailed observations appropriate to their program or undertake special experiments, such as rocket or balloon flights. These S.W.I. should be called by the World Warning Agency, after appropriate advice from other scientific groups, and declared at a stated time of day (e.q. 1600 UT, as during I.G.Y.) over the communications network coordinated by W.M.O. and over other facilities. The S.W.I. should take effect upon receipt of the message, and continue until a terminating message is received The message should specify whether the S.W.I. is based on prediction or on actual commencement of disturbance.

(5) *Rapid Interchange of Solar-Geophysical Data.* — The arrangements for rapid interchange of significant data by telegram or similar means, should be continued in effect during I.Q.S.Y. as arranged by the U.R.S.I. Central Committee on Ursigrams. The selection of the appropriate level of solar-geophysical activity to be thus interchanged should be adapted to the stage of the solar activity cycle. Cooperating observatories in the I.Q.S.Y. program are invited to participate in supplying relevant data by telegram. I.Q.S.Y. stations are invited to avail themselves of the telegraphic summaries where their observing programs or immediate researches will benefit by knowledge of current solar and geophysical activity.

(6) *A Calendar Record* should be compiled under I.W.D.S. auspices for publication as soon as practical after the I.Q.S.Y. observing period. It should follow the general pattern of the I.G.Y.

Calendar Record and take into account experience in the interim. The continued cooperation of discipline reporters, sub-reporters and institutions involved is invited.

III. — Geomagetism

Time-variations of the geomagnetic field and of earth-currents provide valuable basic information on solar influences on the Earth, exerted by means of solar wave radiation, as well as by the impact of clouds of solar gas (corpuscular radiation). Important links exist between these variations and other phenomena such as aurora, ionospheric conditions and cosmic radiation ; also, the structures of the outer atmosphere and of the radiation belts change distinctly with geomagnetic activity. Geomagnetic time-variations are so sensitive to solar influences that these variations will give unique and reliable continuous information on solar influences during the intervals of minimum solar activity.

The I.G.Y. having provided excellent data on conditions during sunspot maximum, it is imperative to supplement that enterprise by observations to be carried out during I.Q.S.Y. at a level at least comparable to the program of the I.G.Y., at ground observatories as well as in space. The network of stations should be supplemented by additional stations, in particular in and inside the auroral zone where geomagnetic activity responds clearly to weak solar corpuscular radiation.

Special attention should be given to observations of rapid variations of earth-currents and of the geomagnetic field in the range of 0.1 to 15 sec. periods, using rapid-run registration with a time-resolution of not less than 30 mm/minute. Special storm variometers should be installed to record magnetic storms, in their general course as well as in their fine structure, as clearly and completely as possible, in order to avoid loss or illegibility of records during the most interesting geophysical intervals.

V. — Ionosphere

1. As a result of the I.G.Y. program in ionosphere, there already exist in the scientific literature the most comprehensive description and discussion of the ionosphere for any period in history. The I.G.Y. was a period of solar maximum activity. Since the ionization is produced mainly by ultraviolet light and X-rays from the

sun, the state of the ionosphere is changed very distinctly as these solar fluxes change from solar maximum to solar minimum. The type and intensity of ionospheric disturbances are also quite different at the two extremes of the solar cycle. Thus to extract the full potential of the extensive and successful ionospheric work of I.G.Y. and I.G.C., there is need for a companion and comparable program at solar minimum.

2. The first priority of the I.Q.S.Y. program in ionosphere should be the production of data for direct comparison with I.G.Y. and I.G.C. data. In some sub-disciplines the networks of stations may not need to be as complete as for the I.G.Y. in order to determine and study the solar cycle effects. But in all cases, care must be taken that the observations during I.Q.S.Y. are taken, reduced and published in a way so that they may be discussed jointly with the I.G.Y. body of data.

3. The second priority of the program should be the exploitation of new techniques and the following up of new knowledge of the ionosphere gained during and since the I.G.Y. Again the emphasis should be on ionospheric studies where change in solar activity is an important factor. Such experiments, including those with rockets and satellites will both be important to present researches and be a reference to which future experiments of this kind can be compared.

4. The ionospheric program to be prepared for I.Q.S.Y. may be divided into sub-disciplines, somewhat as for I.G.Y., as given below. In most cases the U.R.S.I.-C.I.G. Committee has already designated « sub-reporters » for these component points of the program. For experiments in these sub-disciplines to be fully effective, there needs to be a degree of coordination to assume compatibility and comparability of results ; it is the task of the sub-reporters to take steps to try to arrange for this degree of uniformity in the programs undertaken for I.Q.S.Y.

Vertical incidence soundings
Oblique incidence pulse transmissions
Absorption A-1 (pulse at vertical incidence)
Absorption A-2 (extra terrestrial noise)
Absorption A-3 (cw fieldstrength)

Drift D-1 (pulse fading)
Drift D-2 (meteors)
Drift D-3 (scintillations)
Radar aurora
Whistler and VLF emission
Backscatter B-1 fixed frequency
Backscatter B-2 multifrequency
Forward scatter
Scatter sounding
Atmospheric noise
Rockets and satellites

5. A number of important problems in ionospheric physics which are mostly unsolved seem especially appropriate for study during I.Q.S.Y.

They will depend on work done in several of the sub-disciplines mentioned above. The list of problems is naturally incomplete and is intended to be suggestive.

(*a*) The upper side of the F-region is now accessible to measurement in several ways, both from the ground and by rockets and satellites. A study of the F-region electron content as a whole and its time and geographic variations should perhaps be a major effort of I.Q.S.Y., involving as it does close cooperation of ground and space techniques and stations.

(*b*) Geomagnetic control of the ionosphere has taken on new significance with the improved understanding of the role of the magnetic field in aligning and guiding electrons. Coordinated observations at magnetically conjugate stations takes on increased importance in the ionospheric discipline as well as for aurora.

(*c*) The lower ionosphere, 50 to 100 km, is still not too well understood. Particular effort seems necessary to improve the understanding of absorption processes and work during the relatively simple conditions of minimum solar activity may help. An opportunity exists to bring together the potentialities of various improved ground-based techniques with those of the newer rocket methods.

(d) It is one of the major results of I.G.Y. and I.G.C. that the ionosphere cannot be regarded as a medium in quasi-equilibrium

at least during disturbed conditions. The dynamic processes in the ionosphere are thus of paramount interest. Obviously a pertinent picture of these processes can be obtained only from a knowledge of true motions in the ionosphere. These in turn may be derived from the temporal variations of N(h) — profiles and simultaneous drift observations. It is very important that these also be calibrated against drift measurements by meteor and rocket techniques.

(e) The physics and chemistry of the formation and maintainance of the regular ionospheric layers remains an important problem although great progress has been made from the N(h) and rocket programs of the I.G.Y. A complementary program in I.Q.S.Y. will be most important, especially since the conditions will be relatively undisturbed and the F1 layer will be more prominent. The broad geographic coverage of the vertical sounding network will be of great advantage in this work.

(f) The state and development of the ionosphere over the polar caps may hold the key to understanding many ionospheric processes. Here comparison of solar maximum and minimum data will help. Readjustment of station networks in view of I.G.Y. results and introduction of additional experiments at such stations should be considered.

(g) Irregularities in electron distribution in the very high ionosphere or exosphere have become better recognized as a result of I.G.Y. and subsequent effort. It seems certain that very significant solar cycle effects will be found in this part of the ionosphere, although the detailed motions of such changes can hardly be imagined.

6. Bearing in mind that data taken during I.Q.S.Y. must be comparable to that of I.G.Y., every possible effort should be made to improve the techniques and instrumentation used for ionospheric observations. In particular an increase in accuracy of measurement seems possible in vertical soundings and in techniques in absorption, drifts and ULF recordings.

7. The U.R.S.I.-C.I.G. Committee is developing more detailed program outlines for the various sub-disciplines. It is appropriate for suggestions to come from the international scientific community so that the balance of emphasis can be representative of the present state of the science.

XI. — Space Research

In the discipline programs outlined above several references are made to geophysical experiments requiring the use of balloons, rockets, satellites and space probes. The C.O.S.P.A.R. representative at the I.Q.S.Y. Committee, Prof. J. Bartels will transmit these proposals to C.O.S.P.A.R. for consideration. The general resolutions contain a reference to C.O.S.P.A.R. participation in the I.Q.S.Y.

In addition the following suggestions are made by the C.I.G.-I.Q.S.Y. Committee for a space research programme during I.Q.S.Y.

(i) studies of the zodiacal light, intensity or polarization in order to determine the distribution of dust, etc. in interplanetary space and in the neighbourhood of the earth.

(ii) measurement of magnetic field intensities and variations in interplanetary space.

(iii) studies of phenomena in the terrestrial atmosphere associated with hydromagnetic waves.

PROGRAMMES OF PARTICIPATING COUNTRIES

In response to a request to countries intending to participate in I.Q.S.Y. the programmes given below have been received from Austria, Belgium, Czechoslovakia, Finland, France, Ireland, Japan, Netherlands, New Zealand, and the United States of America.

Austria

Programme of Special Observations during I.Q.S.Y. (March 1962)

V. — *Ionosphere*

Institut für Meteorologie und Geophysik, Universität Graz.

Hourly vertical incidence soundings.

Quarter-hourly vertical incidence soundings on International World Days.

Evaluation and publication of monthly mean values for f_oE, f_oEs, f_oF1, f_oF2, h'E, h'F, and h'F2, as well as hourly values of f_oF2.

Construction of *f*-plots and transmittal to the Slough Data Centre for all World Days.

Calculation of N(h)-profiles, at least for the World Days.

Hourly measurements of ionospheric absorption by method A-1 (pulse at vertical incidence).

Whistler observations, if possible at Sonnblick Observatory (3100 m).

Satellite observations, in collaboration with the Geodetic Institute, Technische Hochschule Graz.

Address : Prof. F. Steinhauser, Zentralanstalt für Meteorologie and Geodynamik, Hohe Warte 38, Wien XIX, Austria.

Belgique

Programme Provisoire de l'I.Q.S.Y. (1964-1965)

I. — *Journées Mondiales.*

Le centre belge de réception et de diffusion des messages d'Alertes et des Intervalles Mondiaux Spéciaux établi au Service du Rayonnement de l'Institut Royal Météorologique participera au programme général.

V. — *Ionosphère.*

Le Centre de Physique du Globe établi à Dourbes par l'I.R.M. effectuera les observations suivantes :

Observation de l'ionosphère par sondages verticaux donnant :

a) Ionogrammes normaux (balayage de 1 à 20 Mc/s en 3 min toutes les 15 minutes).

b) Enregistrement continu des hauteurs virtuelles en fonction du temps.

c) Enregistrement continu de la fréquence critique de la couche E et Es en fonction du temps.

d) Enregistrement continu du MUF_2 en fonction du temps.

Observation de l'ionosphère par impulsion verticale pour la mesure d'absorption A-1 sur les fréquences 2, 3, 4 et 6 Mc/s.

VI. — *Activité solaire.*

1. Domaine radio-astronomique (Observatoire de Humain).

Observations radio-électriques du soleil calme sur les fréquences de 153 MHz, 408 MHz, 600 MHz et 800 MHz.

Ces observations concernent :

a) la mesure absolue du flux solaire global sur les différentes fréquences afin d'établir la courbe énergie-longueur d'onde su soleil calme ;

b) la mesure des distributions de brillance sur 408 MHz et 900 MHz.

La mesure sur 408 MHz doit, en principe, être effectuée à l'aide de l'interféromètre à 48 paraboloïdes (pouvoir résolvant 3') à la station de Humain.

La mesure sur 900 MHz doit être effectuée à l'aide de l'interféromètre à deux antennes, à balayage de lobes et à base variable, dont la réalisation sera terminée pour cette époque.

Le programme des mesures absolues implique :

a) la calibration absolue des radiomètres à l'aide de charges thermiques ;

b) la détermination absolue du diagramme de gain à l'aide de radiosources.

Adresse : Prof. M. Nicolet, I. R. M., 3 Avenue Circulaire, Bruxelles 18, Belgium.

Czechoslovakia

Provisional Programme for I.Q.S.Y. (December 1961)

I. — *World Days.*

Rapid exchange of solar and geomagnetic data by means of Ursigrams or similar form of information with the stations Nizmir Moskva (Regional Center), F.T.Z. Darmstadt, N.E.R.A. Netherlands and (on working days) C.N.E.T. Bagneux, France.

V. — *Ionosphere.*

1. Vertical ionospheric sounding at 1-18 Mc/s every 30 minutes.

During the World Days the intervals may be reduced, up to uninterrupted recording ; this is, however, not recommended in the period of quiet sun as the equipment easily jams when working at short intervals.

2. Permanent measurement of the absorption (recording of the field's intensity) at 2,61 and 2,78 Mc/s.

3. Permanent measurement of the atmospheric noise at 5 and 27 kc/s.

Study and classification of special effects (S.I.D., S.E.A., S.F.A.).

4. Study of whistlers and V.L.F. emissions may be introduced, nevertheless a more detailed project should be elaborated after the Warszawa Conference scheduled for December 1961.

Address : Prof. F. Link, Astronomichy Ustav, Ceskoslovenska Akademia Ved, Budecska 6, Prague 12, Czechoslovakia.

Finland

Provisional Program for I.Q.S.Y. (February 1962)

V. — *Ionosphere.*

Regular vertical incidence soundings continue at Sodankylä and Nurmijärvi. Oblique incidence measurements between Sodankylä and Lindau continue also. Measurements of radio wave attenuation will be carried on between Kemi (65°45'N, 24°30'E) and Sodankylä. These attenuation measurements will probably be started also between Sodankylä and Numijärvi.

VI. — *Solar Activity.*

The present program of the study of the low-frequency radio spectrum of the sun will be undertaken at Keimola (60°21'N, 24°46'E). It is expected that the program will be extended to the use of interferometer technics on the sweep-frequency and fixed-frequency basis. The basis of corner reflectors of sufficient size is planned.

Address : Prof. J. Keränen, Academia Scientiarum Finnica, Snellmaninkatu, 9, Helsinki.

France

Projet de programme pour l'Année Internationale du Soleil Calme (Février 1962)

I. — *Jours Mondiaux.*

Un Calendrier Géophysique International pour l'A.I.S.C. est en cours de préparation. Son application suppose une organisation de collecte et de diffusion des informations, à laquelle la France se doit de participer.

Pour la collecte des données spécialisées et leur diffusion à long terme, les Centres Mondiaux de Données (W.D.C.) français suivants pourront poursuivre leur travail : Ciel Nocturne (W.D.C.-C1, Institut d'Astrophysique, Paris), Activité Solaire (W.D.C.-C4, Observatoire de Paris, Meudon ; W.D.C.-C5, Observatoire du Pic du Midi).

Pour la diffusion à court terme, prévisions et alertes, le Centre d'Information sur les Relations Soleil-Terre (C.I.R.S.T.) pourrait assurer les fonctions suivantes : Service des « ursigrammes », informations sur les phénomènes solaires et géophysiques, prévisions et alertes selon besoins exprimés (M. Michard, Observatoire de Meudon).

V. — *Ionosphère.*

Les études au sol de l'ionosphère seront effectuées à partir du réseau de stations de sondage ionosphérique françaises, qui fonctionneront conformément au programme fixé internationalement : Paris, Garchy, Poitiers, Tamanrasset, Dakar, Djibouti, Bangui, Tahiti, Tananarive, Kerguelen, Terre Adélie. Le fonctionnement des stations à haut régime pendant l'A.I.S.C. suppose le remplacement, la révision ou l'adaptation vers les fréquences basses de certains sondeurs : Terre Adélie et Kerguelen (T.A.A.F.), Djibouti et Dakar (C.N.E.T.-D.P.I.).

Certaines de ces stations pourront être dotées d'un riomètre pour mesure du bruit galactique et éventuellement d'un équipement de mesure d'absorption à plusieurs fréquences : Djibouti, Tahiti, Kerguelen, Terre Adélie (C.N.E.T.-G.R.I.).

Les stations australes en région aurorale pourront être munies de radars auroraux : Kerguelen, Terre Adélie (T.A.A.F.).

Dans la région antarctique, la France peut participer à la mise en place de liaisons par réflexion météorique à partir de Dumont d'Urville, Terre Adélie, dans le cadre d'un projet international patroné par le Scientific Committee on Antarctic Research (S.C.A.R.) et dont le but principal est, outre l'étude de la basse ionosphère, la détection des événements à particules dures (C.N.E.T. C.D.S.).

Pour l'étude indirecte au sol de l'ionosphère extérieure, le Laboratoire de Physique de la Haute Atmosphère, à Poitiers (M. Rivault) pourra être développé pour l'observation permanente des sifflements

radioélectriques et des bruits d'origine exosphérique, et le Laboratoire de Physique de l'Exosphère à Paris (M. Delloue, Faculté des Sciences) étudiera la structure des sifflements et des bruits exosphériques. Simultanément le réseau d'enregistrement du champ moyen des atmosphériques sera maintenu (M. Carbenay).

Un ensemble d'études sur les phénomènes mettant en cause la conjugaison géomagnétique de deux points d'observation terriens sont entreprises (C.N.E.T., M. Storey), profitant de la situation favorable des points conjugués de France et d'Afrique du Sud. Ces études concernent l'enregistrement simultané des sifflements en deux paires de points conjugués (M. Storey, C.N.R.S. et M. Rivault, Poitiers) ; des sondages ionosphériques simultanés pour l'étude des perturbations itinérantes de la couche F (C.N.E.T.-G.R.I.) ; l'étude de la propagation guidée par le champ magnétique des ondes courtes (C.N.E.T.-G.R.I.) ; l'étude de la corrélation des bruits exosphériques entre points conjugués (C.N.E.T.-G.R.I.) ; l'installation des riomètres en des points conjugués (C.N.E.T.-G.R.I.) ; la réception par propagation exosphérique de l'émetteur de Sainte-Assise en Afrique du Sud (M. Delloue, Faculté des Sciences) ; enfin des enregistrements magnétiques simultanés, déjà mentionnés (M. Schlich, I.P.G.).

Une étude directe de l'ionosphère par fusées est également prévue : Etude de la température dans la couche F par éjection de sodium en région saharienne et en zone aurorale (M. Blamont, C.N.R.S.) ; étude des mouvements au niveau de la couche E par éjection de sodium (M. Blamont, C.N.R.S.) ; étude de la structure fine de la basse ionosphère et des couches E sporadiques par sondes portées (C.N.E.T.-C.D.S.) ; étude de l'absorption dans la couche D par mesure du champ d'émetteur T.B.F. (C.N.E.T.-T.C.) et d'émetteurs B.F. et M.F. (M. Vassy, Faculté des Sciences).

VI. *Activité solaire.*

A la station radioastronomique de Nançay (M. Denisse) : enregistrement du flux solaire à 169, 500 et 9000 MHz, localisation interférométrique des centres d'émission, observation journalière à 9000 MHz avec le grand radiotélescope (localisation des centres), observation spéciale (juin 1964 et 1965) de l'occultation de la Nébuleuse du Crabe par la couronne solaire.

Des observations sont prévues en outre en ballons et en fusées : observation de la couronne solaire en ballon (M. Dollfus), mesures du rayonnement primaire solaire en UV et rayons X par ballons et fusées (M. Blamont, C.N.R.S.), mesures du rayonnement UV solaire par fusées (M. Vassy, Faculté des Sciences.)

VIII. *Recherche Spatiale.*

Les études mettant en œuvre des fusées ont été replacées dans le cadre de chaque discipline concernée. (II. Météorologie et Aéronomie III. Géomagnétisme, IV. Ciel Nocturne et Aurores, V. Ionosphère, VI. Activité Solaire).

Des études sont également prévues en satellite, dans le cadre d'une coopération avec la National Aeronautic and Space Administration aux Etats Unis (N.A.S.A.) pour le lancement. Les satellites envisagés sont un satellite pour études des irrégularités d'ionisation dans l'exosphère à partir de la propagation d'ondes TBF (C.N.E.T.-T.C.), un satellite d'observation du ciel nocturne et des perturbations magnétiques et un satellite d'études des aurores (M. Blamont, C.N.R.S.), et un satellite avec spectrographe de masse pour détection des ions positifs (M. Vassy, Faculté des Sciences).

Adresse : Prof. E. Thellier, Institut de Physique du Globe, 191 rue Saint-Jacques, Paris 5.

Ireland

Provisional Programme for I.Q.S.Y. (December 1961)

V. *Ionosphere.*

Recording of sudden ionospheric disturbances (S.I.D.). Dunsink Observatory to act as W.D.C. for records of these phenomena.

Address : Mr. J. Byrne, National Committee for Geodesy and Geophysics, 44 Upper O'Connel St., Dublin, Ireland.

Japan

Provisional Programme for I.Q.S.Y. (February 1962)

I. — *World Days and Communications.*

The Radio Research Laboratories, Ministry of Posts and Telecommunications, will act as the center of the World Days and

Communications in Japan during I.Q.S.Y. If necessary Radio Research Laboratories will accept the responsibility as the Regional Center of the Western Pacific Region as during the I.G.Y.

V. — *Ionosphere.*

I.Q.S.Y. observations in the ionosphere discipline will be intensified in whistlers and VLF emissions much more than during I.G.Y. and I.G.C.

Items of observation and stations are shown in the following table.

Items	*Stations*
Vertical incidence soundings	Wakkanai, Akita, Kokubunji and Yamagawa
Oblique incidence pulse transmissions	Hiraiso
Absorption A-1 (pulse at vertical incidence)	Kokubunji
Drift D-1 (pulse fading)	Yamagawa
Drift D-2 (meteors)	Yamagawa, Hiraiso and Wajima
Forward scatter	Yamagawa, Yonago, Hiraiso and Sapporo
Back scatter B-2 multifrequency	Hiraiso
Atmospheric noise in ELF band	Toyokawa
in VLF band	Toyokawa
in LF band	Toyokawa
in HF band	Ohira, Wakkanai and Yamagawa
Whistlers	Wakkanai and Toyokawa
VLF emissions	Hokkaido, Kyoto and Kakioka
Radio observation of satellites	Toyokawa

VI. *Solar Activity.*

Radio Observations. Intensity and polarization observations at frequencies of 9500, 9400, 3750, 3000, 2000, 1000 and 200 Mc/s, intensity observations at 100 and 60 Mc, position determination at 9400, 4000 and 200 Mc will be made as for the I.G.Y. Intensity

observations at 17,000 and 35,000 Mc are planned. It is also planned to increase the resolving power of the interferometer at 9400 and 4000 Mc/s up to $0.7 \times 3'$.

Address : Prof. M. Hasegawa, Science Council of Japan, Tokyo, Japan.

Netherlands

Provisional Program for I.Q.S.Y. (March 1962)

V. — *Ionosphere.*

Routine measurements will be continued at the stations in the Netherlands and in Paramaribo and possibly in Hollandia (Netherlands New-Guinea). Furthermore drift measurements will be made at Paramaribo (Surinam) by means of the Mitra-method in cooperation between the Meteorological Institute and the P.T.T.

The following investigations will be carried out at the P.T.T. station N.E.R.A. :

(*a*) Scintillation measurements of radio radiation from the sun will be made on the frequency of 200 Mc/s.

(*b*) Riometer measurements at 25 Mc/s.

Radio Astronomy.

(*a*) A spectrograph for the frequency 175-300 Mc/s will be used to study the radio radiation from the sun (N.E.R.A.).

(*b*) The big telescope at Dwingeloo will make absolute measurements of the flux in one or more discrete frequencies of the radiation from the sun.

(*c*) The same will be done at N.E.R.A. for frequencies of 200, 545, 3000 and 9100 Mc/s by comparing relative fluxes.

(*d*) Interferometric detection for weak sources of enhanced radiation on frequencies of 108 Mc/s (3 bases), 136 Mc/s (3 bases), 200 Mc/s (3 bases) and 254 Mc/s (1 base).

This set of interferometers will also be used for tracking satellites.

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

New Zealand

Provisional Programme for I.Q.S.Y. (December 1961)

I. — *World Days.*

New Zealand is not in a position to contribute significantly to the organization of World Days but, in cases where data from New Zealand stations are of vital importance, is prepared to give full cooperation.

V. — *Ionosphere.*

(*a*) Vertical incidence sounding will be carried out at Rarotonga (Cook Islands), Godley Head (New Zealand), Campbell Islands, Hallett Station and Scott Base with the following equipment :

Rarotonga	NZ	P2	ionosonde
Godley Head	NZ	P2	ionosonde
Campbell Island	US	C4	ionosonde
Hallett Station	US	C4	ionosonde
Scott Base	NZ	P2	ionosonde

(*b*) Effect of ionosphere on long distance HF radio propagation. Studies will be made of the angle of arrival of HF signals from near antipodal transmitters at Seagrove and Invercargill.

(*c*) Study of fading and diversity effects. At Seagrove and Invercargill.

(*d*) Electron density determination using satellites. Interferometric observations will be made at Ardmore.

(*e*) Antipodal reception of satellite signals. An interferometer will be used at Ardmore to obtain bearing and elevation angles. This will enable the size and position of the effective antipodal area to be determined.

(*f*) Radar meteor equipment will be operated near Christchurch.

(*g*) If there is a suitable satellite in orbit during the I.Q.S.Y. observations will be made at Lower Hutt and Scott Base of scintillation due to ionospheric irregularities.

(*h*) Observations of whistlers and VLF emissions according to the internationally agreed minimum synoptic programme will be continued at Wellington, Lauder, Hallett Station and Scott Base.

Address : New Zealand Committee for Geodesy and Geophysics, P. O. Box 8005, Wellington, New Zealand.

United States of America

Preliminary Outline of Proposed Program for I.Q.S.Y. (*December* 1961)

Following the general philosophy and basic scientific outline of the I.Q.S.Y. program, as presented to the third meeting of C.I.G. by the Working Group on the Solar Activity Minimum Program, a preliminary description of the U. S. contribution to I.Q.S.Y. has been developed. This is described in the following discipline sections; proposed observations making use of sounding rockets, satellites and space probes are described under appropriate discipline headings.

I. — *World Days.*

The United States will participate in the rapid assessment of solar and geophysical data for the purpose of calling the various forms of Alerts and Special World Intervals - the program that evolved from the I.G.Y. World Day program. A.G.I.W.A.R.N., at Fort Belvoir, Virginia, will continue to operate as the focus of U. S. efforts, and the North Pacific Radio Warning Service of the National Bureau of Standards will continue to be the regional warning center for Alaska and other nearby areas.

Many of the special experiments discussed in the following sections will be arranged so that notification of a solar or geophysical event during I.Q.S.Y. will result in special observations or increased schedule of observations.

V. — *Ionospheric Physics.*

Synoptic Programs. The C.R.P.L. network of some twenty-five vertical incidence sounding stations, many operated cooperatively with scientists of other countries, will continue through the I.Q.S.Y. period. There are plans at C.R.P.L. to extend the low-frequency end of the swept spectrum, 1-25 Mc/s down to 0.25 Mc/s. The network includes the pole-to-pole chain along the 75° West meridian and will thus offer comparison with the I.G.Y. data. Vertical incidence stations are also used as control points for conjugate point, rocket and satellite experiments. The I.G.Y. whistler networks in both eastern and western U. S. longitudes have continued since I.G.Y. with some modification and reduction of sampling and will be brought back to full sampling for I.Q.S.Y.,

with some improvements in station location and coverage. At many of these stations, hiss and E.L.F. equipment are also operated. Some special experiments have already been tried and new programs are planned to transmit man- made signals in the whistler mode for a detailed study of propagation and reception phenomena. Improved riometers are in operation at arctic and antarctic stations for monitoring ionospheric absorption, particle events, and the determination of D and D region parameters.

Special Programs. High power radars are under construction to extend radio probing out to thousands of kilometers and perhaps several earth radii. Spaced-receiver experiments are in operation for study of ionospheric irregularities and drifts. Ground reception of satellite radio transmissions continues at University of Illinois, State University of Pennsylvania, C.R.P.L., and Geophysical Institute, for deducing ionospheric parameters from Doppler, Faraday rotation, and fading data.

A satellite-borne down-looking vertical incidence sounder has been successfully tested in a rocket and is planned for launching in one of the satellite payloads. Other satellite payloads contemplated included E.L.F. and whistler monitors. Rocket flights are planned, and now being carried out as part of continuing programs at A.F.C.R.L. and University of Michigan using Langmuir and other ionospheric probes carried by and/or ejected by rockets. Other rocket experiments are being planned that will include synoptic observations of electron density and electric currents. True electron density/height profiles are computed at C.R.P.L. for a number of stations as corrollary information to other ionospheric investigations. Several pairs of magnetically conjugate stations are planned for coordinated E.L.F., whistler, continuous hiss, absorption, and geomagnetic observations. The various centers of ionospheric research at Stanford, A.F.C.R.L., C.R.P.L., State University of Pennsylvania and the Geophysical Institute Alaska are continuing and planning a wide variety of specialized experiments and theoretical ionospheric investigations that will compare I.G.Y. results with data from the I.Q.S.Y. and study ionospheric effects that are related to the solar cycle.

VI. — *Solar Activity.*

Radio astronomers at Harvard College Observatory, Fort Davis, Texas, contemplate basic radio measurements of the sun during

the time of minimum, including, for example, temperatures at various parts of the emission spectrum and reference measurements of levels for comparison during the next solar maximum. The decreased opacity of the ionosphere during the time of minimum will also permit radio observations (at H.A.O., Boulder) of the sun to be extended down to about 8 Mc. Data from the patrol programs, as well as data from other disciplines, particularly data that will permit calculation of flare energetics, will contribute to the basic solar research carried on during the I.Q.S.Y.

Data Publication. It is expected that solar and other data will continue to be made available through the interim publication of the H.A.O. and the C.R.P.L. monthly F Series, Part B, « Solar Geophysical Data ».

XV. — *Other Programs.*

There are a number of experiments using satellite and space probe payloads, as well as ground based observations, that are relevant to the solar cycle and hence I.Q.S.Y., but that do not conveniently fit into the discipline categories. These observations for example, include studies of the solar plasma in near space, low frequency radio astronomy, and spectroscopic studies of the zodiacal light as a means for understanding the nature of interplanetary matter.

Address : Dr. H. Odishaw, Geophysics Research Board, National Academy of Sciences, 2101 Constitution Avenue N. W., Washington 25, D. C., U. S. A.

RECOMMENDATIONS OF INTERNATIONAL UNIONS AND COMMITTEES

International Astronomical Union

The following is a brief résumé of some of the relevant resolutions and discussions which came before Commissions 10 and 10*a* of I.A.U. at its last General Assembly, as prepared by Prof. M. A. Ellison.

Dr. A. H. Shapley described the organizations now in operation for the publication of solar activity data and for the quick exchange of information about out-standing solar events. In this connection

Dr. R. Michard proposed the following resolution which was unanimously agreed by Commission 10 :

The Commission, considering the wish expressed by the Comité International de Géophysique and other organisations for world-wide co-operation in geophysics, urges all observers active in the solar patrol to report promptly to the nearest Regional Warning Centre, by telegram or other available fast channel, all flare events of importance 1+ and greater during the coming years of declining solar activity and especially during I.Q.S.Y.

The telegraphic addresses of the Regional Warning Centres (R.W.Cs.), as arranged by the International World Days Service are as follows :

Western Europe : AGI NEDERHORSTDENBERG (Dutch Section) ; GENTELABO PARIS (Paris Section) ; IONOSPHARE DARMSTADT (Darmstadt Section) ;

Eurasia : NIZMIR MOSCOW ;

Western Hemisphere : AGIWARN WASHINGTON ;

Western Pacific : AGI KOKUBUNJI ;

Australasia : IPSO SYDNEY ;

Alaska : BUSTAN ELMENDORF AFB ALASKA ;

Sweden : IGY CENTRE STOCKHOLM.

The object of these telegrams is to provide material for (*a*) the declarations of Advance Alerts, GEOALERTS and Special World Intervals : these assist in the world-wide co-ordination of geophysical observations of phenomena which are significantly dependent upon solar and geomagnetic disturbances, (*b*) preparation of daily or weekly reports on current flare data.

Following a discussion on the need for improvements in the estimation of flare importance the following resolution was adopted by Commission 10 :

That a Working Group be appointed to consider all problems concerned with the estimation of flare importance and to make recommendations which could be put into operation from 1 January 1965.

Members of the Working Group were appointed as follows : M. C. Ballario, A. Bruzek, H. Dodson-Prince (Chairman), E. E. Dubov, M. A. Ellison, R. Hedeman, J. V. Lincoln, R. Michard,

Y. Ohman, H. J. Smith and C. Warwick. The Group was empowered to take earlier action if it found that discrepancies were arising between the estimations of different stations through the use of incorrect units or methods of measurement. Meanwhile, stations are requested to follow their present system of estimating flare importance and of reporting their results which should continue to be based upon the Report of the Working Group on Flare Classification (Transactions, I.A.U., Vol. IX, p. 146) and the I.G.Y. Instruction Manual for Solar Activity (*Annals I.G.Y.*, Vol. V, p. 245). Attention is also drawn to the report « Un examen de l'état présent de la surveillance des éruptions solaires en lumière H » by Dr. R. Michard.

Union Radio Scientifique Internationale

(see p. 24 and 28)

Scientific Committee for Antarctic Research

Plans and recommendations in relation to I.Q.S.Y.

Routine ionosonde observations should be continued without curtailment throughout the I.Q.S.Y. period. Maximum possible use should be made of riometers for the study of absorption with special emphasis on the use of instruments recording at more than one frequency. Riometers should be regarded essentially as instruments for the observation of special events and should therefore be installed at every ionosonde station and, more important, at every neutron monitor installation. Absorption measurement based on studies of *f*-plots and *f*-min., whilst desirable, should not be made at the expense of the riometer techniques.

Low power low cost oblique incidence VHF ionospheric forward scatter experiments are recommended in addition to riometers.

Studies of the outermost ionized region of the exosphere including radio whistlers, VHF noise emission, geomagnetic micropulsations and HF ducting are recommended at Antarctic stations.

Studies of drifts involving mass transport by means of radio echoes from lowest heights observable would be valuable at high latitude stations.

The continuous study of radio auroral echoes in conjunction with other studies is strongly recommended.

S.C.A.R. urges that great attention should be given to the study of upper atmosphere from Antarctic expedition ships.

S.C.A.R. noted the serious gap in the network of geomagnetic stations caused by the closing of Roi Baudouin and Syowa and by the proposed ending of magnetic observations at Macquarie Island in 1962.

S.C.A.R. recommends the continuous observation of geomagnetic variations by standard variograph at all existing Antarctic stations during I.Q.S.Y. and that earth current observations should be carried out at as many stations as possible before and during I.Q.S.Y.

S.C.A.R. has also urged its members to prepare for the I.Q.S.Y. by :

(*a*) extending the scope of ozone observations.

(*b*) broadening the study of connexions between solar activity, the conditions in the upper atmosphere (200-1000 km) and in the lower atmosphere.

(*c*) providing the means for a comparison of the atmospheric general circulation during the I.G.Y. with that during the I.Q.S.Y.

World Days.

At the 5th S.C.A.R. meeting, the Working Group on Upper Atmosphere Physics considered the need for a special scheme for general distribution of alerts or warnings within Antarctica and was of the opinion that no general Antarctic alert warning system was justified. National Committees have been asked to consider this matter and inform the Secretary of S.C.A.R. whether they consider their circumstances need special warning by means of an elaborate « alert » system or whether existing communication networks will be adequate.

Aeronomy and Space Research.

It seems likely that there will be satellites in polar orbits and experiments with upper atmosphere sounding rockets, details of which are not yet known.

Committee for Space Research

See *Information Bulletin* nº 130, p. *44*

The following recommendations and details of the suggestions made at the C.O.S.P.A.R. meeting, Florence 1961, by the four sub-groups of Working Group 2 have been taken from a report of the meeting published in I.U.G.G. Chronicle nº 39.

Proposal for a Sunspot minimum Ionospheric Rocket Sounding Program

The following proposal was sent to the President of C.I.G., Prof. W. J. G. Beynon, by Messrs S. A. Bowhill, J. H. Chapman, B. Landmark and M. Nicolet.

An understanding of the physical processes in the D and E regions of the ionosphere, the relation between cause and effect, can at present best be obtained by rocket experiments. With the approach of the International Year of the Quiet Sun (I.Q.S.Y.) in 1964-1965, an opportunity will occur to obtain, for the first time, synoptic properties of the quiet ionosphere. To quote from the findings of the C.I.G. at their meeting in Paris in January, 1961 : « Full advantage shall be taken (in the I.Q.S.Y.) of the new knowledge of solar-terrestrial relationships gained during the I.G.Y. and also of the improved and new techniques for geophysical research which have been, and will be, developed in the intervening years ».

It is proposed that a cooperative set of rocket experiments should be undertaken internationally during the I.Q.S.Y., planned in a way which will give a maximum of scientifically useful information, avoiding unnecessary duplication of effort by the various interested groups.

This program is submitted for consideration by the C.I.G. Committee and by Working Group II of C.O.S.P.A.R., to see how such a program may best be set up and coordinated.

The following suggestions are only tentative and represent the opinion of the signatory group as to what might constitute a program of a reasonable scale.

Proposal for I.Q.S.Y. Ionospheric Rocket Sounding Program

1. The observations should cover a height range of 60 to 160 km. This range could be attained by a small, well-tried type of rocket (e. g. the Nike-Cajun).

2. To ensure worthwhile coverage on a global scale, locations should include one auroral latitude, one medium latitude in each hemisphere, and one equatorial station. It might be desirable to add one other in each hemisphere.

3. To ensure uniformity, it is desirable that certain experiments be carried in each rocket, possibly additionally to other experiments that individual workers may wish to arrange. The desirable experiments include :

(*a*) Jackson-Seddon dispersion experiment, for E region electron densities ;

(*b*) medium frequency radio absorption, for D region electron densities ;

(*c*) Langmuir probe, for electron density and temperature ;

(*d*) either an r.f. resonance probe or an ion trap, for E region ion densities ;

(*e*) x-ray photometer in the 44-60 A band to estimate E region electron production ;

(*f*) ultraviolet photometer at 1500 A for E region molecular oxygen densities ;

(*g*) Lyman-α photometer, for D region molecular oxygen densities ;

(*h*) an r. f. mass spectrometer, if a sufficiently compact form is available ;

(*i*) some form of pressure and density measurements.

4. It is essential that any rocket measurements should be accompanied by simultaneous measurements of ionospheric parameters near the launch point. Minimum measurements include : vertical incidence ionosphere sounder ; cosmic noise riometer ; sky photometer (for auroral stations only) ; partial reflection technique for D region soundings.

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

5. Concerning the frequency of the observations, it is noted that the I.Q.S.Y. has seven quarters. It is felt that for satisfactory observations at least one complete day of observations should be made in each quarter at each station. If it were found feasible to fire six rockets on each day from each location, they should be

fired at midnight, noon and immediately before sunrise and sunset. This would imply, for four stations, a total of 168 rockets. Realistically, testing and back-up needs would raise this to a total of about 200 rockets for the four stations.

6. It is appreciated that some groups may prefer to develop their own experiments to accomplish studies of the D and E layers, while others may wish to avail themselves of experimental methods developed centrally. It is suggested that the relative merits of both these approaches should be explored in such a way that the maximum scientific information can be obtained from the proposed program.

First I.Q.S.Y. Meeting, Paris 26-29 March 1962

REPORT OF THE WORKING GROUP V ON IONOSPHERE

The ionospheric program to be prepared for I.Q.S.Y. may be divided into sub-disciplines, somewhat as for I.G.Y. In addition it may be divided into major synoptic programs and into special experiments. These two categories of work support each other and both are necessary for the fulfillment of the I.Q.S.Y. program. For purposes of this report the ionospheric program is outlined as given below ; in many cases, the U.R.S.I.-C.I.G. Committee has already designated « sub-reporters » for components of the program and these names are appended for information purposes.

MAJOR SYNOPTIC PROGRAM :

VI : Vertical Incidence Soundings (Worldwide Soundings Committee)

A : Ionospheric Absorption.

A1 Pulse-echo method (W. R. Piggott).

A2 Cosmic noise method (C. G. Little).

A3 CW Field Strength (W. R. Piggott).

D : Ionospheric Drifts (K. Rawer).

D1 Pulse echo feeding.

D2 Radio meteor.

D3 Radio star feeding.

N : Atmospheric Noise Statistics (Horner).

W : Whistlers and VCF Emissions (R. Helliwell, M. Meyer, Alcode).

SPECIAL EXPERIMENTS.

Vertical Incidence Experiments.

Scatter sounding.

Partial reflections.

Cross modulation.

Absorption A4 (gated pulses).

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

Special multi-frequency riometer.

Oblique Incidence Experiments.

Backscatter B-1, fixed frequency.

Backscatter B-2, Multifrequency.

Radar Aurora.

Forward scatter.

Oblique HF pulse transmissions.

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

Atmospheric Radio Noise.

Spectral distribution of radiated energy.

Sferics.

Conjugate Point Experiments.

Simultaneous measurements by several techniques.

Satellite Experiments.

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

Rocket Experiment.

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

SYMPOSIA

International Symposium on Equatorial Aeronomy

FIRST CIRCULAR

General

An International Symposium on Equatorial Aeronomy will be held in Huaychulo, Perú, September 18-26, 1962, under auspices of the International Scientific Radio Union (U.R.S.I.), the International Union of Geodesy and Geophysics (I.U.G.G.), the Jicamarca Radio Observatory of the National Bureau of Standards and the Instituto Geofísico del Perú.

Participation

Invitations to participants will be issued before May 1, 1962 by the Scientific Program Committee. Invitees will include those actively engaged in equatorial aeronomy, and/or authorities who

will contribute substantially to the scientific discussions and/or those who will derive substantially from the scientific discussions.

There will be some participation of Latin American scientists active in upper atmosphere research ; one objective of this symposium is to stimulate and promote activity in this field. (Such scientists fall into the last category).

In addition, applications will be considered in accordance with the above criteria. However, the total number of attendees will probably be limited to forty persons.

Applications must be received by July 1, 1962.

Applications should be addressed to : Ing. Alberto A. GIESECKE M., *Secretary*, Scientific Program Committee, International Symposium on Equatorial Aeronomy, Apartado 3747, Lima, Perú. — Cable address : AGI LIMA.

A copy of the application should also be sent to : Professor R. W. H. WRIGHT, *Chairman*, Scientific Program Committee, International Symposium on Equatorial Aeronomy, Department of Physics, University of Ghana, Legon, Ghana.

Travel expenses to and from Lima, Perú, will be arranged by the participants. In cases of necessity, there will be limited financial assistance available. If such assistance is required a formal request should be made to the Chairman, Peruvian National Arrangements Committee.

Scope

The technical sessions will open with an invited general survey paper followed by the presentation of related short papers, but most of the time will be devoted to scientific discussion and summations.

Subjects to be discussed are :

1) The D region and absorption (including F-layer absorption).

2) The E region.

   A. The regular equatorial E layer and its dynamics.

   B. Irregularities and drifts in the equatorial E region.

   C. Magnetic variations and the equatorial electrojet.

   D. Airglow and aurora.

3) The F region.

A. The regular equatorial layers and their dynamics.

B. Ionospheric storms.

C. Irregularities and drifts in the equatorial F region.

D. Airglow and aurora.

4) Allied topics.

A. Geomagnetic pulsations.

B. Synchrotron radiation.

C. —

D. —

With the emergence of the International Quiet Sun Year (I.Q.S.Y.) there will be some discussion of I.Q.S.Y. equatorial programs and cooperative projects.

This is a preliminary agenda. Comments and suggestions are invited by Professor Wright and his committee.

Locale

The sessions will be held in Huaychulo, a small vacation resort, located approximately 3335 meters above sea-level and some 25 kilometers north of the city of Huancayo. Room and board will be provided, at no expense to the participants, by the Peruvian Government through the Instituto Geofísico del Perú. Special train transportation will be provided on September 17 from Lima to Concepción (railroad station about 3 kilometers from Huaychulo) and return to Lima on September 27. This is a 300 kilometer trip each way, and takes about nine hours.

Hotel reservations in the Lima area, for dates prior to September 17, can be made by the Peruvian National Arrangements Committee. Optional trips will be arranged for symposium participants to the Huancayo Observatory, the Jicamarca Radio Observatory, the Ancón Minitrack Station and the Nana Extensometer Station (all except Huancayo are in the Lima area). Information on non-technical post- or pre-symposium excursions, such as a visit to Cuzco, will be available at a later date.

Probable Sponsors

Instituto Geofísico del Perú (Ministerio de Fomento y Obras Públicas);

Jicamarca Radio Observatory (National Bureau of Standards) ;

Geophysics Research Directorate (Office of Aerospace Research, U.S.A.F.).

Scientific Program Committee (and pro-tem Publications Committee)

Professor R. W. H. WRIGHT, *Chairman*, Department of Physics, University of Ghana.

Ing. Alberto GIESECKE M., *Secretary*, Instituto Geofísico del Perú.

Dr. Kenneth L. BOWLES, Jicamarca Radio Observatory, C.R.P.L., National Bureau of Standards.

Dr. Robert COHEN, Jicamarca Radio Observatory, C.R.P.L., National Bureau of Standards.

Dr. Sadami MATSUSHITA, High Altitude Observatory, University of Colorado.

Sr. Mateo CASAVERDE R., Instituto Geofísico del Perú.

Dr. A. J. LYON, Department of Physics, University College, Ibadan, Nigeria.

Delegate to be appointed by U.R.S.I.

Delegate to be appointed by I.U.G.G.

Delegate to be appointed by G.R.D.

Peruvian National Arrangements Committee

Dr. Jorge A. BROGGI, *Honorary Chairman*, President Directive Committee, Instituto Geofísico del Perú.

Ing. Alberto A. GIESECKE M., *Secretary*, Institutico Geofísico del Perú.

Dr. Robert COHEN, Jicamarca Radio Observatory, C.R.P.L., National Bureau of Standards.

Major Juan E. BARREDA D., Peruvian National Committee for U.R.S.I.

General Guillermo BARRIGA M., Peruvian National Committee for I.U.G.G.

S. Mario CÁRDENAS Z., « John A. Fleming », Observatory at Huancayo.

S. C. A. R.

Fifth Meeting held at Wellington
9-14 October 1961

(Abstracts from *S.C.A.R. Bulletin*, nº 10, January 1962)

The meeting was held under the chairmanship of the President, G. R. Laclavère. U.R.S.I. was represented by Dr. C. Ellyett. Dr. Robin was re-elected as Secretary for a period of three years.

Organization of working groups

In order to combat the danger of S.C.A.R. becoming too large, a number of proposal for the re-organisation of Working Groups were discussed and accepted. These were :

(*a*) Working Groups would have to conduct their work mainly by correspondence and a Working Secretary for each Permanent Working Group would have to be nominated. The appointments made at the Fifth S.C.A.R. meeting would be subject to review after one year.

(*b*) Each National Committee, and each relevant international organization, should nominate a member to each Permanent Working Group.

(*c*) Groups should have autonomous powers of internal organization, including election of officers.

(*d*) Groups should take advantage of symposia, and similar occasions, to hold meetings. In addition, from two to four Working Groups would meet at S.C.A.R. general meetings. The Executive Committee would decide which Working Groups were to meet.

Working Group	Working Secretary	Suggested time and place of next meeting
Biology	R. CARRICK	Antarctic Biological symposium September 1962
Communications	A. H. SHEFFIELD	Possibly 1962 in conjunction with S.C.A.R. or in conjunction with Antarctic Treaty meeting
Geodesy and Cartography	B. P. LAMBERT	Bonn Conference on International Map of the World, 1962
Geology	R. W. WILLETT	Not at next S.C.A.R. meeting; possibly 1963
Geomagnetism	T. NAGATA	Not at next S.C.A.R. meeting; possibly at meeting of I.U.G.G., August 1963
Glaciology	C. LORIUS (for one year)	Commission of Snow and Ice Meeting at Obergürgl, September 1962
Logistics	D. M. TYREE, G. W. MARKHAM and J. DICKIE (joint working secretaries)	In conjunction with next S.C.A.R. meeting
Meteorology	W. J. GIBBS	Not in 1962, possibly at I.U.G.G. meeting in 1963
Oceanography	M. M. SOMOV	Not at next S.C.A.R. meeting; possibly 1963
Solid Earth Geophysics	E. I. ROBERTSON	Possibly 1963 S.C.A.R. meeting;
Upper Atmosphere Physics	F. JACKA	Next S.C.A.R. meeting with possibility of earlier meeting in April 1962, when C.O.S.P.A.R. meets.

Finance

Recommendation V.F-3. — That, in view of the prospective deficit in S.C.A.R. operating funds which may occur for 1962, assistance to union delegates towards expenses for S.C.A.R. meetings is not practicable.

Reports and recommendations of Working Groups

Communications

Common radio frequency

Recommendation V.C-3. — The Group notes the requirement for a common radio frequency for field safety and invites attention to the recommendation on this matter at Paris, 1956. Namely :

That in addition to the two frequencies of 2182 and 8364 kc/s recommended in Brussels Resolution XLVIII all mobile and fixed Antarctic I.G.Y. stations shall, as far as possible, be equipped to transmit and receive on 3025.5 kc/s and that this frequency be recognized as the normal contact common frequency ; subsequent transmission to be conducted on frequencies to be decided by the operators.

Interference problems

Recommendation V.C-5. — The Group, whilst sympathizing with the desire of the members of the Upper Atmosphere Working Group to have a quiet period of 5 min. at half hourly intervals, regret that at some Antarctic stations, if radio communications circuits are closed down for such periods, it would be impossible to provide adequate communications services, since, on each occasion of closing down, circuits would have to be set up anew, a process requiring a period of possibly 15 min. They also comment on the interference to radio communications services by ionospheric sounding apparatus and other electro-magnetic radiations.

The Group reminds the Upper Atmosphere Working Group that most Antarctic radio stations fulfil the international obligation to keep watch for distress signals on 500 and 2182 kc/s for 3 min. past each quarter hour and it is necessary for these periods that interference by other electronic apparatus be avoided.

The Group, however, recognizes the necessity for designing and operating power supplies and radio communications equipment in such a manner as to reduce harmful interference to the lowest possible level, and recommends that each nation take whatever steps are practicable to reduce harmful interference at each station

caused by all electronic and electrical equipment. The requirement has been taken into account as far as is possible in drawing up the Antarctic network schedule programme.

This problem was brought to the notice of the Plenary Session at the Fourth Meeting of S.C.A.R. in Cambridge 1960, and it was agreed to direct the attention of radio operators to the need for avoiding interference and for following recognized procedures.

It is hoped that due observance for the advice contained above and in the 1960 suggestion to station leaders by operators and all others concerned will reduce mutual interference between communications and scientific equipment.

Upper Atmosphere Physics

F. JACKA (*Chairman*), D. K. BAILEY, C. ELLYETT, M. C. GADSDEN, C. G. HIDE, Y. D. KALININ, M. LEBEAU, T. NAGATA, E. I. ROBERTSON, O. SCHNEIDER, W. H. WARD.

Radio interference

Recommendation V.UA-1. — That the design and operation of power supplies and radio communications equipment should be such as to reduce interference to a tolerable level.

Recommendation V.UA-2. — That provision be made for a period as quiet as feasible (i.e. with minimum radio communications) of at least 5 min., from 1 min. before each hour and half-hour to 4 min. past it. In particular, it is requested that communication schedules do not begin within this quiet period.

Permanence of Working Group

Recommendation V.UA-9. — That a permanent Working Group on Upper Atmosphere Physics be established.

Recommendation V.UA-10. — That the group maintain close liaison with the relevant committees of U.G.G.I., U.R.S.I., C.O.S.P.A.R. and C.I.G.

Recommendation V.UA-11. — That Dr. F. Jacka be appointed Secretary.

Ionosphere

The use of riometers, operating at more than one frequency, was suggested at every ionosonde station, and especially at every neutron monitor station. However, riometers can only measure

total absorption when there are no unknown source of noise, therefore low-power, low-cost forward scatter experiments should be considered ; they can also measure absorption at inaccessible locations.

Recommendation V.UA-12. — That interested parties in Australia, New Zealand, France and the United States take steps to construct a series of forward scatter links for the study of solar cosmic rays. Such links should not be shorter than about 1000 km, nor longer than about 2000 km ; « McMurdo », « Dumont d'Urville », Macquarie Island, and Australia or New Zealand are appropriate stations.

Distribution of alerts

Recommendation V.UA-13. — That stations requiring warning of disturbance from other observers make appropriate bilateral arrangements.

Recommendation V.UA-14. — That the selected stations be strongly urged to co-operate with such arrangements.

Ship observations

Recommendation V.UA-15. — That greater attention be given to the study of upper atmosphere phenomena from Antarctic expedition ships.

NATIONS UNIES

Conférence sur l'application de la Science et de la Technique dans l'intérêt des régions peu développées

L'Organisation des Nations Unies organise une Conférence sur l'Application de la Science et de la Technique dans l'intérêt des régions peu développées. Cette conférence aura lieu à Genève du 4 au 20 février 1963.

L'objet de la conférence et les détails concernant son organisation ont été publiés dans un *Bulletin d'Information des Nations Unies* (E/Conf.39/Inf.1/Rev.1, février 1962) qui peut être obtenu au Secrétariat Général des Nations Unies ou au Secrétariat de l'U.R.S.I.

UNITED NATIONS

Conference on the Application of Science and Technology for the Benefit of the less developed areas

The United Nations Organization is planning a Conference on the Application of Science and Technology for the Benefit of the less developed areas. This meeting will be held in Geneva from February 4 to 20, 1963.

The objective and organizational details of the Conference are published in an *Information Bulletin of United Nations* (E/Conf.39/Inf.1/Rev.1, February 1962) available at the General Secretariat of the United Nations or at the U.R.S.I. Secretariat.

U.N.E.S.C.O.

(see English text, p. 73)

Catalogue général des publications de l'U.N.E.S.C.O. et des publications parues sous les auspices de l'U.N.E.S.C.O.

De par leur nature même, presque toutes les activités du programme de l'Unesco entraînent la diffusion dans le public de connaissances, de faits et de chiffres, de techniques, d'opinions d'experts et de conseils pratiques. Cette diffusion est assurée notamment — voire surtout — grâce à la publication de livres et de périodiques. Les personnes auxquelles les différents programmes de l'Unesco visent à rendre service de la façon la plus directe sont essentiellement les spécialistes des sujets qui relèvent de la compétence propre de l'Organisation : éducation, sciences exactes et naturelles, sciences sociales, information, échanges internationaux de caractère culturel et intellectuel, etc.

Une partie seulement des milliers de publications paraissant en application du programme de l'Unesco (c'est-à-dire ayant un lien officiel avec celle-ci) sont publiées par l'Organisation elle-même et sous sa marque. Il était jusqu'ici impossible de se faire une idée d'ensemble de ces publications, d'en dresser un répertoire unique et d'être ainsi à même de répondre dans tous les cas à des questions telles que les suivantes : « Quelles sont les publications disponibles sur tel sujet ? » « L'Unesco n'a-t-elle rien publié dans ce domaine ? » « Telle ou telle publication est-elle agréée ou patronnée par l'Unesco ? » « Comment puis-je m'en procurer un exemplaire ? », etc.

Le présent ouvrage est le premier qui vise à répondre à toutes ces questions. Il contient plus de 2500 notices, et se divise en quatre parties :

(i) Liste de publications groupées par sujet selon la Classification décimale universelle, avec description bibliographique complète et références aux autres versions linguistiques des mêmes publications ;

(ii) Liste de films fixes et de diapositives ;

(iii) Index d'auteurs, titres et collections ;

(iv) Liste des éditeurs avec adresses.

Ce catalogue général devrait constituer un utile ouvrage de référence pour les bibliothécaires et libraires désireux de trouver et de

fournir des renseignements sur l'une quelconque de ces publications ainsi que pour les nombreux éditeurs et autres représentants de l'industrie du livre qui ont l'occasion de collaborer directement avec l'Unesco. Il devrait être non moins précieux pour les spécialistes qui recherchent une publication traitant de leur domaine d'intérêt particulier. On espère qu'il rendra aussi service dans les milieux qui touchent de plus près à l'Organisation, pour ainsi dire : aux membres des Commissions nationales pour l'Unesco, ainsi qu'aux fonctionnaires des Etats membres chargés des questions en rapport avec l'administration de l'Unesco et d'autres organisations internationales.

Le catalogue est en vente chez les agents dépositaires des publications de l'Unesco. Un certain nombre d'exemplaires gratuits seront envoyée aux bibliothèques dépositaires, aux associations de l'industrie du livre et aux maisons d'édition qui apportent déjà leur collaboration à l'Unesco.

Il est prévu de publier des suppléments à ce catalogue. Le Service des documents et publications vous serait reconnaissant de lui signaler toutes omissions ou corrections à apporter pour qu'il en soit tenu compte dans les éditions ultérieures.

Prix : 3,50 N.F., $ 1.00, 5/stg.

U.N.E.S.C.O.

General Catalogue of U.N.E.S.C.O. and U.N.E.S.C.O.-Sponsored Publications

Almost all Unesco programme activities, by their very nature give rise to the dissemination of knowledge, of facts and figures, of techniques, expert opinions and « know-how » to the world at large. The printed word, in the form of books and periodical publications, is one of, if not the most important means used to achieve these ends. The users, those whom the various Unesco programmes are designed to benefit most directly, are mainly specialists working in Unesco's particular subject-fields : education, natural science, social sciences, mass communications, international cultural and intellectual exchanges, etc.

Of the many thousands of publications issued in implementation of Unesco's programme (i.e. all having some official link with Unesco), only a part are published by Unesco itself, under its own imprint. Up to now, the difficulty has been that it has been impossible to see the complete picture of all these publications, to list them all in one place and thus obtain comprehensive answers to such questions as « What publications are available in a particular subject-field ? » « Hasn't Unesco published something on this ? » « Is such and such a publication recognized or sponsored by Unesco ? » « How can I obtain a copy ? » and so on.

This general catalogue is the first attempt to provide the complete answer to all these questions. It contains over 2500 entries and is divided into four parts :

(i) A list of publications classified by subject in accordance with the Universal Decimal Classification, and containing full bibliographical data as well as references to other language versions of the same publications ;

(ii) A list of filmstrips and diapositives ;

(iii) An index of authors, titles and series titles ;

(iv) A list of names and addresses of publishers.

This catalogue should prove a useful reference work for librarians and booksellers wanting to trace and provide information about any of the publications, as well as to the many publishers and other members of the book trade who have had occasion to co-operate directly with Unesco. It should prove equally valuable to the specialist seeking a publication in his particular field of interest. Nearer home, so to speak, it is hoped that members of Unesco National Commissions and the various officials in Member States concerned with the administration of Unesco and of international organizations generally, will find it equally useful.

The catalogue is sold by Unesco sales agents. A certain number of complimentary copies will be sent to depositary libraries, book trade and publishers' associations, and publishers and organizations already co-operating with Unesco. It is planned to issue supplements to this catalogue, and the Unesco Documents and Publications Service would be glad to be notified of any omissions or corrections which can be rectified in subsequent editions.

Price : $ 1.00, 5/—, 3.50 N.F.

Liste des Agents Généraux — List of National Distributors

EXTRAIT — ABSTRACT

Allemagne — Germany :

R. Oldenburg Verlag., U.N.E.S.C.O. Vertrieb für Deutschland, Rosenheimerstrasse, 145, München 8.

Australie — Australia :

Melbourne University Press, 369, Lonsdale Street, Melbourne C.1 (Victoria).

Autriche — Austria :

Verlag Georg Fromme and Co., Spengergasse 39, Wien V.

Belgique — Belgium :

Office de Publicité, S. A., 16, rue Marcq, Bruxelles 1.

N. V. Standaard Boekhandel, Belgielei 151, Antwerpen.

Canada :

The Queen's Printer, Ottawa (Ont.).

Danemark — Denmark :

Einar Munksgaard Ltd., 6 Norregade, Kobenhavn K.

Espagne — Spain :

Libreria Cientifica Medinaceli, Duque de Medinaceli 4, Madrid 14.

Etats-Unis d'Amérique — United States of America :

U.N.E.S.C.O. Publications Center, 801, Third Avenue, New York 22, N. Y.
et, sauf pour les périodiques/and except for periodicals :

Columbia University Press, 2960 Broadway, New York 27, N. Y.

Finlande — Finland :

Akateeminen Kirjakauppa, 2 Keskuskatu, Helsinki.

France :

Librairie de l'U.N.E.S.C.O., place de Fontenoy, Paris 7, CCP 12598-48.

Grèce — Greece :

Librairie H. Kauffmann, 28, rue du Stade, Athènes.

Inde — India :

Orient Longmans Ltd, 17 Chittaranjan Avenue, Calcutta 13.

Nicol Road, Ballard Estate, Bombay 1.

36*a* Mount Road, Madras 2.

Kanson House, 1/24 Asaf Ali Road, New Delhi 1.

Italie — Italy :

Libreria Zanichelli, Portici del Paviglione, Bologna.

Libreria Commissionaria Sansoni (Agente Generale), via Gino Capponi 26. casella postale 552, Firenze.

Hoepli, via Ulrico Hoepli 5, Milano.

Libraria internazionale Ulrico Hoepli, Largo Chighi, Roma.

Libraria Internazionale Modernissima, via delle Mercede 43, 45, Roma.

Libreria Paravia, via Garibaldi 23, Torino.

Japon — Japan :

Maruzen Co., Ltd, 6 Tori-Nichome, Nihonbashi, P. O. Box 605, Tokyo Central, Tokyo.

Maroc — Morocco :

Centre de diffusion documentaire du B.E.P.I., B. P. 211, Rabat.

Norvège — Norway :

A. S. Bokhjornet, Lille Grensen 7, Oslo.

Nouvelle Zélande — New Zealand :

U.N.E.S.C.O. Publications Centre, 100 Hackthorne Road, Christchurch.

Pays-Bas — Netherlands :

N. V. Martinus Nijhoff, Lange Voorhout 9, 's-Gravenhage.

Pérou — Peru :

« E.S.E.D.A.L.-Officina de Servicio », Dpto. de Venta de Publicaciones, Jiron Huancavelica (calle Ortiz), 368, apartado 577, Lima.

Pologne — Poland :

Osrodek Rozpowszechniania Wydawnictw Naukowych P.A.N., Palac Kultury i Nauki, Warszawa.

Portugal :

Dias and Andrade Lda, Livraria Portugal, rua do Carmo 70, Lisboa.

Royaume-Uni — United Kingdom :

H. M. Stationery Office, P. O. Box 569, London S. E. 1.

République sud-africaine — Republic of South Africa.

Van Schaik's Bookstore (Pty) Ltd., Libri Building, Church Street, P. O. Box 724, Pretoria.

Suède — Sweden :

A/B C. E. Fritzes Kungl. Hovbokhandel, Fredsgatan 2, Stockholm 16.

Suisse — Switzerland :

Europa Verlag, Rämistrasse 5, Zürich.
Payot, 40, rue du Marché, Genève.

Tchécoslovaquie — Czechoslovakia :

Artia Ltd., 30 Ve Smeckach, Praha 2.

U. R. S. S. — U. S. S. R. :

Mezhdunarodnaja Knjiga, Moskva G-200.

Yougoslavie — Yugoslavia :

Jugoslovenska Knjiga, Terazije 27, Beograd.

BIBLIOGRAPHIE

(see English text, p. 79)

Commission Electrotechnique Internationale

Publication 100 : *Deuxième édition.* — Méthodes de mesure des capacités entre électrodes des tubes électroniques.

Prix : Fr. s. 15.00.

Publication 130-1 : *Première édition.* — Connecteurs utilisés aux fréquences jusqu'à 3 MHz. Première partie : Connecteurs pour récepteurs de radiodiffusion et équipements électroacoustiques similaires.

Prix : Fr. s. 15.00.

Publication 130-2 : *Première édition.* — Connecteurs utilisés aux fréquences jusqu'à 3 MHz. Deuxième partie : Connecteurs pour récepteurs de radiodiffusion et équipements électroacoustiques similaires.

Prix : Fr. s. 7.50.

Catalogue des Publications de la C.E.I. — édition 1961.

Prix : Fr. s. 1.50.

Publication 122-1 : *Première édition.* — Quartz pour oscillateurs. Section I : Valeurs et conditions normalisées. Section II : Conditions de mesures et d'essais.

Prix : Fr. s. 12.00.

Publication 122-3 : *Première édition.* — Quartz pour oscillateurs. Section IV : Encombrements normaux.

Prix : Fr. s. 7.5.

Ces publications sont en vente au Bureau Central de la C. E. I. Les prix ne comprennent pas les frais de port.

Union Internationale des Télécommunications

L'U.I.T. vient de publier la 1re édition de la *Liste alphabétique des indicatifs d'appel des stations utilisées dans le service mobile maritime* (*Liste VII A*).

Selon les dispositions de l'article 20 du Règlement des radiocommunications (Genève, 1959), cette liste contient les parties suivantes :

— Tableau d'attribution des séries internationales d'indicatifs d'appel selon le nº 747 du Règlement des radiocommunications, Genève, 1959, modifié selon le nº 749 de ce Règlement.

— Liste alphabétique des signaux caractéristiques des stations de radiophare utilisés dans le service mobile maritime.

— Liste alphabétique des indicatifs d'appel des stations dont l'état signalétique figure dans la Nomenclature des stations côtières, la Nomenclature des stations de navire ou la Nomenclature des stations de radiorepérage et des stations effectuant des services spéciaux.

Les observations et explications, le Tableau d'attribution des séries internationales d'indicatifs d'appel ainsi que des renseignements particuliers relatifs à certains indicatifs d'appel figurent en langues française, anglaise, espagnole, russe et chinoise.

Le prix de vente d'un exemplaire de cette publication, qui compte environ 150 pages, a été fixé à 5 *francs suisses* ; ce prix comprend les frais de port pour envoi par la poste ordinaire dans le monde entier, l'emballage et l'abonnement aux suppléments trimestriels qui paraîtront jusqu'à la prochaine édition.

BIBLIOGRAPHY

International Electrotechnical Commission

Publication 100 : *Second edition.* — Methods for the measurement of direct interelectrode capacitances of electronic tubes and valves.

Price : Sw. Fr. 15.00.

Publication 130-1 : *First edition.* — Connectors for frequencies below 3 MHz (Mc/s), Part 1 : General requirements and measuring methods.

Price : Sw. Fr. 15.00.

Publication 130-2 : *First edition.* — Connectors for frequencies below 3 MHz (Mc/s). Part 2 : Connectors for radio receivers and associated sound equipment.

Price : Sw. Fr. 7.50.

Catalogue of I.E.C. Publications. — 1961 Edition.

Price : Sw. Fr. 1.50.

Publication 122-1 : *First edition.* — Quartz crystal units for oscillators. Section I : Standard values and conditions. Section II : Test conditions.

Price : Sw. Fr. 12.00.

Publication 122-3 : *First edition.* — Quartz crystal units for oscillators. Section IV : Standard outlines.

Price : Sw. Fr. 7.50.

These publications are on sale at the Central Office of the I.E.C. The prices do not include postage.

International Telecommunication Union

The I.T.U. has just published the first edition of the *Alphabetical List of Call Signs of Stations used in the Maritime Mobile Service* (*List VII A*).

In accordance with Article 20 of the Radio Regulations (Geneva, 1959), this List contains :

— A table showing the allocation of international call-sign series in accordance with the Radio Regulations, Geneva, 1959, n° 747, amended in accordance with n° 749.

— An alphabetical list of characteristic signals used by maritime mobile radio beacons.

— An alphabetical list of call signs of the stations particulars of which appear in the List of Coast Stations, the List of Ship Stations, and List of Radiolocation and Special Service Stations.

Comments and explanations, the table showing the allocation of international call-sign series, and information about individual call signs, are given in Chinese, English, Spanish, Russian, and French.

The volume runs to some 150 pages, and will cost 5 *Swiss francs* (carriage paid by ordinary mail to any address), which covers the supply of the quarterly supplements which will appear between now and the next edition.

XIVe ASSEMBLÉE GÉNÉRALE

Réunion du Comité de Coordination

(See English text, p. 11)

Le Comité de Coordination (Bureau et Présidents des Commissions) s'est réuni à Bruxelles les 18 et 19 avril 1962.

Au cours de cette réunion les documents ci-après ont été établis ; ils sont d'application pour la préparation et l'organisation de la XIVe Assemblée Générale :

1. Buts des Assemblées Générales de l'U.R.S.I.
2. Directives pour l'établissement des Rapports des Comités Nationaux.
3. Rapports des Présidents de Commission.
4. Programme scientifique provisoire de la XIVe Assemblée Générale.
5. Publications des Assemblées Générales.
6. Programme provisoire de la XIVe Assemblée Générale.

1. -- Buts des Assemblées Générales de l'U.R.S.I.

Etant donné les statuts, les règlements, les usages et l'expérience fournie par les Assemblées Générales tenues dans le passé, les buts scientifiques de ces réunions peuvent être définis comme suit :

1. fournir aux *scientifiques* un forum pour la discussion de sujets d'intérêt *général* ressortissant à la science radio et aux domaines s'y rattachant ;
2. passer en revue et mettre en discussion les progrès et développements intervenus dans les différents domaines d'activité de l'U.R.S.I. ;

3. rédiger, pour chaque Commission ou Comité :
   (i) des résolutions résumant les besoins en ce qui concerne les recherches à effectuer par la Commission avec, si nécessaire, la collaboration d'autres organes de l'U.R.S.I. ou d'organismes internationaux,
   (ii) les programmes de recherches qui seront effectués sous les auspices des Comités Nationaux dans la période subséquente.

Le Bureau considère que le meilleur moyen pour réaliser ces objectifs consistera à :

a) sélectionner, pour chacune des Commissions, un nombre limité de sujets d'intérêt international et d'actualité,

b) faire une synthèse générale des progrès et développements atteints sous les auspices des Comités Nationaux dans le domaine de ces sujets choisis,

c) rédiger, pour chaque sujet, un rapport qui ouvrira les discussions pendant les séances scientifiques.

2. — Directives pour l'établissement des rapports des Comités nationaux

1. — *Contenu.*

Les Comités Nationaux sont invités à établir *un rapport distinct pour chaque Commission de l'U.R.S.I.*

Ces rapports devraient faire mention, pour les sujets choisis dans chaque Commission, des travaux effectués et des réalisations atteintes dans le pays. Ces sujets, après avoir été choisis par le Comité de Coordination, seront communiqués aux Comités Nationaux et aux Membres Officiels des Commissions par le Secrétaire Général de l'U.R.S.I. (Voir Programme Scientifique Provisoire).

Ces rapports devraient être d'une longueur raisonnable et constituer des revues utiles des sujets choisis. Il est souhaitable que les bibliographies relatives à chaque sujet figurent à la suite du texte consacré à ce sujet.

Alors que le programme scientifique de chaque Assemblée Générale est confiné à certains points d'intérêt primordial et général, les rapports des Comités Nationaux pourraient comprendre de courtes revues générales d'autres développements intervenus dans le domaine de chaque Commission.

2. — *Distribution et publication.*

Considérant que, généralement, les rapports des Comités Nationaux ne sont pas lus au cours de l'Assemblée Générale, ils ne seront pas distribués à l'Assemblée Générale, mais seront publiés en langue originale (anglais ou français) dans le Compte Rendu.

3. – Les Comités Nationaux sont priés de faire parvenir pour *le* 1er *mai* 1963 *au plus tard* trois exemplaires de leurs rapports au Secrétaire Général de l'U.R.S.I. qui en adressera une copie au Président de la Commission intéressée pour lui permettre de rédiger le rapport de sa Commission.

3. — Rapports des Présidents de Commission

1. — *Rapport introductif.*

Les rapports introductifs des Présidents de Commission devraient contenir une revue étendue des activités de leur Commission au cours de la période précédant l'Assemblée Générale.

Ils devraient, autant que faire se peut, avoir la forme d'une communication intéressante et de lecture aisée, accompagnée de références se rapportant aux rapports des Comités Nationaux.

Il est espéré que ces rapports apporteront une aide aux réunions des diverses Commissions en les guidant dans leurs travaux scientifiques au cours de l'Assemblée Générale. Ces rapports ne doivent pas être confinés aux sujets choisis pour les discussions de chaque Commission.

Pour en permettre la distribution à l'Assemblée Générale, ces rapports doivent être entre les mains du Secrétaire Général, en trois exemplaires, pour le 1er *juillet* 1963.

2. — *Rapport de clôture.*

A la séance de clôture de l'Assemblée Générale, chaque Président de Commission présentera un *rapport décrivant l'activité* de sa Commission au cours de l'Assemblée Générale, en même temps que les résolutions et/ou les recommandations.

Ces rapports devront être remis au Secrétaire Général à la fin de l'Assemblée Générale, pour publication, selon les directives contenues dans le document « Publications des Assemblées Générales ».

3. — *Publication.*

Les rapports introductifs seront distribués à l'Assemblée Générale.

Tous les rapports des Présidents de Commission seront publiés en langue originale dans les « Reports on Progress in Radio Science », et dans les deux langues officielles dans le Compte Rendu.

* * *

Les Présidents des Commissions sont invités à collaborer avec le Secrétaire Général en appliquant les directives ci-dessus de façon à permettre une publication aussi rapide que possible des documents de l'Assemblée Générale.

4. — PROGRAMME SCIENTIFIQUE PROVISOIRE

Indiquant :

(1) Les dates des séances scientifiques (M = matinée, AM = après-midi),

(2) Les sujets choisis par le Comité de Coordination,

(3) Les Commissions intéressées aux sujets traités (S.R.R. = Recherches Radioélectriques dans l'Espace ; C.I.G. = Comité de l'U.R.S.I. pour la Coopération Géophysique Internationale).

(1)	(2)	(3)
Septembre		
	COMMISSION I	
10.AM	Etalons de fréquence. Horloges à quartz et systèmes automatiques de mesure	III, IV
11.AM	Etalons de mesure de la puissance	
12.M	Etalons atomiques et moléculaires de fréquence	VII
13.M	Emissions de fréquences étalon	
16.M	Mesures générales radioélectriques y compris celles en hyperfréquences	
	COMMISSION II	
10.AM	Modèles de troposphère	
11.AM	Radioclimatologie	
13.M	Météorologie au radar et physique des nuages	
13.AM	Propagation troposphérique influençant les communications spatiales	S.R.R.

(1)	(2)	(3)
16.M	Influence des irrégularités du terrain et de la végétation sur la propagation	
17.AM	Ondes dirigées dans la troposphère et l'ionosphère (Séance mixte avec III et IV, organisée par IV)	
18.AM	Séance libre	
	COMMISSION III	
10.AM	Radiation ionisante et constitution de l'atmosphère	
11.AM	Géomagnétisme et l'ionosphère	IV
12.M	Orages ionosphériques	IV
16.AM	Année Internationale du Soleil Calme (I.Q.S.Y.) (Radioélectricité et Ionosphère)	IV, V
17.AM	Ondes dirigées dans la troposphère et l'ionosphère (séance mixte avec II et IV, organisée par IV)	
18.M	Distribution des électrons dans l'ionosphère (séance mixte avec IV, organisée par III)	
18.AM	Séance libre	
	COMMISSION IV	
10.AM	Emissions atmosphériques (Revue des résultats de l'A.G.I. et programme de l'I.Q.S.Y.)	C.I.G.
12.M	*Idem*	C.I.G.
16.M	Sifflements (Revue des résultats de l'A.G.I. et programme de l'I.Q.S.Y.)	III, C.I.G.
17.M	Phénomènes de bruit en très basses et extrêmement basses fréquences (VLF et ELF)	III, VII
17.AM	Ondes dirigées dans la troposphère et l'ionosphère (Séance mixte avec II et III, organisée par IV)	
18.M	Distribution des électrons dans l'ionosphère (séance mixte avec III, organisée par III)	
18.AM	Séance libre	
	COMMISSION V	
10.AM	Radioastronomie de la Galaxie	
12.M	Radioastronomie des sources discrètes	
12.AM	Radioastronomie solaire (Soleil actif et Soleil calme) (1)	III, IV, C.I.G.
16.M	Techniques et mesures observationnelles	VI, VII, S.R.R.

(1)	(2)	(5)
17.M	Radioastronomie solaire (2)	III, IV, C.I.G.
18.AM	Radioastronomie du système solaire	III, IV, S.R.R., VI
	COMMISSION VI	
10.AM	Théorie des « Graphes »	
11.AM	Circuits non-linéaires	
12.M	Théorie de l'Information (canaux variables et codage)	II, III
12.AM	Théorie Electromagnétique (milieux non-homogènes et anisotropes)	II, III
16.M	Théorie Electromagnétique (diffraction)	II, III
17.M	Théorie de l'Information (canaux variables : statistiques)	II, III
	COMMISSION VII	
11.M	Lasers et Masers (Physique)	I à VI
11.AM	Lasers et Masers (Applications)	V
13.M	Plasmas (à l'échelle des laboratoires)	III à VI
13.AM	Plasmas (à l'échelle géophysique et astrophysique)	III à VI, S.R.R.
16.AM	Systèmes de communication par satellites	V, S.R.R.
18.M	Séance libre	
	COMITÉ POUR LES RECHERCHES RADIOÉLECTRIQUES DANS L'ESPACE (S.R.R.)	
10.M	Séance générale (1)	I à VII, C.I.G.
17.M	Séance du Comité	
	(1) Les sujets de la réunion seront publiés ultérieurement	
	COMITÉ DE L'U.R.S.I. POUR LA COOPÉRATION GÉOPHYSIQUE INTERNATIONALE (C.I.G.)	
12.AM	L'U.R.S.I. et le Programme de l'I.W.Q.Y.	II à V, S.R.R.
19.M (?)	Réunion du Comité	

5. — PUBLICATIONS DES ASSEMBLÉES GÉNÉRALES

A la suggestion du Comité de Coordination lors de sa réunion de Bruxelles les 18 et 19 avril 1962, le Bureau de l'U.R.S.I. a décidé à l'unanimité de soumettre au Comité Exécutif, lors de la prochaine Assemblée Générale, les règles ci-après pour les publications se rapportant à cette Assemblée.

1. — *Comple Rendu.*

Il est suggéré de publier une édition bilingue des Comptes Rendus, contenant :

(i) les rapports des Comités Nationaux dans la langue originale (anglais ou français),

(ii) les rapports des Présidents de Commission (en anglais et en français),

(iii) les procès-verbaux des séances,

(iv) les recommandations et résolutions (en anglais et en français).

2. — *Publications scientifiques.*

Dans le but d'assurer à ces publications un niveau scientifique élevé, les règles ci-après seront mises en application lors de la prochaine Assemblée Générale :

1. Les volumes seraient intitulés « *Reports on Progress in Radio Science* » (Rapports sur les Progrès en Radio Science) et porteraient *le litre de la Commission* et *l'année de l'Assemblée Générale.*

2. Ils contiendraient :

   a) une revue établie par le Président de la Commission et basée sur les Rapports des Comités Nationaux ;

   b) les revues sollicitées par le Président de la Commission ;

   c) les discussions verbales, à la discrétion du Président ; ces discussions seraient reproduites en petits caractères ;

   d) un rapport du Président de la Commission résumant les activités de la Commission pendant l'Assemblée Générale ;

   e) éventuellement certaines résolutions ou recommandations, mais *seulement* lorsqu'elles présentent un *intérêt scientifique général.*

Les contributions mentionnées ci-dessus pourront être rédigées soit en anglais, soit en français.

3. Les auteurs invités à présenter une contribution devraient recevoir 50 tirés à part de leur contribution et un exemplaire du volume.

4. L'étendue des revues sollicitées par le Président ne devrait pas être trop strictement limitée. Les auteurs devraient pouvoir

disposer de l'étendue nécessaire pour traiter du sujet considéré.

5. Les auteurs des revues devraient être désignés environ *un an avant* l'Assemblée Générale. Lorsque cela est possible, il est souhaitable que les auteurs aient connaissance des autres sujets qui seront inclus dans le même volume, ainsi que des auteurs de ces articles.

6. L'attention des Rédacteurs Scientifiques des « Reports on Progress in Radio Science » devraient être invités à respecter, autant que faire se peut, les Instructions pour la publication des Monographies.

7. Les auteurs des revues sont invités à faire parvenir au Secrétaire Général de l'U.R.S.I. au plus tard pour le 1er juillet 1963 *deux exemplaires complets* de leur contribution pour que celle-ci puisse être distribuée à l'Assemblée Générale.

PROGRAMME PROVISOIRE DE LA XIVe ASSEMBLÉE GÉNÉRALE
Septembre 1963

Date	Matinée	Après-midi	Soirée
Jeudi 5	Réunion du Bureau Inscription définitive	Inscription définitive	
Vendredi 6	Réunion du Comité Exécutif Inscription définitive	Inscription définitive	
Samedi 7	Réunion du Comité de Coordination Inscription définitive	Inscription définitive	
Dimanche 8	Inscription définitive		
Lundi 9	Séance Plénière d'Ouverture	Réunion des Bureaux des Commissions et Comités Séances d'organisation des Commissions	Réception
Mardi 10	Séances scientifiques et visites		Divertissement
Mercredi 11	Séances scientifiques et visites		Séance commémorative
Jeudi 12	Séances scientifiques et visites		Divertissement

Date	Matinée	Après-midi	Soirée
Vendredi 13	Séances scientifiques et visites		Réception
Samedi 14 Dimanche 15	Visites et/ou excursions		
Lundi 16	Séances scientifiques et visites		Divertissement
Mardi 17	Séances scientifiques et visites		
Mercredi 18	Séances scientifiques et visites		Réception
Jeudi 19	Séances administratives finales des Commissions	Réunion du Comité Exécutif	
Vendredi 20	Séance plénière de clôture	Réunion du Comité de Coordination	
Samedi 21			
Dimanche 22			
Lundi 23	Excursion après l'Assemblée (Kyoto, Mara, etc.)		
Mardi 24			

XIVth GENERAL ASSEMBLY

Meeting of the Co-ordinating Committee

The meeting of the Co-ordinating Committee (Board of Officers and Commission Chairmen) was held in Brussels on April 18-19, 1962.

During this meeting, the following documents were drafted; they should be applied for the preparation and organization of the XIVth General Assembly :

1. Aims of U.R.S.I. General Assemblies.
2. Instructions for the drafting of National Committee Reports.
3. Commission Chairmen Reports.
4. Provisional Scientific Programme of the XIVth General Assembly.
5. General Assembly Publications.
6. Provisional Programme of the XIVth General Assembly.

1. — Aims of U.R.S.I. General Assemblies

According to the statutes, bylaws, customs and experience of past General Assemblies, the scientific aims of such meetings may be summarized as follows :

1. to provide a forum for *scientists* to discuss topics of *general* interest in radio science and connected fields;
2. to review and discuss the progress and developments in the various domains belonging to U.R.S.I.;
3. to draft in each Commission or Committee :
   (i) resolutions summarizing the needs for further investigations to be carried out by the Commission with, if necessary, the co-operation of other U.R.S.I. or international bodies,

(ii) programmes of research to be carried out under the auspices of National Committees during the forthcoming period.

The Board of Officers considers that the best way to aim these purposes will be :

(*a*) to select for each Commission a limited number of topics of outstanding international and up-to-date interest,

(*b*) to draft a general and broad synthesis of the progress and developments reached under the auspices of the National Committees in the field of those selected topics,

(*c*) to draft for each topic a review which will initiate discussion during the scientific sessions.

2. — Instructions for the drafting of National Committee Reports

1. — *Contents.*

National Committees are invited to draft *a separate report for each Commission of U.R.S.I.*

Such reports should mention, for the topics selected in each Commission, the work and developments carried out in the various countries. These topics will be communicated to National Committees and Official Members of the Commissions by the Secretary General of U.R.S.I., as agreed by the Co-ordinating Committee (See Provisional Scientific Programme).

Such reports should be of reasonable length and form useful reviews of the selected topics. It is desirable that bibliographies relevant to each topic should be given after the text of that topic.

While the scientific programme for each General Assembly is confined to certain items of outstanding topical interest, it is intended that the reports of the National Committees should comprise a short general review of the progress made in the field of activity of each Commission.

2. — *Distribution and Publication.*

Considering that National Committee Reports are generally not read during the General Assembly, they will not be distributed at the Assembly, but will be published in the original language (English or French) in the Proceedings.

3. — National Committees are invited to send, *at the latest by May 1st*, 1963 three copies of their reports to the Secretary General of U.R.S.I. who will forward one copy to the Chairman of the appropriate Commission in order to help him in the drafting of the Commission Report.

3. — Commission chairmen reports

1. — *Introductory report.*

Introductory reports of Commission Chairmen should comprise broad reviews of the activities of their Commission during the period preceding the General Assembly.

They should, as far as practicable, be in the form of an interesting and readable paper supported by references to the reports of the National Committees.

It is intended that these reports will assist the meetings of the various Commissions in conducting their scientific work at the General Assembly. Such reports need not to be confined to the subjects selected for discussion by each Commission.

In order to have these reports available for distribution at the General Assembly, they must be in the hands of the Secretary General, in three copies, by *1st July*, 1963.

2. — *Final report.*

At the Closing Session of the General Assembly, the Chairman of each Commission will present *his report reviewing the activity* of his Commission during the General Assembly together with resolutions or/and recommendations.

These reports should be in the hands of the Secretary General at the end of the General Assembly for publication, as stated in the paper on « General Assembly Publications ».

3. — *Publication.*

Introductory reports will be distributed at the General Assembly.

All Commission Chairmen Reports will be published in their original language, in the Reports on Progress in Radio Science and in both official languages in the Proceedings.

* * *

The Commission Chairmen are requested to co-operate with the Secretary General in putting the above matter into effect so that the publications of the General Assembly may be achieved as quickly as possible.

4. — Provisional Scientific Programme

Mentioning :

(1) The dates of scientific sessions.

(2) The topics selected by the Co-ordinating Committee.

(3) Commissions interested in the topics to be considered (S.R.R. = Space Radio Research Committee; C.I.G. = U.R.S.I. Committee on International Co-operation in Geophysics).

(1)	(2)	(3)
September		
	Commission I	
10.PM	Frequency standards. Quartz clocks and automatic systems of measurement	III, IV
11.PM	Standards of power measurements	
12.AM	Atomic and molecular frequency standards	VII
13.AM	Standard frequency transmissions	
16.AM	General radio measurements including microwaves	
	Commission II	
10.PM	Models of the troposphere	
11.PM	Radio climatology	
13.AM	Radar meteorology and cloud physics	
13.PM	Tropospheric propagation affecting space communications	S.R.R.
16.AM	Influence of irregularities of terrain and of vegetation on propagation	
17.PM	Guided waves in the troposphere and ionosphere (Joint session with III and IV, organized by IV)	
18.PM	Free session	
	Commission III	
10.PM	Ionizing radiation and constitution of the atmosphere	
11.PM	Geomagnetism and the ionosphere	IV

(1)	(2)	(3)
12.AM	Ionospheric storms	IV
16.PM	I.Q.S.Y. (Radio and the ionosphere)	IV,V
17.PM	Guided waves in the troposphere and the ionosphere (Joint session with II and IV, organized by IV)	
18.AM	Electron distribution throughout the ionosphere (Joint session with IV, organized by III)	
18.PM	Free session	
	COMMISSION IV	
10.PM	Atmospheric noise (Review of I.G.Y. results and I.Q.S.Y. programme)	C.I.G.
12.AM	*Idem*	C.I.G.
16.AM	Whistlers (Review of I.G.Y. results and I.Q.S.Y. programme)	C.I.G., III
17.AM	VLF and ELF noise phenomena	III, VII
17.PM	Guided waves in the troposphere and the ionosphere (Joint session with II and III, organized by IV)	
18.AM	Electron distribution throughout the ionosphere (Joint session with III, organized by III)	
18.PM	Free session	
	COMMISSION V	
10.PM	Radio astronomy of the Galaxy	
12.AM	Radio astronomy of discrete sources	
12.PM	Solar radio astronomy (Active and quiet Sun) (1)	III, IV, C.I.G.
16.AM	Observational techniques and measurements	VI, VII, S.R.R.
17.AM	Solar radio astronomy (2)	III, C.I.G., IV
18.PM	Radio astronomy of the solar system	III, IV, VI, S.R.R.
	COMMISSION VI	
10.PM	« Graphs » theory	
11.PM	Non-linear circuits	
12.AM	Information theory (variable channels and coding)	II, III
12.PM	Electromagnetic theory (inhomogeneous and anisotropic media)	II, III
16.AM	Electromagnetic theory (diffraction)	II, III
17.AM	Information theory (variable channels and statistics)	II, III

(1)	(2)	(3)
	COMMISSION VII	
11.AM	Lasers and Masers - Physics	I to VI
11.PM	Lasers and Masers - Applications	V
13.AM	Plasmas - Laboratory scale	III to VI
13.PM	Plasmas - Geophysical and astrophysical scale	III to VI, S.R.R.
16.PM	Satellite communication devices	V, S.R.R.
18.AM	Free session	
	ESPACE RADIO RESEARCH COMMITTEE (S.R.R.)	
10.AM	General session (1)	I to VII, C.I.G.
17.AM	Committee meeting	
	(1) Topics to be discussed will be announced later on	
	U.R.S.I./C.I.G. COMMITTEE (C.I.G.)	
12.PM	U.R.S.I. and I.Q.S.Y. programme	II to V, S.R.R.
19.AM(?)	Committee meeting	

5. — GENERAL ASSEMBLY PUBLICATIONS

On the suggestion of the Co-ordinating Committee meeting in Brussels on April 18-19, 1962, the Board of Officers of U.R.S.I. unanimously decided to submit during the forthcoming General Assembly to the Executive Committee, the following rules for the publications relevant to the General Assembly :

1. — *Proceedings.*

It is suggested to publish one bilingual issue of the Proceedings, containing :

(i) National Committee Reports in their original language (English or French),

(ii) Reports of Commission Chairmen (both in English and in French) ;

(iii) Minutes of the sessions,

(iv) Resolutions and Recommendations (English and French).

2. — *Scientific Publications.*

In view of securing a high scientific standard to the scientific publications, the following rules will be brought into application for the forthcoming General Assembly :

1. The volumes should be called « *Reports on Progress in Radio Science* » and should also carry the *title of the Commission* and the *year of the General Assembly.*

2. The contents should be :

   (*a*) a survey paper by the Chairman of the Commission — based on National Committee Reports ;

   (*b*) the invited review papers ;

   (*c*) verbatim discussions at the discretion of the Chairman : such discussions should be printed in small type ;

   (*d*) a report of the Commission Chairman summarizing the activity of the Commission during the General Assembly ;

   (*e*) possibly certain resolutions or recommendations but *only* when these are of *general scientific interest.*

The above papers may be written either in French or in English language.

3. Authors invited to contribute should be supplied with 50 reprints of their paper and a copy of the whole volume.

4. Authors of invited reviews should not be severely limited in the scope of their paper. They should be given *ample scope* to deal with the topic under consideration.

5. The review papers should be commissioned about *one year before* the time of the General Assembly. Whenever possible it is desirable that authors should know the other topics to be included in the same volume and also the possible authors of these other articles.

6. Attention of Scientific Editors of Reports on Progress in Radio Science should be invited to follow, as near as possible, the Instructions for the publication of U.R.S.I. Monographs.

7. Authors of reviews are invited to send, *at the latest by July 1st*, 1963, two copies of their reports to the Secretary General of U.R.S.I., in view of the distribution of their papers at the General Assembly.

PROVISIONAL PROGRAMME OF THE XIVth GENERAL ASSEMBLY
September 1963

Date	Morning	Afternoon	Evening
5 Thursday	Board Meeting Final Registration	Final Registration	
6 Friday	Executive Comm. Meeting Final Registration	Final Registration	
7 Saturday	Co-ordinating Comm. Final Registration	Final Registration	
8 Sunday	Final Registration		
9 Monday	Opening Plenary Meeting	Meeting of the officers of All Commissons and Committees Organising Meetings of Individual Commissions	Reception
10 Tuesday	Scientific Sessions and Field Trips		Entertainment
11 Wednesday	Scientific Sessions and Field Trips		Memorial Lecture
12 Thursday	Scientific Sessions and Field Trips		Entertainment

Date	Morning	Afternoon	Evening
13 Friday	Scientific Sessions and Field Trips		Reception
14 Saturday 15 Sunday	Field Trips and/or Excursions		
16 Monday	Scientific Sessions and Field Trips		Entertainment
17 Tuesday	Scientific Sessions and Field Trips		
18 Wednesday	Scientific Sessions and Field Trips		Reception
19 Thursday	Final Administrative Commission Meetings	Executive Committee Meeting	
20 Friday	Closing Plenary Meeting	Co-ordinating Comm.	
21 Saturday			
22 Sunday	Post Assembly Tour (Kyoto, Mara, etc.)		
23 Monday			
24 Tuesday			