
International Scientific Radio Union

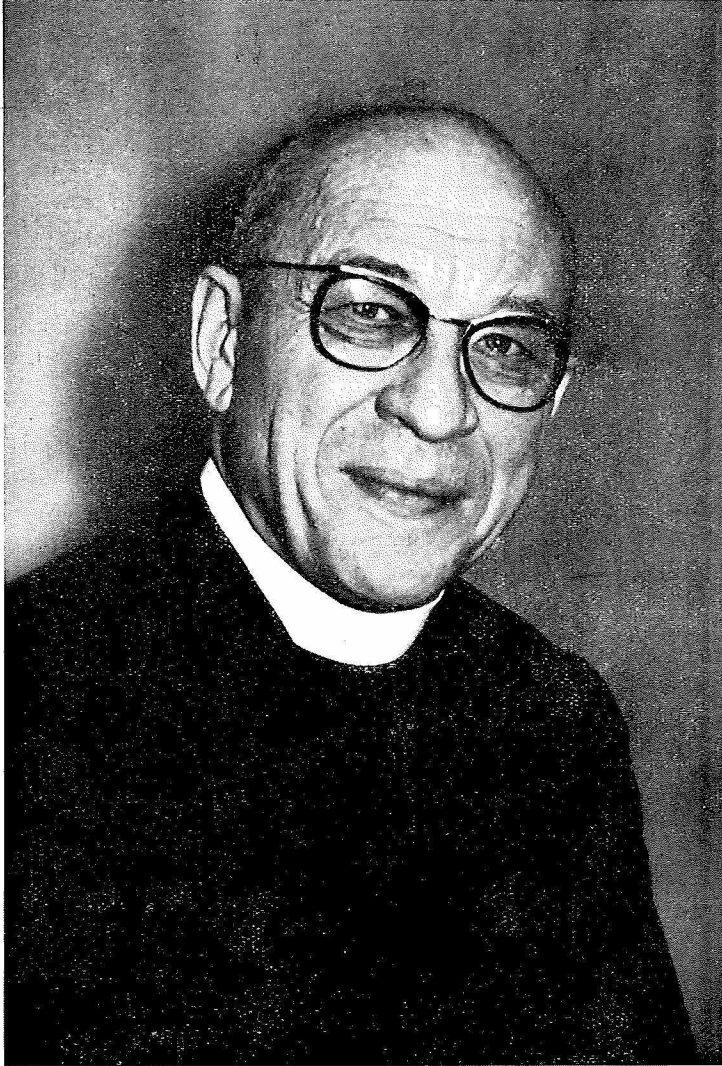
U. R. S. I.

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Father P. LEJAY, Past President

IN MEMORIAM

Father Pierre Lejay S. J.

It is quite impossible to give a complete picture of the life of Father Lejay. For those who had the privilege of knowing him well Father Lejay had three lives : his personal life, his religious life and his scientific life. All three were lived simultaneously but they never interfered one with the other.

To follow the scientific career of our late President we must make a long tour through many fields of Astronomy, Geophysics, Geodesy and Radioelectricity. Having obtained his diploma in the radio-electricity section of the Ecole Supérieure d'Electricité in Paris in 1919, Father Lejay won the degree of Doctor of Science at the Sorbonne in 1926. In 1936 the Institut des Sciences de France awarded him the Vaillant prize, the Ferrié in 1940, the Darracq in 1942 and the Holwerk in 1952.

He became a correspondant of the Académie des Sciences in 1935 and in 1946, at the age of 48 he became a member of the Académie.

At the moment when death brought his career to an abrupt end Father Lejay was :

Vice-President of the International Council of Scientific Unions ;
President of the Longitude Bureau ;

Member of the Executive Committee of the International Geodesic
and Geophysical Union and the International Geodesic Association ;

President of Section IV (Gravimetry) of this Association ;

Director of the International Gravimetric Bureau ;

President of the French National Committee for the International
Geophysical Year, etc.

He was also a member of numerous national and international scientific Committees and Commissions.

* * *

The foregoing enumeration of his occupations might lead us to believe that Father Lejay had left radio-electricity out of his activities but the ionospheric specialists know that this was not the case. During the time he spent in China, Father Lejay established an ionospheric station there and looked after its operation for several years and in 1948 we had the pleasure of welcoming him among those attending the General Assembly. In a very short time he was taking an important part in the discussions and activities of U.R.S.I. During this Assembly Father Lejay was appointed president of the Working Group which was examining the question of the location of ionospheric stations, and it is of interest to note that several points of the I.G.Y. programme are in agreement with the conclusions arrived at by this Working Group. As a result of the important part played by Father Lejay at the VIIIth General Assembly, he was elected Vice-President of the Union and continued in office until 1952 when, at the Xth General Assembly, he was elected to the Presidency.

In the meantime he had become president of the Ursigram Committee and during his period of office he worked hard to give new life to this service of U.R.S.I. which is so important for the other Unions. We all know the amount of work undertaken by Father Lejay in order that this service should achieve all that was expected of it during the I.G.Y.

All those who took part in the life of U.R.S.I. know with what devotion Father Lejay fulfilled the onerous duties of President of U.R.S.I. from 1952 to 1957. Very many of us well remember the General Assembly of 1954 when our President, weakened by illness and despite the disapproval of his doctors, came to the Hague to fulfill the task he had accepted. It was Father Lejay who, at the end of the Assembly, said : « I feel much better than when I arrived ; the sympathy shown me and the climate of U.R.S.I. have done me far more good than a lot of the treatment given me by my doctors. » This is surely a proof of the part played by U.R.S.I. in Father Lejay's occupations and a thousand similar events could be recalled.

But it is unnecessary to continue. We all know that if the members of U.R.S.I. accorded their sympathy to their President he on his side gave a very special place in his scientific life to our

Union. If U.R.S.I. constitutes a big family there is now a very important place left empty in our family. But he who occupied this place has left us a task to accomplish. « Not lost but gone before » and in memory of Father Lejay, our fifth President, we will follow in the path he has traced for us.

U. R. S. I. NEWS

Prof. A. C. B. LOVELL, Chairman of U.R.S.I. Commission V on Radio Astronomy has accepted to serve as U.R.S.I.'s representative on the Special Committee on Space Research (COSPAR).

* * *

Dr. J. W. FINDLAY has been appointed as Chairman of Sub-Commission V^e on Frequency Allocations, in replacement of Dr. F. T. HADDOCK who resigned his functions. Dr. FINDLAY's address is as follows : Dr. John W. FINDLAY, U. S. National Radio Astronomy Observatory, Green Bank (Vir.) U. S. A.

* * *

Mr. W. S. AMENT, Naval Research Laboratory, Code 5271, Washington 25, D. C., will represent U.R.S.I. as observer at the Second Session of Regional Association IV (North America and Middle America) of the World Meteorological Organization to be held in Washington, on December 1-6. Mr. AMENT is member of U. S. National Commission 2.

Address changes

We advise our readers of the following address changes :

Dr. A. H. WAYNICK, Program Director for Engineering Sciences, National Science Foundation, Washington 25, D. C.

Prof. Dr. Jean LUGEON, Directeur de l'Institut Suisse de Météorologie, Krähbühlstrasse 58, Zürich 7/44.

XIIth GENERAL ASSEMBLY

Proceedings

Part 7 of Volume XI (Proceedings of Commission VII) is out of press. Copies have been forwarded to National Committees which have informed the Secretary General of their requirements (Letter n° 386 of October 1957).

Supplementary copies are available at the General Secretariat at the price of B. F. 225, or \$ 4.50, or £ 1.12.6 per copy (postage included).

NATIONAL COMMITTEES

U. S. A.

The U. S. National Committee has advised the General Secretariat of the following changes in its composition given in *Information Bulletin*, n° 109, p. 8 :

Maj. Gen. Harold W. GRANT, Directorate of Communications-Electronics, U. S. Air Force, Room 5 B 479, The Pentagon, Washington 25, D. C.

replaces Maj. Gen. A. L. PACHYNSKI ;

Mr. Allen H. SCHOOLEY, Code 5000, Naval Research Laboratory, Washington 25, D. C.

replaces Dr. R. M. PAGE ;

Rear Admiral Frank VIRDEN, USN, Director, Naval Communications (Op 3D), U. S. Navy, Washington 25, D. C.

replaces Rear Adm. H. C. BRUTON.

COMMISSIONS

Official Members

The Netherlands National Committee of U.R.S.I., at its last meeting, reconsidered the Commission memberships and drafted up a new list of Official Members and Members, as follows :

COMMISSION I

Official Member : Ir. L. R. M. Vos de WAEL, Dr. Neher Laboratory of the Netherlands PTT, Leidschendam.

Members :

Jhr. Dr. Ir. M. GEVERS, Philips Research Labs., Eindhoven ;
Ir. J. J. VORMER, Central Direction Neth. PTT, The Hague.

COMMISSION II

Official Member : Mr. A. HAUER, Royal Neth. Meteorological Inst., de Bilt.

Members :

Dr. H. BREMMER, Philips Research Labs., Eindhoven ;
Ir. F. A. W. van der Burg, Technical University, Delft ;
Ir. S. GRATAMA, Defence Research Organization, The Hague ;
Capt. J. HOUTSMULLER, Dr. Neher Laboratory of the Neth. PTT,
Leidschendam ;
Prof. Dr. Ir. J. P. SCHOUTEN, Technical University, Delft ;
Jhr. Dr. Ir. C. Th. F. v. d. WIJCK, Dr. Neher Laboratory of the
Neth. PTT, Leidschendam.

COMMISSION III

Official Members : Prof. Dr. J. VELDKAMP, Royal Neth. Meteorological Institute, de Bilt.

Members :

- Ir. P. L. M. van BERKEL, Dr. Neher Laboratory of the Netherlands PTT, Leidschendam ;
Dr. H. BREMMER, Philips Research Labs., Eindhoven ;
Prof. Dr. Ir. J. P. SCHOUTEN, Technical University, Delft ;
Ir. A. H. de VOOGT, Central Direction Neth. PTT, The Hague.

COMMISSION IV

Official Member : Ir. J. J. BLOEMSMA, Mient 551, The Hague.

Members : Mr. A. HAUER, Royal Neth. Meteorological Inst., de Bilt.

COMMISSION V

Official Member : Prof. Dr. J. H. OORT, Astronomical Observatory, Leiden.

Members :

- Mr. A. D. FOKKER, Central Direction Neth. PTT, The Hague ;
Prof. Dr. H. C. van de HULST, Astronomical Observatory, Leiden.
Prof. Dr. M. G. J. MINNAERT, Astronomical Observatory, Zonnenburg, Utrecht.
Ir. C. A. MULLER, Radio-astronomical Observatory, Dwingeloo ;
Dr. Ch. L. SEEGER, Astronomical Observatory, Leiden.
Ir. A. H. DE VOOGT, Central Direction Neth. PTT, The Hague.

COMMISSION VI

Official Member : Dr. F. L. STUMPERS, Philips Research Labs., Eindhoven.

Members :

- Ir. J. W. ALEXANDER, Philips Telecom. Ind., Hilversum ;
Dr. H. BREMMER, Philips Research Labs., Eindhoven ;
Dr. Ir. H. C. A. van DUUREN, Dr. Neher Laboratory of the Netherlands PTT, Leidschendam ;
Prof. Dr. Ir. J. P. SCHOUTEN, Technical University, Delft ;

Prof. Ir. B. D. H. TELLEGEN, Philips Research Labs., Eindhoven ;
Prof. Dr. Ir. A. A. T. M. van TRIER, Technical University, Eindhoven.

COMMISSION VII

Official Member : Prof. Dr. J. L. H. JONKER, Technical University, Eindhoven.

Members :

Dr. H. BRUINING, Philips Research Labs., Eindhoven ;
Ir. H. J. DIRKSEN, Defence Research Organization, The Hague ;
Mr. P. H. J. A. KLEYNEN, Philips Research Labs., Eindhoven ;
Prof. Dr. K. S. KNOL, Technical University, Eindhoven ;
Dr. C. E. MULDER, Dr. Neher Laboratory, Neth. PTT, Leidschendam ;
Ir. F. H. STIELTJES, Philips Research Labs., Eindhoven ;
Prof. Dr. Ir. A. A. T. M. van TRIER, Technical University, Eindhoven.

Commission III

New Working Party

Determination of true ionisation-height profiles in the ionosphere from experimental h' - f curves

It has been found desirable to set up a working party in Commission III in view of coordinating the various present activities in various parts of the world in connection with the production of true ionisation-height profiles in the ionosphere from the experimentally determined h' - f curves. The terms of reference of this working party will be *a*) to produce a report on what has been done in this field for the 1960 General Assembly of U.R.S.I., *b*) to draft recommendations for future work.

Action taken by the Secretary General on request of Dr. Martyn, Chairman of Commission III, has been followed by a general

agreement amongst the official members of this Commission both on the aims of this working group and its proposed membership. On the other hand, the opportunity of this setting up has been underlined in many answers received by the Secretary General in this connection.

The membership of this working party is as follows :

- Dr. J. O. THOMAS, Cavendish Laboratory, Cambridge, England (Chairman);
- Mr. R. A. DUNCAN, C.S.I.R.O. Radio Research Laboratories, Camden, N. S. W., Australia;
- Mr. G. A. M. KING, D.S.I.R. Geophysical Observatory, P. O. Box 2111, Christchurch, New Zealand;
- Dr. E. R. SCHMERLING, Dept. of Electrical Engineering, Penn. State Univ., State College, Pa., U. S. A.
- Mr. J. W. WRIGHT, National Bureau of Standards, Boulder, Colorado, U. S. A.;
- Mr. M. D. VICKERS, D.S.I.R. Radio Research Station, Slough, Bucks, England;
- Mr. Ray EGAN, Stanford University, Stanford, California, U. S. A.;
- Mr. J. E. JACKSON, N.R.L., Washington 25, D. C., U. S. A.;
- Mr. W. BECKER, Max Planck Institut, Lindau am Harz, Germany.
-

U. R. S. I. - A. G. I. COMMITTEE

World-Wide Soundings Committee

Plans for Conducting Future Work of Committee

It seems to be fairly generally agreed among WWSC members and consultants that there is a continuing job for our committee to perform. WWSC Memo 17 quoted a number of these opinions. Strong sentiments to this effect were expressed at the U.R.S.I.-A.G.I. meeting in Edinburgh in July and at the C.S.A.G.I. Working Group on Ionosphere at Moscow in August, and I interpret the C.C.I.R. Study Group VI actions at Geneva this summer as continuing to look to U.R.S.I. for the guidance of work in ionosphere vertical soundings. I think we all can take pride in the accomplishments of the last three years and I, personally, want to acknowledge my appreciation for the active role which members and consultants have played. At the same time we should remember and acknowledge our debt to the former High Latitude Committee, which gave such a healthy start to our work. It is hard to imagine what would have happened in the vertical soundings field in this I.G.Y.-stimulated time of expansion and emphasis if F. T. Davies had not spoken out plainly and vigorously at the U.R.S.I. General Assembly at the Hague in 1954 and if J. H. Meek had not subsequently conceived the *f*-plot idea to decrease the role of arbitrary rules and conventions in ionogram reduction and take research with ionospheric sounding results out of the realm of numerology; in my opinion we owe most to these two of our colleagues.

As for our future method of operation, I suggest we continue in the general spirit of the last three years, but that we try to improve the organization of our work. I propose, unless I get different advice from members or consultants, to have an agenda of topics of concern to the committee. In our circular memoranda we will distribute information on these topics, have discussions, and finally, when appropriate, take action. I hope this degree of

formality will keep the committee's work going in a more orderly way.

I also envisage that as time goes on there will be need to keep more individual and groups of stations informed about our committee's work and the progress of the world-wide vertical soundings programme. Certainly the U.R.S.I.-A.G.I. Committee is looking to us to guide and advise the world network. Thus, we probably should distribute more information copies of our circular memoranda.

On the other hand there is already so much substantive correspondence on the committee's work that it is becoming difficult to copy all for distribution to all members, consultants and the others we are keeping informed. Therefore, in the future I will plan to cite such correspondence in the circular memoranda, but send copies only to the six members of the committee itself. If a consultant wants a copy of a particular item, it would be sent on request.

Perhaps I should remind you that much of what is attributed to your chairman in the series of WWSC memoranda actually is due to his colleagues, R. W. Knecht and J. W. Wright. We all owe much to them, especially to Mr. Knecht who keeps continual track of the Committee's work.

The next circular memorandum, just now being issued, follows the plans as discussed above. I hope they are in the direction of making our work more effective. I also hope that members and consultants will continue to give freely their comments on the method of conducting the work, as well as contributing on individual topics. This is what has given our efforts the success they have had.

Sincerely yours,

A. H. SHAPLEY,

Chairman

U.R.S.I./A.G.I. World Wide Soundings
Committee

Committee activities

(Abstract from Memo WWSC-20 and 21, Sept. 17 and Nov. 6, 1958)

Since July 1958, ad hoc meetings of Committee Members and Consultants have been held as follows :

London, July 20 (SHAPLEY, PIGGOTT, LYON, R. WRIGHT, KNECHT).

Edinburgh, July 23 (SHAPLEY, AONO, PIGGOTT, MINNIS, LYON, KNECHT).

Moscow, August 6 (SHAPLEY, AONO, MEDNIKOVA, LYON, R. WRIGHT, plus about 15 temporary consultants).

Discussions at these meetings and by correspondence were centered on the post I.G.Y. vertical sounding programme, on the clarification of scaling and on the interpretation problems and conventions, but included also topics on the whole range of WWSC interest. An inquiry by questionnaire sent to sounding stations on their post I.G.Y. plans has given good results (94 answers from about 170 stations). Resolutions made by the working group of the U.R.S.I.-I.G.Y. Committee in Edinburgh concerning the general orientation which should be given to these plans have been discussed and amended by correspondence in order to be adopted as a WWSC document. On the other hand the need for a concise and non-argumentative set of scaling instructions has been clearly recognized and it is now suggested that C.R.P.L. Memo 40-B be adopted to serve this purpose. Discussions included also monitoring, visits to stations, coordination for $N-h$ profiles, U.R.S.I. stations list. Proposals for Committee's action were made and submitted by correspondence.

IONOSPHERIC STATIONS

Ionospheric Stations Manual

The following letter has been sent to all National Committees :

September, 30th, 1958.

Dear Mr. Chairman,

We have the pleasure to inform you that the « Ionospheric Stations Manual » will be out of press in a few weeks.

This work consists of a gazetteer of all stations which are associated with ionospheric studies, together with a collection of other data relevant to the handling of ionospheric problems. The station gazetteer occupies Sections I to IV, and comprises various classified tables. In order to present the data in a form which is convenient for different types of referencing, it has been necessary to duplicate certain information in these Sections. Tables of monthly median hourly values of solar zenith angle ($\cos \chi$) for the vertical incidence sounding stations are included in Section III. Sections V, VI, VII and VIII contain respectively tables of « Chapman functions », Mean Moon phases, solar rotation numbers, and a list of scaling symbols for vertical incidence ionograms. The calendar of Regular World Days and World Meteorological Intervals for the International Geophysical Year (1957-58) is given in Section IX. Finally, the geographical distribution of ionospheric stations is illustrated on the maps at the end of the volume.

With the explanation included in the text, the use of each Section is self evident. It should be noted that Section I, giving an alphabetical list of all stations, serves as an index to the gazetteer. It gives the geographic and geomagnetic coordinates and indicates the ionospheric studies at present undertaken by each station. As far as possible, the names of those vertical incidence stations which have now ceased operation are also included in Section I, and whenever possible, the alternative names of stations have been

given. For reference purposes, each station has been a «three letter abbreviation» which is used on the maps at the end of the volume.

Section II presents the list of stations arranged in order of geographic latitude decreasing from the North Pole. Further information on any particular station may be obtained by referring to either Section III or IV.

The work will be presented in a cardboard cover and in loose leaves in order to facilitate its keeping up to date.

The Ionospheric Stations Manual will be distributed free of cost to the Officers of the Board and to the National Committee and Commission Chairmen. It will be on sale at the price of B. F. 800.— (£ 5.15.0 or \$ 16), postage and regular forwarding of addenda and errata included. This price will be B. F. 600.— (£ 4.6.0 or \$ 12) for the orders sent to the General Secretariat through National Committees.

As the number of copies is limited, you are kindly invited to send your orders as soon as possible.

Yours sincerely,
(*sgd*) HERBAYS,
Secretary General.

U. R. S. I. PERMANENT SERVICES

Ursigrams

New Codes

The following letter has been sent to all National Committees :

November 26th, 1958.

Mr. Chairman,

I have the pleasure to inform you that the U.R.S.I. General Secretariat is undertaking presently the publication of a « Manual of Ursigram Codes » which will include a repertory of all stations participating up to now in this international service (140 stations in 40 countries), all codes used for the rapid distribution of data concerning Solar Activity, Ionosphere, Radio Propagation characteristics, Geomagnetism, Aurora, Cosmic Rays, etc., as well as other codes related with artificial satellites of the Earth, with special radio propagation phenomena as whistlers, etc.

This Manual will include four sections. *Section I* deals with general information on the Ursigram Service and on the contains of messages ; *Section II* is a list of all participating stations indicating their actual status concerning messages transmitted. In *Section III* a time table of Ursigram radio broadcasting with indication of wavelengths and characteristics will be found. *Section IV*, the most important section of the work, will contain the codes presently used, grouped in sub-sections according to their subject (Sun, Ionosphere, etc.).

The Manual will be presented under a cardboard cover and in loose leaves in order to be kept up to date. Supplementary leaves will be issued and sent to interested individuals or organizations as soon as a modification to the present status is decided or a new code is introduced.

The Manual of Ursigram Codes will be sent free of charge to the Members of the U.R.S.I. Board of Officers and to the National

Committee and Commission Chairmen. Owing to the financial aid of the Federation of Permanent Services for Astronomy and Geophysics (F.A.G.S.), its price shall be kept very low : B. F. 400 (£ 2.17 or \$ 8) including postage and the regular expedition of additional sheets.

For orders reaching the General Secretariat through National Committees, this price shall be reduced to B. F. 300 (£ 2.30 or \$ 6). Special conditions will be made to stations and observatories participating in the International Ursigram Service. These organisms are invited to apply directly to the Secretary General of U.R.S.I.

We would be grateful to you to give this letter the widest possible diffusion in your country, in order to allow us to fix the necessary number of copies, that number being limited. It would be helpful for us to receive as soon as possible orders from organisms of your country.

Yours sincerely,

HERBAYS,

Secretary General.

International World Days Service

(IWDS)

On the recommendation of the Bureau and of the Executive Board of I.C.S.U., the Eighth General Assembly (Washington, October 2-6, 1958) agreed :

1. That in preference to either a Special Committee or Joint Commission on World Days, there should be formed an International *Service* for World Days (IWDS).

2. That the Council delegate its authority in the formation and subsequent functioning of I.W.D.S. to U.R.S.I.

3. That its terms of reference should correspond to those set out by the C.S.A.G.I. Reporter for World Days, with the omission of paragraph 3 (See below).

4. That it should be guided by a Committee consisting of one representative each from U.R.S.I., I.U.G.G. and I.A.U.

5. That Dr. R. Coutrez be named Convenor.
6. That it should be formed, and prepared to take over from C.S.A.G.I., by December 31, 1958.

**Proposal from the C.S.A.G.I. Reporter for World Days
on the formation of a Joint Commission
on World Geophysical Days**

Noting that the introduction of the I.G.Y. World Days programme has made a valuable contribution to the advance of geophysical observations, the C.S.A.G.I. Bureau transmits to I.C.S.U. the following proposal from the C.S.A.G.I. Reporter for World Days :

That a Joint Commission on World Geophysical Days be established which would continue some of the work done under the I.G.Y. World Days programme, including :

- (1) the advance specification of Regular World Days and World Meteorological Intervals in a World Geophysical Calendar ;
- (2) the specification on a current schedule of solar activity Alerts and, occasionally, Special Observational Intervals ;
- (3) the coordination, collection, interchange and distribution of selected current observations of immediate significance to geophysical research ;
- (4) the preparation of a *post facto* calendar of significant indices and outstanding solar and geophysical events.

It is felt that such a Joint Commission should be small (for instance a representative for each of four geographical regions) so that its work can be timely, and that it should have an advisory group of corresponding members representative of the major specialised fields and the interests of the Unions concerned, including sunspots, flares, corona, metric solar radio waves, decametric solar radio waves, ionospheric flare effects, ionospheric storms, magnetic indices, magnetic storms, aurora, airglow, meteorology, cosmic rays, rocket explorations of the atmosphere, scientific satellite experiments.

* * *

It is for us a pleasant duty to recall that the C.S.A.G.I. Reporter for World Days is Mr. A. M. Shapley, who took a very active part

in the I.G.Y., particularly as Chairman of the World Wide Ionospheric Sounding Sub-Committee of U.R.S.I.

IWDS

International World Days Calendar for 1959

(Priority dates underlined>

Regular World Days	Intervals
1959	
Jan. 3, 4, 9, 10 (from I.G.Y. Calendar)	
Feb. 17, <u>18</u> , 19	
Mar. 17, <u>18</u> , 19	17-26 Regular World Inter-
	val (R.W.I.)
Apr. 14, <u>15</u> , 16	16-25 World Meteorological
	Interval (W.M.I.)
May 12, <u>13</u> , 14	
June 16, <u>17</u> , 18	15-24 R.W.I.
July 14, <u>15</u> , 16	15-24 W.M.I.
Aug. 11, <u>12</u> , 13 (Perseid Meteor Shower	
Maximum)	
Sept. 15, <u>16</u> , 17	13-22 R.W.I.
Oct. 1, <u>2</u> , 3 (Total Solar Eclipse)	18-27 W.M.I.
9, <u>10</u> , 11 (Giacobinid Meteor Shower)	
Nov. 17, <u>18</u> , 19	
Dec. 14 (Geminid Meteor Shower Maximum)	
15, <u>16</u> , 17	12-21 R.W.I.
1960	
Jan. 12, <u>13</u> , 14	11-20 W.M.I.

BIBLIOGRAPHY

of scientific reports and papers published in Proceedings of the General Assemblies

(See *Information Bulletin* n° 111, p. 45)

- (R) after the title of a paper indicates that only a summary has been published ;
- (Re) that a summary in English language follows the text ;
- (Rf) that a summary in French language follows.

RADIO AND TROPOSPHERE

- 1922-1948. — Commission II on Radio Wave Propagation.
- 1948-1954. — Commission II on Troposphere and Wave Propagation.
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- 1954. — Report on the work of the Commission, Ch. BURROWS, X, P. 2, 64.
 - Summary of the Proceedings of the Commission, Ch. BURROWS, X, P. 2, 84.
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1948. —

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(To be continued.)

INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS

Eighth General Assembly

Washington, October 2-6, 1958

Note : This report contains a summary of the main actions taken by the General Assembly constituted by the representatives of national members (Academies, Research Councils, etc.) and of scientific members (Unions).

Actions taken by the Executive Board (Representatives of Unions) and not submitted to the General Assembly will be recorded in another report.

THE EIGHTH GENERAL ASSEMBLY :

I. — *International Geophysical Year*

RESOLVED THAT

the appreciation of the International Council of Scientific Unions (I.C.S.U.) be placed on record for the magnificent work that has been done under the International Geophysical Year (I.G.Y.) program, and its special thanks to all those who have made it such a great success. In the first place mention is made of our distinguished friend and colleague Professor Sydney Chapman, the President of the Comité Spécial de l'Année Géophysique Internationale (C.S.A.G.I.). His position in geophysics is in many respects a unique one, and he has given unstintingly of his best, for guiding the deliberations of C.S.A.G.I.

It records its thanks to the distinguished Secretary General of C.S.A.G.I., Dr. Marcel Nicolet and his staff, and to the distinguished members of the Bureau of C.S.A.G.I. and the scientific Reporters of C.S.A.G.I. ⁽¹⁾.

⁽¹⁾ On a proposal drafted after the General Assembly by Professor S. CHAPMAN, President of C.S.A.G.I., it was agreed to add the following resolution.

« The General Assembly wishes also to express its high appreciation of the services rendered to the I.G.Y. by Dr. LLOYD V. BERKNER, the first inspirer of the I.G.Y., through his fine leadership in the councils of C.S.A.G.I. as its Vice-President. »

The Assembly expresses its grateful appreciation to the International Scientific Unions and to the other international organizations whose continuing support contributed greatly to the remarkable accomplishments so far noted in the I.G.Y., particularly the I.A.U., I.U.G.G., U.R.S.I., I.G.U., I.U.P.A.P., I.U.B.S., W.M.O., C.C.I.R. and the P.A.I.G.H.

Tribute is also paid to the many hundreds of scientists who have been engaged in the implementation of this program ; to the many scientific organizations in practically all the countries of the world, and to the countries themselves who have contributed generously to these achievements.

Special thanks is accorded to Unesco for its generous financial support.

2. — *Continuation of International Geophysical Collaboration*

RESOLVED THAT

a Special Committee for Inter-Union Cooperation in Geophysics, hence forward called the S.C.G. be established to consist of the members of the present bureau of the C.S.A.G.I. and of its present reporters on the various I.G.Y. disciplines.

The S.C.G. will be organized and managed in accordance with the I.C.S.U. Rules for Special Committees.

The S.C.G. will enter into function on the date when the C.S.A.G.I. terminates its work, ie. on July 1, 1959.

The General Assembly accepts the recommendation of the C.S.A.G.I. in respect of the International Geophysical Cooperation 1959 that the observational and data collecting activities in the geophysical and related sciences be conducted during 1959 on the same general plan as in 1957-58, under the direction of the C.S.A.G.I., respectively the S.C.G., as far as feasible and at such level and in such fields as may be determined by each Participating National Committee.

The primary task of the S.C.G. will be to deal with all aspects of the closing stage of the I.G.Y. enterprise, including the International Geophysical Cooperation 1959. Its activities will include publication, finance, and organization of international cooperation in the use and analysis of I.G.Y. data by World Data Centers, the International Unions, the World Meteorological Organization and otherwise.

In the accomplishment of this task, a close cooperation between the S.C.G. on one hand, and the Unions and Special Committees and other organizations concerned on the other hand, shall be maintained.

CLARIFIED

the understanding that those programs that have been entrusted to other Special Committees or Services of I.C.S.U. shall be transferred by the C.S.A.G.I. to those Committees or Services on or before December 31, 1958.

Note : Accordingly, it is understood that the C.S.A.G.I. calendar is the following :

Termination date of the International Geophysical Year :
December 31, 1958.

Termination date of C.S.A.G.I. : June 30, 1959.

Termination date of C.S.A.G.I. Secretariat : October 31, 1959.

3. — *Oceanic Research*

RESOLVED THAT

the action of the Executive Board in establishing the Special Committee on Oceanic Research (SCOR) be ratified.

4. — *Antarctic Research*

RESOLVED THAT

the action of the Executive Board in establishing the Special Committee on Antarctic Research (S.C.A.R.) be ratified.

Terms of reference : S.C.A.R. is a Special Committee of I.C.S.U. charged with furthering the coordination of scientific activity in Antarctica with a view to framing a scientific program of circum-polar scope and significance.

Membership : S.C.A.R. consists of a representative of each country effectively engaged in scientific operations in the Antarctic, together with a representative of each of the following Unions : I.U.B.S., I.U.G.G., I.G.U., U.R.S.I., I.U.P.A.P.

Note : It should be recalled that Dr. L. Harang has been appointed to this Committee as representative of U.R.S.I.

5. — *International Service for World Days*

RESOLVED THAT

the actions of the Executive Board in establishing the International Service for World Days (I.W.D.S.) be ratified.

Note : More details on this Service are given p. 20.

6. — *Space Research*

RESOLVED THAT

recognizing the need for an International Committee on Space Research and considering that I.C.S.U. should continue its work of coordination in this field there be established an I.C.S.U. Committee on Space Research to function until the end of the year 1959.

Note : See details p. 48.

7. — *Recognition to Unesco*

EXPRESSED

its deep appreciation to Unesco for its significant support of the work of the I.C.S.U. and the associated scientific unions during the period since the last General Assembly, noting with pleasure that the program of the I.C.S.U. and those of its agencies have materially furthered the objectives of Unesco.

URGED

Unesco to take fuller advantage of the services which I.C.S.U. and its associated unions can provide and to increase substantially the funds made available to them for the furtherance of the joint and common objectives of both organizations.

8. — *Increased Unesco Budget for the Natural Sciences*

RESOLVED THAT

the recommendation of the Unesco Advisory Committee on Research in the Natural Sciences Program of Unesco and also the recommendations of the Executive Board of I.C.S.U. be endorsed.

DECIDED

to transmit once again to all National Members of I.C.S.U. its urgent plea that they make immediate contact with the Unesco National Commission in their respective countries, urging the Commissions to recommend to their governments that they include a scientific member in their respective National Delegations to the Tenth General Conference of Unesco and that they ensure that such Delegations bring pressure to bear on the General Conference, so that the percentage of the total budget for 1959-1960 to be allocated to the Natural Sciences Department be substantially increased ; and so that the Departments of Education and Mass Communication be instructed to devote more effort to science education and the dissemination of scientific knowledge.

Note : The President of I.C.S.U., upon proposal by the representative of a National Member, requested the Secretary General, at the same time that he forwards the text of this Resolution to the respective National Commissions of Unesco in each I.C.S.U. Member Country, to provide those National Commissions with the background facts and figures which highlight :

1. The decrease in the Unesco Subvention to I.C.S.U. and the associated unions, vis-à-vis their constantly expanding needs ; and

2. The urgent necessity for an increased budget within Unesco for its Department of Natural Sciences to meet these and other requirements.

9. — *Annual I.C.S.U.-Unesco Conference of Senior Officers*

RESOLVED THAT

in accordance with the spirit of the I.C.S.U.-Unesco agreement and in order to further existing cooperation between I.C.S.U. and Unesco, the Executive Board of I.C.S.U. be instructed to make arrangements with Unesco for a formal annual conference between the senior officers of I.C.S.U. and Unesco.

10. — *Policy of Political Non-Discrimination*

RESOLVED THAT

in keeping with the purely scientific character of the I.C.S.U., the General Assembly approves the following statement :

1. To ensure the uniform observance of its basic policy of political non-discrimination, the I.C.S.U. affirms the right of the scientists of any country or territory to adhere to or to associate with international scientific activity without regard to race, religion or political philosophy.

2. Such adherence or association has no implications with respect to recognition of the government of the country or the territory concerned.

3. Subject only to payment of subscriptions and submission of required reports, the I.C.S.U. is prepared to recognize the academy, research council, national committee, or other bona fide scientific group representing scientific activity of any country or territory acting under a government de facto or de jure that controls it.

4. Meetings or assemblies of I.C.S.U. or of its dependent organisms such as its special committees and its joint commissions should be held in countries which permit participation of the representatives of every national member of I.C.S.U. or of the dependent organisms of I.C.S.U. concerned, and allow free and prompt dissemination of information related to such meetings.

5. I.C.S.U. and its dependent organisms will take all necessary steps to achieve adherence to these principles.

11. — *Admittance of New National Members*

VOTED TO ADMIT

as National Members of I.C.S.U. the National Council of Scientific and Technical Research (Consejo Nacional de Investigaciones Cientificas y Tecnicas) of Argentina, and the Bulgarian Academy of Sciences.

12. — *Revision of By-Laws*

RESOLVED THAT

1. By-Law 1.8 be revised to read as follows :

The Secretary General and the Treasurer shall be assisted by a full-time Administrative Secretary and such other staff as may be approved by the Executive Board. The salary and terms of appointment of all members of the Administrative Staff shall

be determined by the Bureau with the approval of the Executive Board.

2. A by-law be added as by-law numbered 2.8 :

The retiring Bureau shall draw up a list of nominees for the officers and members of the incoming Bureau at its spring meeting in the year of each General Assembly. It should ask Scientific and National Members for suggestions before preparing its list. This list, together with biographical notes of the nominees, shall be circulated to all National and Scientific Members at least four months before the date of the General Assembly. National and Scientific Members may propose additional nominees up to two months before the General Assembly. The complete list of nominees shall be distributed at least one month before the General Assembly to all National and Scientific Members.

Elections to the Bureau shall be by secret ballot, separately for each position to be filled.

3. By-Law 4.1 be revised to read :

Scientific Members, the Special Committees constituted under the terms of By-Law 3.3. above, and the Joint Commissions set up under the terms of Article 25 of the Statutes, shall submit in writing to the Secretary General at least four months before the General Assembly reports on their activities since the last meeting of the General Assembly. The Secretary General shall communicate such reports together with a report from the Bureau with the agenda for the General Assembly.

13. — *Regular Provision of Information to the Members of I.C.S.U.*

CONSIDERING

that it is important to the continuing growth of the I.C.S.U. to keep its Scientific and National Members at all times fully informed concerning the affairs of I.C.S.U.,

that current information on programs, plans and budgets is needed by the Scientific and National Members in the execution of their respective responsibilities to their parent bodies and to the I.C.S.U.,

that the deliberations of future General Assemblies would be greatly facilitated if the Scientific and National Members were

to be provided with background information on all activities of the I.C.S.U. as these develop during the three-year period between General Assemblies,

RESOLVED THAT

the Executive Board be instructed to provide fuller information to all members of the I.C.S.U. between General Assemblies, and in this connection suggested that the Secretary General provide for distribution to Scientific and National Members reports on the meetings of the Executive Board. Special Committees and other agencies of I.C.S.U., together with such pertinent documents as the Executive Board may determine, at the same time that these reports are forwarded to the memberships of those bodies.

14. — *Revision of Statutes and By-Laws*

APPROVED

the appointment of a Committee of the Executive Board charged with the study and review of the Statutes and By-Laws, composed of Sir Harold Spencer Jones (Great Britain), Chairman, and Professors Ch. Manneback (Belgium) and A. Stoll (Switzerland). This Committee is to report its findings appropriately in advance of the Ninth General Assembly.

15. — *Officers and Bureau for the Period 1958-1961*

ELECTED

the following officers and members of the Bureau of the I.C.S.U. for the ensuing period :

President : Sir Rudolph PETERS (Great Britain);

Retiring President : Dr. Lloyd V. BERKNER (U. S. A.);

Vice-President : Rev. Père LEJAY (France);

Vice-President : Professor W. A. ENGELHARDT (U. S. S. R.);

Treasurer : Col. E. HERBAYS (Belgium);

Secretary General : Professor Nicolai HERLOFSON (Sweden);

Members : Professor A. STOLL (Switzerland);

Professor Seiji KAYA (Japan).

16. — *The I.C.S.U. Capital Fund*

RESOLVED THAT

Noting that the I.C.S.U. has no capital fund from which to meet extraordinary or emergency expenses, the decision of the Executive Board be strongly endorsed that such an I.C.S.U. Capital Fund be instituted immediately and the Treasurer be instructed to invite each Member of the Council to take early and vigorous action to secure appropriate donations to the Fund.

17. — *Contributions to the I.C.S.U. Special Fund*

RESOLVED THAT

the best thanks and warmest appreciation of the Assembly be expressed to the following for their generosity in making valuable gifts to the I.C.S.U. Special Fund :

The Sir Darabji Tata Trust (India)	\$ 2,800
The Academy of Sciences of the U.S.S.R.	10,000
The National Academy of Sciences of the United States of America with the support of the National Science Foundation of the U. S. A.	15,000

such contributions having already made it possible for I.C.S.U. to undertake important new international scientific activities, further gifts to the Special Fund will be welcomed.

18. — *Accounts of Period 1955-58*

ACCEPTED

the report of the Finance Committee of the Assembly to the effect that the Treasurer's report and the accounts for the period between the Seventh and Eighth General Assemblies, the fiscal years 1955, 1956 and 1957, have been examined and found to be in order.

19. — *Approval of the Budget for 1959-61*

APPROVED

the annual budget for the ensuing period between the Eighth and Ninth General Assemblies, specifically for the fiscal years 1959, 1960 and 1961, in the amount of \$ 58,000.

Note: The Executive Board approved a change in the I.C.S.U. fiscal year to make it coincide with the calendar year, starting as of January 1, 1959.

20. — *Annual Subscriptions of Scientific Members*

RECEIVED

the report of the Executive Board to the effect that the annual dues of the International Scientific Unions, the Scientific Members of the I.C.S.U., shall be in the amount of two per cent of their normal income.

21. — *Annual Subscriptions of National Members*

DECIDED

that the annual dues to be paid by the national adhering organizations, the National Members of the I.C.S.U., shall be the same as those voted by the Seventh General Assembly, Oslo, 1955, ie. the new scale of contributions which was approved at that time.

22. — *Reports Received*

EXPRESSED

appreciation to the following for the excellent reports received by the General Assembly :

The President of the Council ;

The Secretary General ;

The Treasurer ;

The Bureau ;

The Executive Board ;

The Scientific Members, the International Scientific Unions of :

Astronomy (I.A.U.) ;

Biochemistry (I.U.B.) ;

Biological Sciences (I.U.B.S.) ;

Pure and Applied Chemistry (I.U.P.A.C.) ;

Crystallography (I.U.C.R.) ;

Geodesy and Geophysics (I.U.G.G.) ;

Geography (I.G.U.) ;

History and Philosophy of Science (I.U.H.P.S.) ;

Mathematics (I.M.U.);
Theoretical and Applied Mechanics (I.U.T.A.M.);
Pure and Applied Physics (I.U.P.A.P.);
Physiological Sciences (I.U.P.S.);
Radio Science (U.R.S.I.);

The Joint Commissions :

Ionosphere,
Radiometeorology ;
Solar and Terrestrial Relationships ;
Spectroscopy ;
Applied Radioactivity ;

The Special Committees :

International Geophysical Year (C.S.A.G.I.) ;
Oceanic Research (S.C.O.R.) ;
Antarctic Research (S.C.A.R.) ;
Contamination by Extra-Terrestrial Exploration (C.E.T.E.X.) ;

The Permanent Services :

Astronomy and Geodesy (F.A.G.S.) ;

The I.C.S.U. Abstracting Board (I.A.B.).

23. — *Joint Commissions*

NOTED

the following decisions of the Executive Board :

1. That the Joint Commission for the Ionosphere be abolished, to become a commission of U.R.S.I. ;
2. That the Joint Commission for Radio-Meteorology be abolished, to become an inter-union commission (U.R.S.I.-I.G.G.U.) ;
3. That the Joint Commission on Solar and Terrestrial Relationships be abolished, and that a Committee consisting of Pere Lejay, Prof. Oort, and Prof. Wilson consider the need or otherwise of the creation of a new Joint Commission, charged with a specific task in this field ;
4. That the Joint Commission on Spectroscopy be abolished ;
5. That the Joint Commission on Applied Radioactivity be extended for one year only, so that it may make specific recom-

mendations to I.C.S.U. in regard to future needs of investigation in this field.

24. — *Rules for Joint Commissions*

RECEIVED

the text of Rules for Joint Commissions as approved by the Executive Board (see p. 42).

25. — *Rules for Special Committees*

RECEIVED

the text of Rules for Special Committees as approved by the Executive Board (see p. 46).

26. — *The I.C.S.U. Review*

NOTED

the decision of the Executive Board to authorize the publication of a new quarterly international journal to be known as the *I.C.S.U. Review*, and of which the first issue will appear in January, 1959.

27. — *I.C.S.U. Publication Office*

NOTED

the establishment by the Executive Board of an I.C.S.U. Publications Office.

23. — *Place of the Ninth General Assembly*

GRATEFULLY RECEIVED

the kind invitation of the Instituto Geografico e Catastral of Portugal to meet in Lisbon or at Funchal, and of the Royal Society of England to meet in that member country in 1961, and instructed the Executive Board to give full consideration to these invitations and to make the selection of the place for the holding of the Ninth General Assembly in 1961.

Rules for Joint Commissions

I. — FORMATION OF JOINT COMMISSIONS

1.1. Joint Commissions may be established by the Executive Board of the International Council of Scientific Unions under

article 25 of the Statutes. These Commissions are charged with the preparation, organisation, and publication of the results of Symposia on well defined topics falling within scientific domains which are the concern of more than one Union, or such other specific activities as may be determined by the Executive Board.

1.2. Such Commissions may be established on the proposal of at least one of the interested Unions. Such proposals must define precisely the program to be undertaken by each Commission.

1.3. On approval of the program, the Executive Board will designate a Parent Union, responsible for stimulating and guiding the activities of the Commission and for ensuring its observance of the present Rules.

2. — CONSTITUTION OF JOINT COMMISSIONS

2.1. The Parent Union will designate a Secretary, charged with the administration of the Joint Commission.

2.2. The Secretary is responsible for obtaining the list of members designated by the Unions, and for convening meetings of the Commission in conformity with the present Rules,

2.3. The interested Unions nominate the members of the Steering Committee of the Joint Commission, each Union being entitled to designate two members and one alternate.

2.4. The President of the Joint Commission is elected by the members of the Steering Committee from among their number.

3. — DURATION OF THE JOINT COMMISSIONS

3.1. Each Joint Commission is established for a term of up to 3 years, counting from the date of its first meeting. It is then for the Executive Board of the International Council of Scientific Unions to decide, after due consultation with the Parent Union, whether the Commission should continue its activities for a further period of up to three years.

In such case, the interested Unions are invited to review the names of their representatives so that they continue to be properly informed of current developments in the domain covered by the Commission.

3.2. Each Joint Commission, on the termination of its mandate, will be dissolved or replaced by a Commission of one of the participating Union, with if necessary the cooptation of members from other Unions.

4. — CO-OPTED MEMBERS

In organising Symposia, the Steering Committees of the Joint Commissions may co-opt additional members, whose term of office expires on the termination of the Symposium in question.

5. — MEETINGS AND EXPENSES

5.1. All meetings of a Joint Commission must be proposed by the Parent Union and authorised by the Bureau of the International Council of Scientific Unions.

5.2. The cost of these meetings, borne by the International Council of Scientific Unions, covers the secretarial costs and the reimbursement of travelling and subsistence expenses incurred by the Secretary and the members of the Steering Committee or their alternates.

5.3. Subventions allocated for the organisation of symposia authorised and subvented by the International Council of Scientific Unions, are used, according to the funds available, in the following order :

- (a) secretarial expenses ;
- (b) reimbursement of travelling and subsistence expenses incurred by members of the Steering Committee ;
- (c) total or partial reimbursement of the travelling and subsistence expenses of the co-opted members ;
- (d) total or partial reimbursement of the travelling and subsistence expenses of participants invited by the Steering Committee.

5.4. The travelling and subsistence expenses mentioned in articles 5.2. and 5.3. are subject to the regulations adopted by the International Council of Scientific Unions.

6. — SUBVENTIONS AGREED BY THE INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS

6.1. In order that requests for subventions may be examined in good time, each Joint Commission shall submit to the first

annual meeting of the Bureau of the Council, through its Parent Union, a provisional list of the meetings and symposia which it wishes to hold in the year following the next meeting of the Executive Board.

6.2. Requests for subventions from the International Council of Scientific Unions, whether for meetings or symposia approved by the Executive Board under article 6.1. above, or to meet the costs of publications, should be presented by the Parent Union in the name of the Joint Commission.

6.3. All subsequent dealings with the International Council of Scientific Unions on the subject of subventions are the responsibility of the Parent Union.

6.4. The administration costs of the Joint Commissions are the direct responsibility of the International Council of Scientific Unions. Any other expenses must be approved by the Parent Union and by the International Council of Scientific Unions before being incurred.

7. — REPORTS

7.1. The Parent Union is responsible to the Executive Board of the International Council of Scientific Unions for any Joint Commission attached to it.

7.2. The Joint Commissions are requested to furnish their Parent Unions with full reports of all their meetings and other activities.

7.3. The Parent Union shall present a provisional report on the activities of each Joint Commission attached to it to the annual meeting of the Executive Board of the International Council of Scientific Unions. Every three years, it shall present a report summarising the activities of its Joint Commissions to the General Assembly of the Council, in accordance with article 4.1. of the By-Laws.

Rules for Special Committees

1. In virtue of Article 25 of the Statutes, and of By-Law 3.3, Special Committees can be set up under the authority of the Executive Board, to facilitate the planning and coordination of scientific research on an international basis, such as necessitates the cooperation of several countries and of several Scientific Unions.

2. Each Special Committee functions under a constitution approved by the Executive Board, which is appropriate to its specific task ; and the Committee, as an organic element of I.C.S.U., shall act for I.C.S.U. within the limits of its approved constitution.

3. The membership of a Special Committee shall be determined by the Executive Board. The Bureau of I.C.S.U. has the right to nominate not more than one-third of the total membership. Members representing the Unions shall be nominated by the said Unions. On the authority of the Executive Board, other international organisations may be represented as members or observers on a Special Committee.

4. A Special Committee shall elect its officers from among the members of the Committee, at its first meeting, called by a Convenor appointed by the Bureau of I.C.S.U. : such appointments being subject to confirmation by the Bureau of I.C.S.U.

5. The officers of a Special Committee shall be appointed for a period of not more than three years, and are not then eligible for re-appointment, with the exception of the Secretary, who may be re-appointed for one further term.

6. The adherents to Special Committees other than the Scientific Unions may be either qualified Academies, or Research Councils, or participating Committees, representing bona fide scientific activity in any geographical area.

7. A Special Committee may not act as arbiter between these adherents. Any bilateral or multilateral negotiations must take place directly between the adhering bodies.

8. The task of any Special Committee is to prepare plans for research, but not to carry out research projects. The latter is the function of the adherents as defined in paragraph 6, each making its own contribution to the integrated research program planned by the Committee.

9. Special Committees have the obligation to submit to the Officers of the Council, to its National and Scientific Members, and to the Participating Committees the agenda of all meetings at least two months in advance of the date of such meetings, and subsequently a full and proper record of their proceedings.

10. Each Special Committee will appoint an Editor of Publications, who will be responsible for obtaining a permanent record of the projects launched by the Committee, and of their scientific results. The Editor will arrange with the I.C.S.U. Publications Office for suitable publication.

11. Special Committees must acquire adequate funds for planning and administration, subject to the approval of the Bureau of I.C.S.U. with respect to the sources of such funds.

12. The funds for planning and administration may come from I.C.S.U., or Unesco, from the adherents, or from foundations or other private sources, and shall be deposited with I.C.S.U. for allocation or expenditure in accordance with approved budgets.

13. The Council will make a charge of 3½ per cent on all funds received on behalf of its Special Committees.

14. The budget of any Special Committee is subject to the approval of and adequate control by I.C.S.U.

15. The following rules relating to financial control, already approved by the Executive Board of I.C.S.U., are to be strictly observed.

a) *Finance Committee* :

(1) Each Special Committee will set up a Finance Committee, composed of two members, not belonging to the Executive Committee or Bureau of the Special Committee, together with the Treasurer of I.C.S.U. *ex officio*. The Secretary of the Special Committee will act on the Finance Committee as counsellor.

(2) The task of the Finance Committee will be to help and advise the Executive Committee or Bureau of the Special Committee in the preparation of the provisional budget, drawn up according to the various categories of anticipated expenses. This provisional budget, with the remarks and suggestions of the Finance Committee, will be forwarded to I.C.S.U. by the Secretary of the Special Committee.

(3) The Finance Committee will be consulted on all questions concerning the search for additional resources, or in respect of economies to be made against an eventual deficit.

(4) Arrangements should be made by the Secretary of the Special Committee to advise the Finance Committee periodically of the financial situation of the organization.

b) Directives concerning Expenses :

(1) The Special Committees are advised that all expenses not foreseen in the approved budget estimates, and exceeding a limit specified by the Treasurer of I.C.S.U., should be authorized by the Secretary of the Special Committee, who will inform the Treasurer of I.C.S.U. accordingly.

(2) Per diem and travel expenses may not be reimbursed in excess of those allowed by the rules and scale of I.C.S.U.

c) Statements to be rendered to I.C.S.U. :

(1) Special Committees will adhere to the system of Central Accounting in accordance with regulations to be established by the Treasurer of I.C.S.U.

(2) Budget estimates should reach I.C.S.U. early enough to be presented at the meeting of the Executive Board of I.C.S.U. held before the beginning of the next I.C.S.U. financial year.

(3) The Treasurer of I.C.S.U. will take the necessary steps to reduce the other financial documents to a minimum.

Committee on Space Research

(see p. 34)

The primary purpose of the Committee is to provide the world scientific community with the means whereby it may exploit the possibilities of satellites and space probes of all kinds for scientific purposes, and exchange the resulting data on a cooperative basis. It shall further report to I.C.S.U. these measures needed in the future to achieve the participation in international programs of space research of all countries of the world with those which are already actively engaged in research programs involving the use of instrumented earth satellites and space probes.

The Committee shall hold as a primary objective the maximum development of space research programs by the international community of scientists working through the I.C.S.U. and its adhering national academies and unions. Recognizing, however, the need for international regulation and control of certain aspects of satellite and space probe programs the Committee shall keep itself fully informed on United Nations or other international activities in this field, in order to assure that maximum advantage is accorded to international space science research through such regulations, and to make recommendations relative to matters of planning and regulation that may effect the optimum program of scientific research.

The composition of the Committee is as follows :

1. A representative from each of the countries which are actually launching earth satellites, as also of those having major problems in rocketry.

2. Three representatives, designated on an agreed system of rotation, from among countries actively participating in tracking and other aspects of space research.

3. One representative each from the following Unions : I.A.U., I.U.G.G., I.U.P.A.C., U.R.S.I., I.U.P.A.P., I.U.B.S., I.U.T.A.M., I.U.P.S. and I.U.B. (1).

A convenor will be designated by the Bureau of I.C.S.U., whose duty it will be to call a first meeting of the Committee :

1. To formulate a charter of responsibilities and a detailed organization for the conduct of its affairs, to be submitted to the Bureau of I.C.S.U. for approval.

2. To elect from among its members an Executive Committee of not more than five members, such a Committee to include representatives of countries actually launching earth satellites.

The Committee on Contamination by Extra-Terrestrial Exploration (CETEX) will report its conclusions to the Committee on Space Research.

(1) Professor A. C. B. LOVELL, Chairman of Commission V has kindly agreed to act as representative of U.R.S.I. in this Committee.

The Bureau of I.C.S.U. is directed to arrange the adherence of as many countries as possible.

Note : Dr. Homer Newell was designated as Convenor. It is understood that the first meeting of C.O.S.P.A.R. will be held in London, November 14-15, 1958.

C. C. I. R.

Documents received at the General Secretariat

(See *Information Bulletin*, n° 109, p. 30 and n° 110, p. 64)

STUDY GROUP N° IV

On Ground Wave Propagation

- IV/7. — Netherlands : Ground Wave propagation (mixed-path).
- IV/8. — Report by the Chairman of Study Group IV for the Interim Meeting.
- IV/9. — Report by the Chairman of Study Group IV : Proposed modifications to the radio regulations further to recommendations made by Study Group IV.
- IV/10. — United States of America : Ground wave propagation.
- IV/11. — Netherlands : T. V.-transmitter (Band V) measurements.
- IV/12. — Czechoslovakia : Ground wave propagation curves below 10 Mc/s.
- IV/13. — France : Ground wave propagation over mixed paths.
- IV/14. — France : Ground-wave propagation over irregular terrain (Dispersion in measurements of medium-frequency and low-frequency ground-wave field strengths).
- IV/15. — France : Ground-wave propagation over irregular terrain (Propagation in urban areas).
- IV/16. — France : Ground-wave propagation over irregular terrain (Observation of the phenomenon of obstacle gain).
- IV/17. — People's Republic of Poland : Surface impedance concept in the theory of radio wave propagation.
- IV/18. — Belgium : Ground-wave propagation over irregular terrain.
- IV/19. — Italy : Methods of reading the propagation curves contained in the C.C.I.R. Atlas, 1955.
- IV/20. — C.C.I.R. Secretariat : Supplement to the Atlas of ground-wave propagation curves for frequencies between 30 and 300 Mc/s.
- IV/21. — Japan : Theory of radio wave propagation over mixed path including diffraction by hills or mountains.
- IV/22. — Japan : Theory of wave propagation over mountains.
- IV/23. — China : A measurement of ground wave field intensity along an assigned direction on the earth surface in Taiwan Province.

- IV/24. — Study Group IV : First meeting held on 21 July, 1958, at 10.0 a m..
- IV/25. — Study Group IV : Report of Working Group IV, B.
- IV/26. — Switzerland : Ground wave propagation over irregular terrain. Obstacle gain caused by the Alps.
- IV/27. — Study Group n° IV : 2nd Meeting, held at 9.30 a. m. on 24 July, 1958.
- IV/28. — Working Group IV, A1 : Draft report. Determination of the electrical characteristics of the surface of the earth.
- IV/29. — Working Party IV, B n° 21 : Supplement to C.C.I.R. Atlas of propagation curves ; n° 22 : Publication of new ground-wave propagation curves.
- IV/30. — Preliminary report of Working Group IV/4/8.
- IV/31. — Working Party IV, A1 : Draft report. Ground-wave propagation over inhomogeneous earth.
- IV/32. — Working Party IV, A1 : Report, Ground-wave propagation over inhomogeneous earth.
- IV/33. — Terms of reference of C.C.I.R. Study Groups.
- IV/34. — Joint meeting of Study Groups n° IV and V, 28th July, 1958, at 16.30.
- IV/35. — Study Group IV : Third meeting, 28 July 1958 at 14.30.
- IV/36. — Study Group IV : Recommendation.
- IV/36 (revised) : Study Group IV. Recommendation.
- IV/37. — Study Group IV : Fourth and last meeting held on 29 July 1958, at 14.30.
- IV/38. — List of documents issued.

STUDY GROUP V

On Tropospheric Propagation

- V/3. — Study Group V : Draft proposed revision of Recommendation n° III, Tropospheric wave propagation curves.
- V/18. — Japan : Report on some characteristics of fading ranges in microwave regions.
- V/19. — Japan : Tropospheric propagation across mountain ridges. Investigation of multipath transmission across mountain ridges.
- V/20. — Japan : Report on the correlation between the variations in the radio field strength and statistical parameters of the gradient of refractive index of the air.
- V/21. — Japan : Radio transmission utilising inhomogeneities in the troposphere (commonly termed « scattering »). Experimental investigations of V.H.F. and U.H.F. tropospheric propagation to distances well beyond the horizon.

- V/22. — Federal Republic of Germany : Propagation data required for wide-band radio systems.
- V/23. — European Broadcasting Union : Polarisation of transmissions in bands IV and V. Advantages to be obtained from considerations of polarisation in the planning of broadcasting services in the VHF (metric) and U.H.F. (decimetric) bands (television and sound).
- V/24. — Czechoslovakia : Mean refractivity gradient in Prague.
- V/25. — France : Tropospheric propagation across mountain ridges.
- V/26. — France : Tropospheric wave propagation.
- V/27. — France : Note on polarization discrimination on VHF (175 Mc/s).
- V/28. — France : Propagation data required for wide-band radio systems.
- V/29. — Measurement of field strength for VHF (metric) and UHF (decimetric) broadcast services, including television.
- V/30. — Netherlands : TV-Transmitter (band V) measurements.
- V/31. — Czechoslovakia : Draft amendment to Recommendation n° 54.
- V/32. — Italy : Tropospheric propagation data on line-of-sight paths.
- V/33. — Italy : Propagation data required for wide-band radio systems.
- V/34. — U.R.S.I. : Measurement of field strength in the neighbourhood of obstacles.
- V/35. — France : Tropospheric propagation curves for distances well beyond the horizon (Attempt to prepare a propagation curve for distances beyond the horizon.)
- V/36. — C.C.I.R. Specialized Secretariat. Observations on two signal paths cross mountain ridges.
- V/37. — Sweden : Measurement of field strengths for VHF and UHF broadcast services including television.
- V/38. — Sweden : Tropospheric propagation curves for distances well beyond the horizon.
- V/39. — Report by the Chairman of Study Group V for the Interim Meeting (Geneva, July 1958).
- V/40. — U. S. S. R. — Data on statistical distribution of the vertical gradient of the dielectric constant of the atmosphere for the central strip of the European territory of the U. S. S. R.
- V/41. — Study Group V : Draft new question. Protection of frequencies used by artificial earth satellites or other space vehicles for communication and positional observation.
- V/42. — U. S. S. R. — International Broadcasting Organization-Field strength graphs for the 60-1000 Mc/s frequency band.
- V/43. — Study Group V : 1st Meeting, 28 July, 1958.
- V/44. — International Astronautical Federation.
- V/45. — Study Groups IV and V : Joint Meeting, 28 July, 1958.
- V/46. — Study Group IV : Recommendation.

- V/47. — Study Group V : 2nd Meeting, 30 July, 1958.
- V/48. — Study Group V : Proposed addition to Question n° 136 (V).
- V/49. — Study Group V : 3rd Meeting, 1st August, 1958.
- V/50. — List of documents issued (V/1 to V/50).
- V/51. — Study Group V : Recommendation n° 170.
- V/52. — Study Group V : Draft Study Programme n° 91 (V) (Revised),
Radio Transmission utilising inhomogeneities in the troposphere
(commonly termed « scattering »)
- V/53. — Study Group V : Draft Report. Radio transmission utilising inho-
mogeneities in the troposphere (commonly termed « scattering »)
(Study Programme n° 91).
- V/54. — Study Group V : Draft Report. Propagation data required for
wide band radio systems (Question n° 136).
- V/55. — Study Group V : Report on reference atmosphere for field intensity
calculation.
- V/56. — Study Group V : Working Group V, E. Draft Report. Influence of
tropospheric propagation across mountain ridges (Study Programme,
n° 79).
- V/57. — Study Group V : Working Group V, E. Effect of the troposphere
on propagation across mountain ridge.
- V/58, 59. — Study Group V : Working Group V, A. Report (Question,
n° 138 (V)). Field measurement for broadcasting services including
television, on metric and decimetric waves.
- V/60. — Study Group V : Recommendation (Question n° 137 (V)).
- V/61. — Study Group V : Report. Description of coverage for VHF (metric)
and UHF (decimetric) broadcast services, including television (Question
n° 138 (V)).
- V/62. — Study Group V : Report on work under Study Programme n° 55.
- V/63. — Study Group V : Study Programme n° 90. Tropospheric wave
propagation.
- V/64. — Study Group V : Study Programme n° 55. Tropospheric propaga-
tion curves for distances well beyond the horizon.
- V/65. — Study Group V : Report. Advantages to be obtained by using
orthogonal wave polarisation in the planning of broadcasting services
in the VHF (metric) and UHF (decimetric) bands, television and sound.
- V/66. — Study Group V : Draft Report. Tropospheric wave propagation
(Study Programme, n° 90). Correlation of tropospheric propagation
with radio-meteorological parameters.
- V/67. — Study Group V : Measurement of field strength (Question n° 8).
- V/68. — Study Group V : 4th Meeting, 4 August, 1958.
- V/69. — Study Group V : 5th and 6th Meetings, 5 and 6 August, 1958.
- V/70. — List of documents issued (n° V/51 to V/70).

STUDY GROUP N° VI

On Ionospheric Radio Propagation

- VI/42. — Italy : Research on the applications of back-scatter ionospheric sounding to radiocommunications. Preliminary results.
- VI/43. — Federal Republic of Germany : Pulse-transmission tests at oblique incidence.
- VI/44. — Federal Republic of Germany : Choice of a basic index for ionospheric propagation.
- VI/45. — Federal Republic of Germany : Back scattering.
- VI/46. — Federal Republic of Germany : Basic propagation information for ionospheric propagation.
- VI/47. — Japan : Measurement of atmospheric radio noise proposed to local lightning flash counters.
- VI/48. — Japan : Report on characteristics of HF propagation to be considered in making MUF prediction.
- VI/49. — Japan : Report on identification of precursors indicative of short-term variations of ionospheric propagation conditions.
- VI/50. — List of documents issued (n° VI/1-VI/50).
- VI/51. — China and Japan : Report on ionospheric scatter propagation.
- VI/52. — Japan : Report on measurement of atmospheric radio noise in high frequency band.
- VI/53. — Japan : Report on ionospheric propagation tests by sweep frequency pulse transmission at oblique incidence.
- VI/54. — Japan : Report on radio propagational characteristics on frequencies above 1500 kc/s.
- VI/55. — France : Choice of a basic index for ionospheric propagation.
- VI/56. — France : Identification of precursors indicative of short-term variations of ionospheric propagation conditions.
- VI/57. — France : Basic prediction information for ionospheric propagation.
- VI/58. — France : Use of special modulation on the standard frequency transmissions for assessing the reliability of propagation forecasts.
- VI/59. — France : Measurement of atmospheric radio noise.
- VI/60. — France : Measurement of atmospheric radio noise. Proposed modifications to the noise charts adopted by the C.C.I.R. (Warsaw, 1956).
- VI/61. — France : The estimation of sky-wave field strengths on frequencies above 1500 kc/s.
- VI/62. — United Kingdom : Ionospheric scatter propagation.
- VI/63. — Italy : Charts for reliability computations of HF radio circuits via ionosphere.
- VI/64. — Czechoslovakia : Determination of radio-path elements.

- VI/65. — Czechoslovakia : Choice of the relative sunspot R applicable to the F₂ layer.
- VI/66. — China : A study of regular variations of f_oF_2 in Taipei skies from 1951 to 1957.
- VI/67. — U.R.S.I. : Resolution n° 6 of U.R.S.I. Commission V.
- VI/68. — U.R.S.I. : Recommendations on Measurement of atmospheric noise from U.R.S.I. Commission IV.
- VI/69. — U.R.S.I. : Resolution n° 26. Ionospheric sounding stations after the I.G.Y.
- VI/70. — Belgium : Basic forecasts for ionospheric propagation.
- VI/71. — United Kingdom : Long distance propagation of waves of 30-300 Mc/s by way of ionisation in the E and F regions of the ionosphere.
- VI/72. — Meeting Sub-Group Lépéchin'sky, C.C.I.R., Geneva 1957 : Provisional Report of the Working Party set up in accordance with C.C.I.R. Recommendation n° 177 (Warsaw 1956) to examine « Methods for estimating sky-wave field strength on frequencies above 1500 kc/s for the I.F.R.B. ».
- VI/73. — U. S. S. R. : Continuation of universal time charts of critical frequencies F₂ layer.
- VI/74. — U.S.S.R. : Space-and-time variation of f_oF_2 during disturbances.
- VI/75. — U.S.S.R. : Observation data exchange for short-period forecast and distribution of prediction of ionospheric disturbances.
- VI/76. — U. S. S. R. : Experimental investigation method of statistical properties of atmospheric radio noise.
- VI/77. — U. S. S. R. : Suppression of pulse disturbances occurring in radio-astronomical observations.
- VI/78. — U. S. S. R. : Method of prediction virtual height frequencies ($h f$) curves.
- VI/79. — U. S. S. R. : Field strength distribution of short wave signals.
- VI/80. — Spain : Practical uses and reliability of ionospheric propagation data.
- VI/81. — Australia : Measurement of atmospheric radio noise in Australia.
- VI/82. — Study Group VI : Working Group charged with Recommendation n° 177.
- VI/83. — Federal Republic of Germany : Radio propagation at frequencies below 1500 kc/s.
- VI/84. — Czechoslovakia : The propagation on the lower boundary of the F-layer.
- VI/85. — Study Group VI : 1st Meeting, 23 July 1958.
- VI/86. — Study Group VI : 2nd Meeting, 29 July 1958.
- VI/87. — International Astronautical Federation.

- VI/88. — Sub-Group VI, C : Recommendation (or Resolution). Working Party for the Study of sky-wave field intensities on frequencies between about 1.5 and 50 Mc/s.
- VI/89. — Sub-Group VI, C : New Study Programme. Absorption of radio-waves propagated via the ionosphere on frequencies between about 1.5 Mc/s and 40 Mc/s.
- VI/90. — Sub-Group VI, C : Text proposed by the Working Group charged with Recommendation n° 177.
- VI/91. — Sub-Group C : Report n° 61. Extension of C.C.I.R. propagation curves to frequencies below 300 kc/s.
- VI/92. — Draft revision of Recommendation n° 173 : Protection of frequencies used for radio astronomical measurements.
- VI/93. — Study Group VI : Protection of frequencies used by earth satellites or other space vehicles for communication and positional observations.
- VI/94. — Draft report for Plenary Assembly : Ionospheric sounding stations after the I.G.Y.
- VI/95. — Study Group VI : New resolution. Identification of precursors indicative of short-term variations of ionospheric propagation condition.
- VI/96. — Sub-Group VI, C : Draft Question. Radio Propagation at frequencies below 1500 kc/s.
- VI/97. — Study Group VI, C1 : New Resolution. Whistler mode of propagation.
- VI/98. — Study Group VI, C1 : Draft new Study Programme. Study of the whistler mode of propagation.
- VI/99. — Study Group VI : New draft Resolution. Choice of a basic index for ionospheric propagation.
- VI/100. — List of documents issued (n° VI/51-VI/100).
- VI/101. — Study Group VI : Draft letter to the Chairman of Study Group IV. Report n° 43. Review of publication on propagation.
- VI/102. — Study Group VI : Coordination Group. Draft letter to the Chairman of Study Group XII. Question n° 54. Best method for calculating the field strength produced by a tropical transmitter.
- VI/103. — Study Group VI : Study Programme n° 100 (VI). Prediction of Solar Index.
- VI/104. — Study Group VI : Report n° 57. Choice of a basic index for ionospheric propagation.
- VI/105. — Study Group VI : Draft Recommendation.
- VI/106. — Study Group VI : Study Programme n° 92 (VI). Choice of a basic index for ionospheric propagation.
- VI/107. — Sub-Group VI, C : Draft Report (New Study Programme, n° 63). Radio propagation at frequencies below 1500 kc/s.
- VI/108. — Working Group VI, D1 : Draft Study Programme to replace Study Programme n° 96. Measurement of atmospheric radio noise.

- VI/109. — Study Group VI : Working Group VI, D1. Draft new Recommendation to replace Recommendation n° 175. Atmospheric Noise Data.
- VI/110. — Study Group n° VI : Working Group n° VI, D1. Draft Recommendation (or Resolutions) to replace Resolution n° 25 and Recommendation n° 25 and Recommendation n° 121. Design and use of local lightning flash counters.
- VI/111. — Study Group VI : 3rd Plenary Meeting 31 July 1958.
- VI/112. — Sub-Group VI, D3 (D) : Intermittent communication by meteorburst propagation. Draft new Study Programme.
- VI/113. — Sub-Group VI, D3 (B) : Draft Resolution n° 28 (Revised). Ionospheric-scatter and meteorburst propagation.
- VI/114. — Working Group VI, D3 (B) : Revised Study Programme n° 95 (VI). Ionospheric-scatter propagation.
- VI/115. — Working Group VI, B1 : Meaning of MUF. Draft Recommendation.
- VI/116. — Study Group VI : Sub-Group VI, B4. Draft revision of Study Programme n° 98 (VI). Back scattering.
- VI/117. — Study Group VI : Draft Report. Basic prediction information for ionospheric propagation.
- VI/118. — U. S. S. R. : Non-linear effect in ionosphere.
- VI/119. — U.R.S.I. : Identification of precursors indicative of short-term variations of ionospheric propagation conditions. Report.
- VI/120. — Study Group VI : Draft Study Programme n° 66 (VI) (Revised). Study of Fading (Questions n° 51 and 52. Study Programme n° 24).
- VI/121. — Study Group VI, C : Draft new Resolution. Radio Propagation at frequencies below 1500 kc/s (Study Programme n° 63 revised).
- VI/122. — Study Group VI : Draft new Report. Intermittent long-distance radiocommunication in the VHF band by means of scattering from columns of ionization in the lower ionosphere produced by meteors.
- VI/123. — Study Group VI : Draft revision of Report n° 64. Regular long-distance transmission in the VHF (metric) band by means of scattering from inhomogeneities in the lower ionosphere.
- VI/124. — Study Group VI : Revised draft for Study Programme n° 60 (VI). Basic prediction information for ionospheric propagation.
- VI/125. — Study Group VI : Working Group VI, D1. Draft Report on Study Programme n° 96.
- VI/126. — Study Group VI : Recommendation n° 116.
- VI/127. — Study Group VI : Working Party VI, A1. Report on Study Programme n° 93. Identification of precursors indicative of short-term variations of ionospheric propagation conditions.
- VI/128. — Study Group VI : Draft revision of Report n° 59. (New Study Programme n° 66). Fading of signals propagated by the ionosphere.

- VI/129. — Study Group VI : Sub-Group VI, D1 : Recommendation n° 174. World wide atmospheric noise measurements.
- VI/130. — Long distance ionospheric propagation without intermediate ground reflections. Draft Report (Study Programmes n° 97 and 98).
- VI/131. — Study Group VI : Draft letter to the Chairman of Study Group VII. Study Programme n° 94. Use of special modulation on the standard frequency transmissions for assessing the reliability of propagation forecasts.
- VI/132. — Study Group VI : Report n° 62.
- VI/133. — Study Group VI : Proposed revised draft for Recommendation n° 176. Basic prediction information for ionospheric propagation (Study Programme n° 60 (VI)).
- VI/134. — Study Group VI : Working Group B2, Recommendation n° 116.
- VI/135. — Study Group VI : 4th Meeting, 1st August 1958.
- VI/136. — Study Group VI : Draft Report. Questions submitted by the I.F.R.B.
- VI/137. — Study Group VI : Draft revision of Report n° 54. Long distance propagation of waves of 30 to 300 Mc/s by way of ionization in the E and F regions of the ionosphere.
- VI/138. — Study Group VI : New Study Programme n° 99. Study of sky-wave propagation on frequencies between the approximate limits of 1.5 and 40 Mc/s for the estimation of field strengths.
- VI/139. — Study Group VI : Draft Report on Study Programme n° 97 (VI).
- VI/140. — Study Group VI : Draft revision of Study Programme n° 97 (VI). Pulse transmission tests at oblique incidence.
- VI/141. — Sub-Group VI, C : Draft Report. Estimation of sky-wave-field strength between the approximate limits of 1.5 and 40 Mc/s.
- VI/142. — China : A study of magnetic disturbance on F2 layer from June to December 1957 above Taipei skies.
- VI/143. — Sub-Group VI, C : Further Report (Study Programme (Document VI/89)). Absorption of radio waves propagated via the ionosphere on frequencies between about 1.5 Mc/s and 40 Mc/s.
- VI/144. — Study Group VI : Working Group VI, A1. Study Programme n° 93 (Identification of precursors).
- VI/145. — Study Group VI : Working Party VI, D1. Addendum to Report n° 65.
- VI/146. — Study Group VI : 5th Plenary Meeting, 4 August 1958.
- VI/147. — Study Group VI : Draft Resolution.
- VI/148. — Study Group VI : 6th Plenary Meeting, 5 August 1958.
- VI/149. — Study Group VI : Working Group VI, A2. Draft revision of Recommendation n° 59.
- VI/150. — List of documents issued (n°s VI/101-VI/156).

- VI/151. — Sub-Group VI, A2 : Draft new Report (replaces Reports nos 45, 58 and 60). Availability and exchange of basic data and reliability of radio propagation forecasts.
- VI/152. — Study Group VI : Report of a Meeting of Working Group VI,A. Special, 4 August 1958.
- VI/153. — Study Group VI : 7th Meeting, 5 August 1958.
- VI/154. — Study Group VI : Working Group VI, A3. Recommendation n° 172. Prediction of Solar Index.
- VI/155. — Study Group VI : 8th Plenary Meeting, 6 August.
- VI/156. — Study Group VI. Draft letter to the Chairman of Study Group VI. Study Programme n° 94 (Use of special modulation on the standard frequency transmissions for assessing the reliability of propagation forecasts).

STUDY GROUP N° VII

Radio Time Signals and Standard Frequencies

- VII/18. — Switzerland : Report on the transmission and reception of time signals and on the comparison of standard frequencies among themselves and with atomic frequency standards.
- VII/19. — United States of America : Standard-frequency transmissions and time-signals in additional frequency bands. Standard-frequency transmission below 300 kc/s.
- VII/20. — United Kingdom : Standard-frequency transmissions and time signals.
- VII/21. — United Kingdom : Standard-frequency transmissions and time signals in additional frequency bands.
- VII/22. — United Kingdom : Stability of standard-frequency transmissions and time signals as received.
- VII/23. — Report by the Chairman of Study Group VII.
- VII/24. — Italy : Standard-frequency and time signals emissions from the Istituto Superiore delle Poste e delle Telecomunicazioni, Roma.
- VII/25. — United States of America : Draft recommendation on Standard frequency transmissions and time signals.
- VII/26. — Study Group VII : Report of the 1st Meeting, August 22, 1958.
- VII/27. — New Zealand.
- VII/28. — Study Group VII : Sub-group VII, A, 2nd Meeting, August 25, 1958.
- VII/29. — Study Group VII : 1st Meeting of the Working Group, August 22, 1958.
- VII/30. — Study Group VII : Working Party VII, A2, 1st Meeting, August 25, 1958.
- VII/31. — Study Group VII : Working Party VII, A2, 3rd Meeting, August 26, 1958.

- VII/32. — Study Group VII : Working Party VII, A2, 2nd Meeting, August 26, 1958.
- VII/33. — Study Group VII : Sub-group VII, A, New Question n° 141. Stability of standard-frequency transmissions and time signals as received.
- VII/34. — Study Group VII : Sub-group VII, A. New Study Programme n° 101.
- VII/35. — Study Group VII : Question n° 140.
- VII/36. — Study Group VII : Draft Recommendation. Avoidance of external interference with transmissions of the standard-frequency service in the bands allocated to that service.
- VII/37. — Study Group VII : 2nd Meeting, August 27, 1958.
- VII/38. — Study Group VII : Draft letter to the Chairman of Study Group VI.
- VII/39. — Study Group VII : Working Party VII, A2, 4th and 5th Meetings, August 27, 1958.
- VII/40. — Study Group VII : Proposed modification to Recommendation n° 179.
- VII/41. — Study Group VII : Draft interim Recommendation on standard-frequency transmissions and time signals in additional frequency bands.
- VII/42. — Study Group VII : Question n° 142.
- VII/43. — Study Group VII : Working Party VII, A2, 6th Meeting, August 28, 1958.
- VII/44. — Study Group VII : 3rd and last Meeting, August 29, 1958.
- VII/45. — List of documents issued (VII/1 to VII/45).
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INTERNATIONAL GEOPHYSICAL YEAR

World Days

We are publishing hereafter the full text of the Memorandum RWC-59 drafted by Mr. A. H. Shapley, C.S.A.G.I. Reporter for World Days and Communications (October 20, 1958). We are drawing your attention to the decision reached by I.C.S.U. at its Washington meeting (October, 1958), to establish an International World Day Service (IWDS) which shall take over from C.S.A.G.I., under U.R.S.I. auspices, by December 31, 1958 (see p. 20).

MEMORANDUM RWC-59 OF C.S.A.G.I. REPORTER FOR WORLD DAYS TO I.G.Y. REGIONAL WARNING CENTERS

At the Vth General Assembly of C.S.A.G.I. held in Moscow, in August, there were recommendations regarding a plan for Alerts and Special World Intervals during 1959 under the program called « International Geophysical Cooperation 1959 ». The resolution of the working group at Moscow delegated to the C.S.A.G.I. reporter for World Days and Communications the task of developing the final plan. A copy of this and the other resolutions of the working group is attached.

Your C.S.A.G.I. reporter regrets that the pressure of other responsibilities has delayed his taking action on this matter. The 1959 plan for Alerts and Special World Intervals as outlined by the working group is attached hereto. It was developed by the representatives of Regional Warning Centers in attendance at the Moscow meetings in conjunction with the representatives of the National Warning Contacts in attendance and with the working groups for Ionosphere, Aurora and Airglow, Geomagnetism, and Cosmic Rays. The plan leans heavily on the report of the May 1958 meeting of the European Ursigram Committee and takes into account the expressions of the U.R.S.I.-A.G.I. Committee.

Because of the regrettable shortness of time before the end of the I.G.Y., I propose that we proceed according to the plan, so thoroughly discussed at Moscow, without alteration for at least the first 6 months of 1959. During that time, the newly constituted International World Days Service, under I.C.S.U., will have had time to get organized.

Accordingly, I am taking steps through the I.G.Y. Coordinator to spread information concerning the 1959 plan for Alerts and SWI to the National Warning Contacts of the various I.G.Y. participating committees. I would urge upon each of the Regional Warning Centers and Associates to likewise spread the information about the 1959 plan. I have also written to the Director General of the WMO regarding the possibility of their continued cooperation in this work.

I would be obliged to receive comments and clarifications which any of you may want to send.

A. H. SHAPLEY.

Appendix I

I. World Days and Communications

PLAN FOR ALERTS AND SPECIAL WORLD INTERVALS DURING INTERNATIONAL GEOPHYSICAL COOPERATION 1959

The plan for Alerts and Special World Intervals carried on during I.G.Y. should be modified and improved for the 1959 program carried out under C.S.A.G.I. auspices. The essential features of the 1959 plan, to be made definite by the C.S.A.G.I. Reporter for World Days and Communications with the advice of the Regional Warning Centers and the C.S.A.G.I. Reporters concerned, are :

(1) There will be four different kinds of Alerts — Solar Flare, Magnetic Storm, Cosmic Ray Increase or Decrease, Aurora. An Alert will be issued only after an exceptional solar or geophysical event has occurred or started. The criteria for these will be as definite as possible as indicated below. The Alert message should give the time of the event whenever appropriate.

(2) Each Regional Center may issue an « Advance Alert » within its region as soon as the phenomenon is recognized and the

RWC is satisfied it meets the stated criteria. This Advance Alert message should be in standard text form and include identification of the originator. It should be (a) distributed promptly within the region as may be practical, and (b) promptly sent to the other RWC which would in turn distribute it, as may be practical or expedient within their respective regions. These Advance Alert messages serve both to aid the observing programs at individual stations and as advice to the World Warning Agency on the declaration of worldwide Alerts and S.W.I.

(3) The World Warning Agency will at 1600 UT decide on the basis of advice received from RWC whether to declare a worldwide Alert in one or more of the following categories : Magnetic Storm, Cosmic Ray Increase, Aurora. If a worldwide Alert is declared, the WWA will decide on the basis of advice received and overall policy whether simultaneously to start a Special World Interval, SWI. If either decision is affirmative, the WWA will initiate the worldwide distribution as done during I.G.Y. ; otherwise no worldwide message will be sent.

(4) Special World Intervals will take effect upon receipt of the message from the WWA, but in no case later than 0001 U.T., on the day following. Some stations will have already received Advance Alerts from their RWC. Observing programs during SWI are specified in several disciplines. A worldwide message will also be initiated by the WWA at 1600 U.T. whenever an SWI is *continued* and when it is declared to be *finished* at 2359 U.T.

(5) The criteria for the four kinds of *Advance Alert* will be :

Solar Flare Alert. — This warning will be issued whenever a solar flare of median importance 2 plus or greater has been reported. There will be only one alert issued per flare and only one a day at most.

Magnetic Storm Alert. — This warning will be issued whenever a significant magnetic storm, K figure 5 or greater at a middle latitude station has begun.

Cosmic Ray Alert. — This warning will be issued whenever a very outstanding change in cosmic ray flux has been observed — increase or decrease.

Aurora Alert. — This warning will be issued whenever a magnetic storm in middle latitudes has reached K figure 7 intensity or whenever selected auroral stations report the presence of outstanding aurora.

The text for Advance Alert messages will include station reporting event, event and time of event. Sample texts are :

- (a) *Advance Geophysical Alert Kokubunji Solar Flare 280010Z*
(This means a solar flare event of importance two plus or greater was observed on 28th day at 0010 U.T. by Kokubunji).
- (b) *Advance Geophysical Alert Nizmir Magnetic Storm 291900Z*
(This means Nizmir recorded beginning of significant magnetic storm, K figures of at least 5, on 29th day at 1900 U.T.).
- (c) *Advance Geophysical Alert Zugspitze Cosmic Ray Decrease 061130Z* (This means the nominal time of an unusual cosmic ray flux decrease was 6th day at 1130 U.T. at Zugspitze).
- (d) *Advance Geophysical Alert Cornell Aurora Observed 070230Z*
(This means outstanding aurora observed 7th day at 0230 U.T. by Cornell University, Ithaca, New-York).
- (e) *Advance Geophysical Alert Agiwarn Aurora Inferred Magnetic Storm 070230Z* (This means beginning of significant magnetic storm, K figures equal or greater than 7, recorded 07th day 0230Z at A.G.I.-W.A.R.N. Auroral displays should be expected).

(6) The *worldwide Alerts* or *Special World Intervals* will be issued by the World Warning Agency on decisions based on Advance Alerts, advice received from Regional Warning Centers and overall policy.

These Geophysical Alert messages will bear a serial number and will be in standard texts specifying event, time of event, and, when appropriate, the beginning, continuation or ending of a Special World Interval. The distribution will be done by the same means as during the I.G.Y. Samples of the possible texts are :

- (a) *Geophysical Alert No. Thirty one Magnetic Storm 051000Z Start Special Observational Interval.* (This means a significant magnetic storm started on 5th day at 1000 U.T. Special Observational Interval as specified by discipline should begin on receipt of message).

- (b) *Geophysical Alert Number Thirty Two Continue Special Observational Interval.* (This means special observational interval continues for another day).
- (c) *Geophysical Alert Number Thirty Three Stop Special Observational Interval.* (This means special observational interval finishes at 2359 U.T. on day of issue of message).
- (d) *Geophysical Alert Number Fifteen Aurora Inferred Magnetic Storm 100716Z.* (This means magnetic storm with K figures equal or greater than 7, began 10th day at 0716 U.T. Auroral displays should be expected).
- (e) *Geophysical Alert Number Two Aurora 120940Z.* (This means outstanding aurora observed 12th day at 0940 U.T. Stations to the west should expect to observe aurora).
- (f) *Geophysical Alert Number Ten Cosmic Ray Increase 061825Z* (This means the nominal time of an unusual cosmic ray flux increase was 6th day at 1825 U.T.).

(7) It should be noted that Solar Flare and Cosmic Ray Decrease Alerts will *only* be distributed *regionally*. However, copies of these « Advance Alerts », as well as of the other types, should be sent to each RWC for their information.

I. — World Days and Communications

RECOMMENDATIONS

1. The Working Group endorses the general plan as collected and coordinated by the C.S.A.G.I. Reporter for an I.G.Y. Calendar Record, and recommends that it be published in the I.G.Y. Annals as early in 1959 as possible. It further believes there should be an introduction which highlights the solar and geophysical events of the I.G.Y. in addition to the daily record. It calls on the reporters in other I.G.Y. disciplines to provide for the calendar record representative indices and remarks appropriate to their branch of science.

2. The Working Group, after consultation with the disciplines concerned, recommends that the C.S.A.G.I. Reporter for World Days and Communications explore the possibility of specifying a series of « I.G.Y. Analysis Intervals », about 18 in number,

covering periods during the I.G.Y. such as the actual major geomagnetic, ionospheric and auroral disturbances, a few quiet periods and other periods of interest in I.G.Y. research. In this selection the C.S.A.G.I. Reporter should seek the advice of the Regional Warning Centers and the Reporters for Geomagnetism, Aurora and Airglow, Ionosphere, Cosmic Rays and Solar Activity. The I.G.Y. Analysis Intervals selected should be listed in the I.G.Y. Annals and other suitable publications.

3. The Working Group recommends that a program for World Days and Communications be carried out in 1959, with modifications indicated by the lowering level of solar activity and the resumption of recurrent series of magnetic disturbances. It appears only practical that this work be carried out under C.S.A.G.I. auspices until such time that I.C.S.U. takes action on the formation of a special group for this purpose and another group is formed and functioning.

4. The Working Group recommends that a World Geophysical Calendar for 1959 be drawn up by the C.S.A.G.I. Reporter for World Days and Communications after consultation with the Reporters for other disciplines. It further recommends that the 1959 Calendar be issued and distributed by C.S.A.G.I. as the only appropriate I.C.S.U. organization functioning at the time plans for the calendar had to be made definite.

5. The Working Group strongly recommends that the rapid interchange of current solar and geophysical data summaries among Regional Warning Centers and their distribution to National Warning Centers, and individual laboratories be continued at the full I.G.Y. level of effectiveness with modifications and improvement as indicated by experience during the I.G.Y., such as the establishment of a daily link between Australia and the Western Pacific, Eurasia and European Regional Warning Centers.

6. The Working Group recommends that a modified plan for Alerts and Special World Intervals be carried out during 1959 under C.S.A.G.I. auspices, the modifications being based on I.G.Y. experience and on the special characteristics of a year of decreasing sunspot activity. The plan which has been specified in some detail in a report by the Working Group at the Vth C.S.A.G.I. Assembly after joint discussion with the scientific

disciplines principally concerned, calls for three kinds of Alerts : Magnetic Storm, Cosmic Ray Increase and Aurora, to be distributed worldwide once daily after recognition of exceptional geophysical events, with Special World Intervals declared simultaneously when deemed appropriate by the World Day organization. Advance Alerts in these three categories and also of exceptional solar flares or other exceptional phenomena will be declared and distributed in each region (and interchanged among Regional Warning Centers) with a minimum of delay after recognition of the unusual phenomenon. Worldwide distribution of messages would only be carried out on those days when the World Warning Agency declares an Alert or gives instructions concerning an SWI, estimated at 8 days per month on the average. It is urgently requested that communication agencies, including the meteorological networks coordinated by WMO continue their splendid cooperation in the worldwide distribution under this modified plan in view of the value of the work demonstrated by the program during I.G.Y.

7. The Working Group endorses the proposal that there be a special I.C.S.U. group for World Geophysical Days which would be concerned on a continuing basis with activities such as those falling in the I.G.Y. program for World Days and Communications. It is believed that a Special Committee would be a more suitable mechanism than the joint Commission originally proposed.

8. The Working Group expresses its sincere appreciation for the invaluable assistance of the WMO and the communication authorities associated with it in the speedy worldwide distribution of the daily I.G.Y. Warning Messages on Alerts and Special World Intervals, and emphasizes the evident mutual advantage of such close and active cooperation among operating arms of several scientific disciplines during I.G.Y. and in the future.

9. The Working Group considers that the high degree of success in the declarations of Alerts and SWI thus far during I.G.Y. has come about largely because of the conscientious observations by solar activity observatories throughout the world and because of the speedy reporting of exceptional phenomena to Regional Warning Centers for interchange. It commends the efforts of the individuals and organizations involved, and recommends that the observing and reporting be maintained at an equal level of effecti-

veness during 1959 so that the regional and worldwide coordination of the geophysical program planned can be retained.

10. The Working Group recommends that the National Warning Contacts and Centers established for the I.G.Y. continue to function in order to guide and assist the World Days and Communications program recommended for 1959.

Telecommunications and the International Geophysical Year (I.G.Y.)

by V. SUNDARAM

Director of Telecommunications, Indian Posts and Telegraphs, seconded to the World Meteorological Organization as telecommunications expert

INTRODUCTION

The International Geophysical Year, which is an intensive international programme of geophysical observations, the third in less than a century, has been going on from 1 July, 1957, as a co-operative effort by several thousands of scientists from more than fifty countries, very often amply supported by their governments. Its main aim is to learn as much as possible about the atmosphere and the oceans, over all the earth and at all heights and depths. It is being carried out in fourteen disciplines, which have been described in several scientific journals from time to time. For almost a year now close and continuous observations have been made of the disturbances of the sun, which affect specially the upper layers of the atmosphere. World-wide studies are being conducted on weather, ionosphere and cosmic rays, glaciers, the form of the earth and its magnetism, gravitation, latitudes, and longitudes, natural and man-made radioactivity in the air and the seas, earthquake waves in remote places and several such factors which will help us to get a unified picture of our physical environment.

Research on such a gigantic scale demands widespread and simultaneous observations. Every known branch of science contributes to it in one form or another and will in turn benefit

from the extensive studies that will continue until the end of this year. The science of radio transmission is in a specially fortunate position because of the fact that the I.G.Y. has been timed to include the period of sun-spot maximum. It will be of interest therefore to examine how far telecommunications are utilized in the accomplishment of this vast scientific enterprise; and to see, perhaps a little prematurely, the additional knowledge that will accrue to communication engineering from it.

USES OF TELECOMMUNICATION IN THE I.G.Y. DISCIPLINES

For examining how telecommunications are used in the I.G.Y., its disciplines can be classified into two very broad categories. Some, like glaciology and gravity involve the accumulation of carefully recorded observations which are to be studied later. There are some others, like World Days and Communications, aurorae, ionosphere or meteorology which involve simultaneous synoptic or special observations, often on a world-wide scale, to determine physical parameters as yet unknown or imperfectly understood at present. This latter category of disciplines generally requires a rapid exchange of information or warnings of approaching phenomena. Consequently their success depends on a large extent on the availability of efficient telecommunication arrangements. Again, geographical location sometimes greatly increases the importance of communication channels to the I.G.Y. stations. For example, in the polar regions even the physical existence of many stations participating in several disciplines depend on the maintenance of reliable communication channels. In these areas communications become almost literally the life-blood of some of the disciplines.

Thus the role that telecommunications play in the I.G.Y. programme varies widely and depends on several factors. Consequently it can be studied from various angles. For example a « discipline-by-discipline » examination can be made to see if and how communications contribute to the work of each. Or again large geographical regions can be taken one at a time and all the disciplines in it considered in connection with its relationship to communications. The latter will probably give a more integrated picture of the part of communications in the overall work of the I.G.Y. Hence this approach has been adopted for this

study. For this purpose it will perhaps be more convenient if the earth is divided into three very broad regions, as follows :

The Arctic region : The area north of the Arctic circle.

The region between the Polar circles : All the area between the Arctic and the Antarctic circle.

The Antarctic region : The area south of the Antarctic circle.

and the part of telecommunications in each of these regions examined separately. It must be pointed out, however, that these are very rough and arbitrary divisions made purely as a convenient approach to this study. They do not have any other significance in the context of the I.G.Y. and its programmes. Nor is it possible to consider this division with any great rigidity. Naturally, communication facilities will often cover more than one of these regions and any consideration of one will lead us inevitably into problems of others neighbouring it.

The Arctic region

Several expeditions have gone into the North polar regions before the I.G.Y. and some observing stations in the Arctic have been functioning over many years. There were however large gaps over which no observation points existed when the I.G.Y. was planned. As synoptic studies constitute the most reliable method of investigating phenomena on a planetary scale, it became increasingly necessary to close these gaps. For this purpose a number of icefloe stations have been established in the Arctic, some for the duration of the I.G.Y. and others on a more enduring basis. Maintenance of reliable communication between these stations within the auroral zone presents several problems which require more or less continuous study.

A Standing Working Group on Arctic communications established by the C.S.A.G.I. Arctic Conference in May, 1956, has been in charge of the Arctic communication problems. It has been paying special attention to :

- (i) the quick distribution of alerts and warnings regarding Special World Intervals (SWI) ;
- (ii) prompt forwarding of warnings of impending auroral displays from one of the auroral warning stations to all others ;

- (iii) regular reporting of data summaries from I.G.Y. stations in the region to the Regional Warning Centre (RWC), and vice versa ; and
- (iv) other communications needed for the operation and co-ordination of the I.G.Y. programme in the Arctic.

Preliminary tests in the months immediately before the commencement of the I.G.Y. showed that the communications were satisfactory. It was recognized, however that difficulties such as ionospheric storms may cause disruptions and so a system of periodic broadcasts from Dixon, Reykjavik, Thule, Tixie Bay, Churchill and Pt. Barrow has been designed to assure complete coverage of the Arctic Ocean areas. In addition a regular exchange of data between the various ice-floe stations has also been designed.

The region between the Polar circles

The area between the Arctic and the Antarctic circles containing, as it does, practically all the inhabited parts of the earth, naturally has within it the major portion of the I.G.Y. stations. Their activities have their effect on the general load carried by the communication channels of the world. The different countries concerned anticipated the impact just before the I.G.Y. and provided for it as appropriate.

Perhaps the most significant thing here is the importance of communications in the discipline on World Days and Communications. While most of the I.G.Y. programmes have been planned in detail well in advance, certain special observations have to be taken during intervals selected on the basis of certain unusual phenomena such as high solar activity, geomagnetic storms, etc., which occur from time to time. These intervals, known as Special World Intervals (SWI), cannot therefore be determined in advance. They have to be declared in the light of current observations, made throughout the world ; and usually they cannot be declared more than 6 to 8 hours before their actual commencement. Therefore communication arrangements are needed for the rapid collection of observations from the various observing stations (at Regional Warning Centre) for the rapid interchange of data and advice among these centres, for very quick conveyance of the information to the World Warning Agency at Fort Belvoir,

and most important of all, for the world-wide dissemination of the warnings of the commencement of a SWI to the participating countries.

Every day at 1600 U.T. the World Warning Agency (WWA) issues a serially numbered SWI message using one of nine predetermined standard texts. These messages are sent by the WWA to :

- (i) the Regional Warning Centres at Tokyo, Moscow and Nera (for Western Europe) by Ursigram Service ; and
- (ii) the Weather Bureau, Washington, by landlines.

From Washington the messages circulate round the world over a carefully worked out network of meteorological telecommunication channels using radio broadcasts, radioteletype and landline systems. As a result of prolonged tests before the I.G.Y. commenced, a message entering this network at the Washington end reaches the remotest parts of the world, including the Antarctic, within four to six hours.

Through these means the messages reach at least one important point in each country. From there onwards, each country undertakes the dissemination of the messages to its own individual stations, on national communication channels.

In addition to this, arrangements exist for anyone to ascertain the prevailing state of S.W.I. alert in force at any time. Standard frequency broadcasting stations broadcast this information in code.

The Antarctic region

It is probably in the Antarctic continent that radiocommunications play their most important part in the I.G.Y. programme. Compared to the Arctic region very little is known about the Antarctic region. And during the I.G.Y. eleven nations have been carrying out a programme of very intensive activities there. So, quite a large amount of general traffic has to be carried by the Antarctic radio network, in addition to the scientific and meteorological data, which are quite voluminous by themselves. Besides, the Antarctic is a difficult region for radiocommunications. There have been occasions when several parties have been able to establish satisfactory two-way speech with their homes like Tokyo, Moscow, London, Paris or New York, but have had to resort to visual signals to communicate with aircraft overhead ! Selection of

suitable frequencies in the already overcrowded spectrum has not been easy, either. In spite of these great difficulties, thanks to extensive trials and discussions at the four C.S.A.G.I. Antarctic Conferences, a network covering all the stations satisfactorily has been evolved.

The Antarctic radio network consists of some sixty to seventy fixed stations, most of which were set up in 1956; and a large number of mobile stations operating from aircraft, sledges, tracked vehicles and several walkietalkies sets. In addition to these there are the long-distance links maintained by several expeditions with their home countries.

Because of the unusual hazards in the region radiocommunication is extremely important to all major activities there. Special care had to be taken therefore to organize the network in such a way that it will be possible to provide effective communication between stations at all times. Consequently, a system of a « Weather Central » and a « Mother-daughter-grand-daughter stations » grouping has been introduced. The grand-daughter stations work into the daughters which in turn work into the mother stations leading ultimately up to the Weather Central; and all the way down in the reverse direction. The United States stations at Little America, and McMurdo Bay together constitute the Weather Central. There are 7 other stations at Williams Air Operations Facility (US), Little America (US), Mawson (Australia), Mirny (U. S. S. R.); Port Stanley (UK), Deception (Argentina) and O'Higgins (Chile). Each of the mother stations has under it from one to thirteen or fourteen daughter stations and sometimes one or two grand-daughter stations.

For the same reasons, detailed operating procedures have been worked out so that no confusion should arise due to different nations operating the stations. Details of these procedures, as also a list of the stations, their location, frequencies, call signs, schedules of operation and all other technical characteristics such as their power, types of antennae, etc., are contained in the Antarctic Radio Communications Manual.

While these are some of the more important instances of how communications contribute to the I.G.Y. Programmes, there are others which utilize radio techniques for making their observations or require communication facilities for their fulfilment.

It will not be possible to cover all of them within this article. However, it has been generally recognized that communications and radio techniques play a significant part in the smooth working of many of the disciplines.

THE BENEFITS TO COMMUNICATIONS FROM THE I.G.Y. PROGRAMME

Communication engineers will be interested in varying degrees in the results of several disciplines, such as aurorae and air glow, solar activity, cosmic rays and nuclear radiation, latitude and longitude, geomagnetism, etc. But their primary interest is bound to be in the work of the discipline on ionosphere. It may perhaps be mentioned in passing that one of the earliest supporters of the idea of the I.G.Y. was the Joint Commission on the Ionosphere (C.M.I.-Commission mixte de l'ionosphère). This discipline is carrying out, among other things,

- (i) a study of data obtained by vertical soundings at stations carefully distributed over the earth's surface, in order to determine the structure of the ionosphere as a function of the geomagnetic position and the period of the year ;
- (ii) a study of ionospheric disturbances in relation to magnetic storms during periods of intense solar activity ;
- (iii) an investigation of the absorption of the radio waves transmitted during multi-frequency ionospheric soundings, with a view to analyzing the electronic distribution in the lower layers, such as the D layer ;
- (iv) an investigation of the ionospheric drift in the various layers, for the analysis of ionospheric winds and tides ;
- (v) a study of the scintillation of extra-terrestrial radio sources, such as radio stars, for the analysis of the ionosphere independently of ionospheric soundings ; and
- (vi) a study of radio noise.

A comprehensive account of the work of this discipline is contained in the *Annals of the I.G.Y.* (Vol. III, Parts I to IV).

Rockets and satellites have opened up a fascinating and new vista for the radio engineer. The general features of the ionosphere and the gross structure of the ionized layers are already

quite well known. But a rocket penetrating rapidly through the ionosphere, recording successive changes in «radio depth» as it goes, or a satellite as a known source of radiation will throw considerable light on ionospheric inhomogeneities of various sorts and help to understand its fine structure. Similarly an earth satellite will make it possible to measure the total free electron density between itself and the ground. It will offer a possibility of measuring the free electron distribution above the top of the ionosphere.

The meteorological discipline includes programmes of special interest to radio engineers, such as measurements of the electric potential gradient and conductivity of the air, both by soundings and by surface measurements at places not disturbed by accidental or local effects; direction and distance rate of occurrence and intensity of thunderstorms, and atmospheric noise measurements; the meteorological parameters, such as the gradient of the refractive index which influence tropospheric propagation; and several other measurements connected with radio meteorology.

Auroral observations have been greatly improved upon. Attempts are being made to detect daytime aurorae and those behind clouds. The latitude and longitude programme is expected to improve the determination of the time of propagation of radio waves. Space thunder and the resultant radio whistlers are again another subject on which considerable new light is expected to be thrown.

These are but some of the programmes which are likely to extend our knowledge with regard to the many problems connected with radio transmission. It is obviously too early to foresee precisely how much and in what directions the radio engineer will benefit from the various disciplines. But as one goes through the details of these programmes, so carefully and painstakingly worked out during the five years of preparation for the I.G.Y., one is left with the feeling that at the end of this unique scientific effort the radio engineer will have available to him a wealth of precious information to help him face the new challenges in his profession.

CONCLUSION

The first international polar year produced the first synoptic charting of the earth's magnetic field. The second taught us

much about the conditions that cause radio blackouts. And when the I.G.Y. ends on New Year's Day 1959, enormous masses of data will become available. When these are analysed and the results interpreted by scientists, it is expected that this unprecedented concentration of effort during these eighteen months will diminish the great gaps in our knowledge and enable us to understand several of the phenomena which baffle us at present. Let us hope that the radio engineer will have a rich share in this; will gain some knowledge of what happens beyond the ionosphere; and will have an answer to the many problems that have nagged the nerves of long-distance communication engineers ever since the electron began to carry messages through the air.

Source : *Telecommunication Journal U.I.T.*, Sept. 1958.

Radio Observations of the First Russian Artificial Earth Satellite

(This paper was published in the *Transactions of the South African Institute of Electrical Engineers*, December 1957)

SUMMARY

Doppler measurements made in Johannesburg, South Africa, on the first Russian earth satellite are described. The orbit of the satellite is derived from these measurements using an approximate method of calculation in which ionospheric effects are neglected and an eccentric circular orbit is assumed.

I.G.Y. News

Antarctic Activity during 1959

The Acting Secretary of S.C.A.R. (I.C.S.U. Special Committee on Antarctic Research) has supplied the following information on proposed research activities in Antarctica during 1959; and

noted that it appears that Antarctic research will continue for the coming year at a similar level to that of the I.G.Y. 1957-1958.

Argentina. — Ellsworth Base will be taken over from the U.S.A. and a main scientific programme will be executed there, limited studies will continue at Base General Belgrano. Other Argentine Antarctic bases will continue to operate as before.

Australia. — Operations will continue at Macquarie Island, Mawson and Davis. In addition Wilkes Base will be taken over from the U. S. A. in February 1959. Ice sheet traverses will continue from Mawson for one further summer, then this activity will be transferred to Wilkes station.

Belgium. — The Base Roi Baudouin will continue to operate during 1959.

Chile. — The 1958 bases will continue in operation, and « Riso- patron » which was destroyed by fire in March 1958 will be rebuilt. New investigations in geomagnetism, cosmic rays, geology, chemistry, biochemistry and bioclimatology are planned.

France. — The inland station Charcot will be closed at the end of the I.G.Y. but D'Urville will continue to operate on the same lines as previously with some small reductions in the programme.

Japan. — Owing to very difficult ice conditions, it was not possible to resupply Syowa Base in the 1957-58 summer, so the personnel were evacuated by air to the supply ship. It is planned to reoccupy Syowa Base in February 1959 with a wintering party of 12 to 15 men. They will recommence studies on aurora, airglow, cosmic rays, geomagnetism, ionospheric physics, meteorology, glaciology and seismology.

New Zealand. — Operations will continue at Scott Base and jointly with the U. S. A. at Hallett Station on a modified basis. During the 1958/59 summer biological, geological, surveying and oceanographic surveys will also be carried out.

Norway. — The present scientific programme will continue at Norway Station during 1959.

South Africa. — Tentative plans are to continue work on Tristan da Cunha and Marion Islands and on Gough Island subject to UK agreement.

United Kingdom. — At Halley Bay research will be continued in the most important scientific disciplines. Extensive topographical and geological surveys will continue in the Graham Land region and eight existing Antarctic bases will continue their programmes.

U. S. A. — Full operations will continue at the Pole, Byrd and McMurdo stations and at Cape Hallett in cooperation with New Zealand. Help may be given at Ellsworth and Wilkes Bases which are being transferred as mentioned above. Ice sheet traverses would continue including one on the Victoria Land plateau, and others in Marie Byrd Land. Little America station will continue to be used for some purposes.

U. S. S. R. — Work will continue at existing bases except Pioneerskaya which will be closed in January 1959, while there will be some reduction of work at Bunger Oasis. It is hoped to move Sovietskaya to the pole of inaccessibility in October/November 1958. Ice sheet traverses will continue, including one from Vostock to the South Pole and back to Sovietskaya. It is intended to establish small bases, one south of the Bellinghausen Sea and one in Queen Maud Land. These will study glaciology and surface meteorology and will assist in traverses which plan to cross the Antarctic in the future. Oceanographical work will continue in the Bellinghausen Sea and in the region of the Antarctic Convergence to the north, and along the coast of Queen Maud Land.

INTERNATIONAL UNIONS

International Astronomical Union

Moscow Meeting

As a result of the Xth General Assembly held in Moscow, August 12 to August 20, 1958, the Executive Committee of I.A.U. shall be composed as follows until the XIth General Assembly which will be held in the United States in 1961 :

President : J. H. OORT.

Vice-Presidents : L. GOLDBERG,
O. HECKMANN,
B. V. KUKARKIN,
R. M. PETRIC,
B. STERNBERK,
R. H. STOY.

Secretary General : H. SADLER, Royal Greenwich Observatory,
Herstmonceux Castle, Sussex, England.

At this Assembly, the Nominating Committee has followed the new rules for membership, adopted by the IXth General Assembly held in Dublin in 1955. The list of general members of the Union has been considerably extended. On the other hand, these new rules have allowed to reduce membership in the standing commissions in order to facilitate their work in the future. Several standing commissions have also been reorganized, especially those concerned with the Sun, and other established. There are now 35 standing commissions in the I.A.U.

The full report of this General Assembly will be published in the tenth volume of the Transactions of the I.A.U. The most important decisions reached at the Xth General Assembly are mentioned in the I.A.U. Circular n° 3, 1958.

List of Radio Astronomical Observatories

We are pleased to draw attention on this circular which contains a World list of Radio Astronomical Observatories, compiled by Dr. J. L. Pawsey, former President of Commission 40, I.A.U.

This list includes information on 60 radio observatories, on their staff, the main investigations and on the equipment effective or in project. As mentioned by the author, this list is not complete in respect to borderline cases such as studies of Moon echoes, whistlers, meteors and generally in fields where the main interest is in the ionosphere and geophysics rather than in Radio Astronomy. However, as it is, this list will be highly useful to those engaged in radio astronomical studies.

Copies of this list are available at the General Secretariat of U.R.S.I.

I.U.T.A.M.-I.U.G.G.

International Symposium on Atmospheric Diffusion and Air Pollution

Aug. 24-29, Oxford, England

This International Symposium was sponsored jointly by I.U.T.A.M. and I.U.G.G., under the chairmanship of Sir Geoffrey Taylor, F. R. S., with Dr. F. N. Frenkiel (Johns Hopkins University, Maryland, U. S. A.) and Dr. P. A. Sheppard (Imperial College of Science and Technology, London), acting as Secretaries. Dr. K. G. Batchelor of Cambridge University acted as chairman of the session on the theory of turbulent diffusion and as an observer for U.R.S.I. at this Symposium.

Amongst subjects of interest for our Union we may note new information, about the turbulence in the troposphere. So far as the stratosphere is concerned the source of turbulence remains unanswered and data is lacking. The use of isotopes produced by cosmic rays has promise as a precise method of studying large scale motions in the stratosphere.

The proceedings of the Symposium will be published in full by Academic Press. A report has been established by Dr. H. G. Booker of Cornell University (Res. Rept EE 388, studies on propagation in the Ionosphere, Techn. Rept n° 48, sept. 28, 1958).

World Meteorological Organization

List of Meetings November 1958-November 1959

(For information only — Not an official notification)

Date and Place	Name and Purpose of Meeting
1958 24-28 November Geneva	<i>Working Group on Terminology of the Commission for Bibliography and Publications.</i> — Review of Draft International Meteorological Vocabulary.
24 November- 13 December Rome	<i>UNESCO/W.M.O. Seminar on Mediterranean Synoptic Meteorology.</i>
27-28 November Geneva	<i>Working Group of Executive Committee on Status and Salaries of W.M.O. Staff.</i>
1-6 December Washington	<i>Regional Association IV (North and Central America), Second Session.</i>
January (tentative) Rome or Paris	<i>F.A.O./UNESCO/W.M.O. Working Group on the Desert Locust Ecological Survey.</i>
1-28 April Geneva	<i>Third World Meteorological Congress.</i> — Consideration of amendments to Convention of W.M.O. Study of structure of Technical Commissions; review of Technical Assistance Programmes; adoption of technical programme and budget of W.M.O. for the period 1960-1963; definition of W.M.O.'s responsibility in the field of hydrology and examination of its participation in the water resource development programme of the UN family; review of the Organization's activities in connexion with the International Geophysical Year, of meteorological aspects of atomic energy, of work in connexion with arid zone and humid tropics research; consideration of meteorological problems relating to the outer atmosphere and artificial satellites. Study of various administrative questions, public information programme, meteorological film loan service. Elections of President, Vice-Presidents, members of the Executive Committee. Appointment of Secretary-General.

Date and Place	Name and Purpose of Meeting
29 April-2 May Geneva	<i>Executive Committee, Eleventh Session.</i> — Implementation of decisions of Third Congress ; consideration of Consultative Status to be granted to additional non-Governmental Organization(s), examination of reports on meteorological aspects of atomic energy, on meetings of North and Central American Regional Association, etc.
Date and place undetermined	<i>Regional Association II (Asia), Second Session.</i>
14-27 July Bangkok	<i>Joint U.N.-E.C.A.F.E. (1)-W.M.O. Seminar on Hydrological Networks and Design Methods.</i>
17-18 July (tentative) Oxford	<i>Working Group on Atmospheric Ozone of the Commission for Aerology.</i>
20-26 July Oxford	<i>I.U.G.G.-W.M.O. Symposium on Radiation and Atmospheric Ozone.</i>
27-28 July Oxford	<i>Working Group on Radiation Measurements of the Commission for Instruments and Methods of Observation.</i>
1 September Place and duration as yet undetermined	<i>Commission for Aeronautical Meteorology, Second Session. Meteorological Division of I.C.A.O. (2), 5th Session, Simultaneous Meeting.</i>

International Electrotechnical Commission

ADDRESSES

CENTRAL OFFICE : 1, rue de Varembe, Genève (Suisse).

Tél. : (022) 34.11.60.

Cables : « INELISSION ».

(1) United Nations Economic Commission for Asia and the Far East.

(2) International Civil Aviation Organization.

OFFICERS :

President : Dr. I. HERLITZ, President of the I.E.C., Svantegatan 5, Vasteras (Sweden).

Past President : Dr. P. DUNSHEATH, C. B. E., Sutton Place, Abinger Hammer (Dorking) Surrey (England).

Treasurer : Dr. Ing. A. ROTH, Administrateur délégué, Sprecher und Schuh A. G., Aarau (Suisse).

Secretary : M. L. RUPPERT, Bureau Central.

I. — List of addresses of I.E.C. National Committees

Germany : German National Committee of the I.E.C., Verband Deutscher Elektrotechniker e. V., Osthafenplatz 6, Frankfurt am M.

Tel. : 43157-59. *Cables* : « ELEKTROBUND ».

President : Prof. Dr. R. VIEWEG.

Secretary : Dr. Ing. P. JACOTTET.

Argentina : Comite Electrotecnico Argentino, Posadas 1659, Buenos-Aires.

Tel. : 41-3454.

President : Cap. de Navio (RE) L. M. GIANELLI.

Secretary : Ing. A. QUEREILHAC.

Australia : Australian Electrotechnical Committee, Standards Association of Australia, Science House, Gloucester and Essex Streets, Sydney.

Tel. : BU 5182. *Cables* : « AUSTANDARD ».

President : Mr. R. W. J. MACKAY.

Director : Mr. A. L. STEWART.

Austria : Elektrotechnischer Verein Osterreichs, Eschenbachgasse 9, Wien I.

Tel. : 57 63 73/74.

President : Dipl. Ing. H. SCHEDLBAUER.

General Secretary : Dipl. Ing. F. SMOLA.

Belgium : Comité Electrotechnique Belge, 3, Galerie Ravenstein, Bruxelles I.

Tel. : 12.00.28.

Cables : « BELGUNION ».

Président : Général E. E. WIENER.

Directeur : M. J. SMOES.

Brazil : Comite Brasileiro de Eletrotecnica e Iluminação (C.O.B.E.I.), Rua João Bricola 24-24º andar, Caixa Postal 4991, Sao Paulo.

Cables : « NORMATECNICA ».

President : Ing. A. SINAY NEVES.

General Secretary : Mr. H. DERTONIO.

Bulgaria : Comité Supérieur de Normalisation, Commission Electrotechnique, 5, rue Idanov, Sofia.

Tel. : 7 32 11.

Président : Ing. Y. PETROUCHEV.

Canada : Canadian National Committee of the I.E.C., Canadian Standards Association, 235, Montreal Road, Ottawa 2 (Ontario).

Tel. SHERwood 9-5971. *Cables* : « CANSTAN ».

President : Mr. E. W. HENDERSON.

Secretary : Mr. R. E. STOPPS.

China (People's Republic of) : Committee of the People's Republic of China for Participation in the International power Conferences, 92, Nan in Fang, Peking.

Tel. : 6-7520. *Cables* : 3531 Peking.

General Secretary : Mr. PAO KAO-PAO.

Denmark : Dansk Elektroteknisk Komite, Vesterbrogade 1, København V.

Tel. : Palae 9283.

President : Mr. N. E. HOLMBLAD.

Secretary : Mr. P. PLUM.

Egypt (United Arab Republic) : Ministry of Public Works, Electrical and Mechanical Dept., Cairo.

General Director : Dr. M. A. EL KOSHAIRY.

Spain : Comision Permanente Espanola de Electricidad, Plaza de la Lealtad 4, Madrid.

Tel. : 22 55 27.

Président : Prof. Dr. J. A. DE ARTIGAS.

Secrétaire : Prof. M. QUEREJETA.

United States of America : U. S. National Committee of the I.E.C., American Standards Association, 70, East forty-fifth Street, New York 17, N. Y.

Cables : « STANDARDS ».

President : Mr. R. C. SOGGE.

Secretary : Mr. S. D. HOFFMAN.

Finland : Finnish Electrotechnical Standards Committee, The Finnish National Committee of the I.E.C., Särkiniementie 3, Helsinki-Lauttasaari.

President : Mr. V. VEIJOLA.

Director : Mr. A. WILLBERG.

Secretary : Mr. E. YRJOLA.

France : Comité Electrotechnique Français, 54, Avenue Marceau, Paris VIII^e.

Tel. : BALZAC 82-50.

Président : M. P. AILLERET.

Secrétaire : M. J. CASSASSOLLES.

Hungary : Magyar Szabványügyi Hivatal, Ullői-ut 25, Budapest IX.

Tel. : 189-800. *Cables* : « NORMHUNGARIA ».

Directeur : M. P. TAKACS.

India : Indian Standards Institution, « Manak Bhavan », 9, Mathura Road, New Delhi 1.

Tel. 45915-19. *Cables* : « MANAKSANSTHA ».

President : Mr. M. HAYATH.

Director : Dr. Lal C. VERMAN.

Israel : The Standards Institution of Israël, 200, Dizengoff Road, Tel Aviv.

Tel. : 21102/3/4.

Director : Mr. M. A. ARNAN.

Secretary : Mr. A. MARGALITH.

Italy : Comitato Elettrotecnico Italiano, Via San Paolo 10, Milano.

Tel. : 794.794-798-897. *Cables* : « ASSELITA ».

Président : Prof. A. BARBAGELATA.

Directeur : Ing. C. REDAELLI.

Secrétaire : Prof. Ing. R. SAN NICOLO.

Japan : Japanese Industrial Standards Committee, Agency of Industrial Science and Technology, Ministry of Intern. Trade and Industry, 7-5, Ginza-Higashi, Chuo-ku, Tokyo.

Cables : « MITI JISC ».

President : Mr. Ichiro ISHIKAWA.

Vice-President : Mr. Harushige INOUE.

Chief Director : Mr. Keizo TAKAMI.

Norway : Norsk Elektroteknisk Komite, Postboks 5093, Oslo-NV.

Tel. : 61 930.

President : Mr. P. D. POPPE.

Secretary : Mr. C. B. BLYDT.

Netherlands : Nederlands Elektrotechnisch Comité, Centraal Normalisatiebureau, Postbus 70, 's-Gravenhage.

Bureaux-Offices : Duinweg 20-22.

Tel. : 01700/514041. *Cables* : « NORMALISATIE ».

President : Prof. Ing. G. DE ZOETEN.

Secretary : Mr. H. LELS.

Poland : Poslki Komitet Normalizacyjny, Commission pour la collaboration avec la C.E.I., Ul. Swietokrzyska 14, Warszawa 51.

Tel. : 6 69 60. *Cables* : « PEKAEN ».

Président : Ing. J. WODZICKI.

Portugal : Commissao Electrotecnica Portuguesa, Rua de S. Sebastiaoda Pedreira 37, Lisboa.

Tel. : 5 2652-5 0145.

Président : Ing. T. FERREIRA.

Secrétaire : Ing. E. MONTEIRO.

Rumania : Comité Electrotechnique Roumain, Office d'Etat pour Normes, Boîte postale 10, Bucaresst 30.

Tel. : 4 60 27. *Cables* : « STAS ».

Président : Prof. Dr. Ing. RADULET.

Vice-Présidents : Prof. Dr. Ing. A. AVRAMESCO, Prof. I. MILETINEANU.

Secrétaire : Ing. E. GELES.

United Kingdom : British National Committee of the I.E.C., British Standards Institution, British Standards House, 2, Park Street, London W. I.

Tel. : MAYFAIR 9000. *Cables* : « STANDARDS AUDLEY ».

President : Col. B. H. LEESON.

Secretary : Mr. J. F. STANLEY.

Sweden : Svenska Elektriska Kommissionen, Malm Morgsgatan 10, Stockholm 16.

Tel. : 22 75 40. *Cables* : « ELNORM ».

President : Mr. G. JANCKE.

Secretary : Mr. L. GREN.

Switzerland : Comité Electrotechnique Suisse, Association Suisse des Electriciens, Seefeldstrasse 301, Zurich 8.

Tel. (051) 34 12 12. *Cables* : « ELEKTROVEREIN ».

Président : Dr. P. WALDVOGEL.

Secrétaire : M. H. MARTI.

Czechoslovakia : Urad pro Vynalezy a normalisaci, Vaclavské nam. 19, Praha III.

Tel. : 22-22-41. *Cables* : « PATENTSTANDARD ».

Vice-Président : Ing. J. DOSTAL.

Secrétaire : M. M. BAUDYS.

Turkey : Turkish National Committee of the I.E.C., Turkish Standards Institution, Gazi Mustafa Kemâl Bulvari 6/1, Istaş Apt. 11, Kizilay, Ankara.

Tel. : 20 917. *Cables* : « STANDARD ».

President : Mr. F. A. SUNTER.

General Secretary (interim) : Mr. M. C. ULUER.

Union of South Africa : South African National Committee of the I.E.C., Council of the South African Bureau of Standards, Private Bag 191, Pretoria.

Tel. 8-0851. *Cables* : « COMPARATOR ».

President : Dr. F. J. DE VILLIERS.

Union of Soviet Socialist Republics : Comité de participation de l'U.R.S.S. aux Conférences énergétiques internationales, Ministère des Usines Electriques et Industrie Electrique, Kitaïski Proiesd 7, Moscou 74.

Tel. : B 6-87-08. *Cables* : « SOVMEK ».

Président : M. A. M. NEKRASOV.

Secrétaire général : M. B. P. LEBEDEV.

Yugoslavia : Comité Electrotechnique Yougoslave, Savezna Komisija za Standardizaciju, Admirala Geprata ul br. 16, Post. fah 933, Beograd.

Tel. : 28-920. *Cables* : « STANDARDIZACIJA ».

Président : Dipl. Ing. E. BLUM.

Secrétaire : Dipl. Ing. V. KUNDIC.

II. — List of I. E. C. Technical Committees, Chairmen and Secretariats (*Abstract*)

N ^o	Title	President	Secretariat	Secretary
1	Nomenclature	Général E. E. WIENER (Belgique), Président, Comité Electrotechnique Belge, 3, Galerie Ravenstein, Bruxelles I	France	M. Ch. DIETSCH, Elec- tricité de France, 6, rue de Messine, Paris VIII ^e
3	Graphical Symbols	M. A. LANGE (France), Vice-Président Comité Electrotechnique Français 54, Avenue Marceau, Paris VIII ^e	Suisse	M. H. BENNINGER, Ate- liers de Construction Oerlikon, Zurich 50
12	Radio-communication	M. P. BESSON (France), Directeur de l'Ecole Supérieure d'Electricité, 8- 14, Av. Pierre Larousse, Malakoff (Seine)	Netherlands	M. P. A. I. HUYDTS
12-1	Radio Receiving Equip- ment	M. S. A. C. PEDERSEN (Denmark), Director, Philips, A. S., Prags Bou- levard, 80, Kobenhavn S	Netherlands	M. P. A. I. HUYDTS
12-2	Safety	M. P. D. POPPE (Norway), President, Norsk Elektroteknisk Komite, Postboks 5093, Oslo NV	Netherlands	M. H. J. BOON

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N°	Title	President	Secretariat	Secretary
12-6	Radio Transmitting Equipment	M. C. BEURTHERET (France), Ingénieur en Chef, Compagnie Française Thomson-Houston, 173, Bd Haussmann, Paris VIII ^e	Netherlands	
12-7	Climatic and Durability Tests for Radio-communication Equipment	A désigner	Netherlands	
13	Measuring Instruments	M. I. BOHM (Hungary), Director, Műszeripari Kutató Intézet, P.O.B. 99, Budapest 53	Hungary	
13A	Integrating Meters	M. M. WHITEHEAD (U. K.), Chief Engineer, Messrs Ferranti Ltd., Hollinwood (Oldham) (Lancs.)	Hungary	
13B	Indicating Instruments	M. I. BOHM (Hungary)	Hungary	
13C	Electronic Measuring Instruments	Prof. A. G. ALEXANDROV (U. R. S. S.), Moscou	U. R. S. S.	
14	Power Transformers	Prof. R. O. KAPP (U. K.), Kennedy and Donkin, 12, Caxton Street, London S. W. 1	United Kingdom	

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1	Dielectric Strengths	Mr. A. COLLINS (U. K.), The Micanite and Insulators Co. Ltd., Empire Works, Blackhorse Lane, Waltham- stow, London E. 17		
2	Volume and Surface Resis- tivity. Insulation Resis- tance	Mr. A. H. SCOTT (U. S. A.), Physicist in Dielectric Research, National Bureau of Standards, Washington 25, D. C.		
3	Tracking	Mr. P. D. POPPE (Norway), President, Norsk Elektroteknisk Komite, Postboks 5093, Oslo NV		
4	Voltage Withstanding under the Action of Ionization Discharges	M. R. LANGLOIS-BERTHELOT (France), Ingénieur-conseil, Compagnie Géné- rale d'Electricité, 54, rue La Boétie, Paris VIII ^e		
22	Static Power Convertors	Mr. L. W. MORTON (U. S. A.), Mana- ger, Power Electronics Division, General Electric Company, Sche- nectady 5, N. Y.	Suisse	

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23	Electrical Accessories	Prof. J. V. VAN STAVEREN (Nether- lands), Vereeniging van Directeu- ren van Electriciteitsbedrijven in Nederland, Utrechtseweg, 310 Arnhem	Belgique	M. J. SMOES
24	Electric and Magnetic Ma- gnitudes and Units	Dr. C. C. CHAMBERS (U. S. A.), Dean, Moore School, University of Penn- sylvania, Philadelphia, 4, Pa.	France	M. Ch. DIETSCH, Elec- tricit� de France, 6, rue de Messine, Paris VIII ^e
25	Letter Symbols and Signs	M. K. LANDOLT (Suisse), Ateliers de Construction Oerlikon, Zurich 50	U. S. A.	Prof. H. M. TURNER, Yale University- New Haven (Con- necticut)

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29-1	Sound Recording	Mr. H. DAVIES (U. K.), The British Broadcasting Corporation, Designs Department, Broadcasting House, London W. 1	United Kingdom	
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39-1	Electronic Tubes and Valves	Mr. T. E. GOLDUP, C. B. E. (U. K.)	Netherlands	Mr. M. W. VAN BATENBURG
39-2	Semi-conductor Devices	Mr. V. M. GRAHAM (U. S. A.), Associate Director, Electronic Industries Association, 11, West 42nd Street, Room 650, New York 36, N. Y.	France	M. J. M. MERCIER, Syndicat des Industries des Tubes Electroniques, 23, rue de Lubeck, Paris XVI ^e
39/40	Sockets and Accessories for Electronic Tubes and Valves	M. F. DUMAT (France), Ingénieur, La Radiotechnique S. A., 51, rue Carnot, Suresnes (Seine)	Netherlands	Mr. M. W. VAN BATENBURG
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40-1	Capacitors and Resistors	Dr. G. D. REYNOLDS (U. K.), Murphy Radio Ltd., Welwyn Garden City, Herts	Netherlands	Mr. M. W. VAN BATENBURG

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40-6	Parts made of Ferromagnetic Oxides	Dr. K. H. VON KLITZING (Germany), Oberregierungsrat, Physikalisch-Technische Bundesanstalt, Bundesallee 100, Braunschweig	Netherlands	Mr. H. W. GHIJSEN
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Copies of the following papers are available free of cost at the General Secretariat :

U. S. Naval Research Laboratory. — The moon can be used as a radio relay station, August, 1957.

WAIT, J. R. — The attenuation as frequency characteristics of VLF radio waves, June 1957.

International Electrotechnical Commission

Third Supplement to Publication n° 67. — Dimensions of electronic tubes and valves.

Publication n° 105, First edition. — Recommendations for an international specification for commercial purity aluminium busbar material.

Publication n° 100, First edition. — Recommended methods for the measurement of direct interelectrode capacitance of electronic tubes and valves.

The Recommendations given in this Publication apply to the measurement of the direct interelectrode capacitances of electronic tubes and valves of the following types : receiving tubes and valves ; cathode-ray tubes ; gas tubes and gasfilled valves ; phototubes, photocells and multiplier types ; highpower vacuum tubes and valves.

The Publication includes tables of electrode connections to be used for the measurements and descriptions of methods of measurement. Detailed specifications are also given for the standard sockets, shields and cap connectors to be used in the measurements.

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