Bulletin N° 95 January-February 1956

International Scientific Radio Union

U. R. S. I.

CONTENTS

XIIth GENERAL ASSEMBLY

Rules for submission of Reports and Papers

1. Generals

1.1. — These rules for submission of documents to General Assemblies have been drafted taking into account decisions adopted by the General Assembly on proposals either of the Executive Committee or of the Publication Committee.

1.2. — Documents submitted to General Assemblies are classified under the following headings :

(i) National Committee Reports.

(ii) Commission Reports.

(iii) Sub-Commission and Working Group Reports.

(iv) Individual papers.

1.3. — No consideration will be given to documents which do not fulfil the conditions mentioned hereafter or which reach the General Secretariat after the dates stated.

1.4. — *Texts* should be typenwritten and be in one of U.R.S.I. official languages (French and English).

1.5. — *Diagrams*, *drawings*,... should contain no text except, for brief indications such as « Fig. 1 », « Mc/s », etc. The accompanying text should be submitted on a separate sheet.

The overall dimensions of diagrams, drawings, etc... should not exceed 6 ½″ × 10″.

1.6. — Before each General Assembly the limit dates will be brought into notice by the Secretary General through the Information Bulletin and through special announcement to National Committees and to Commission and Sub-Commission Chairmen.

1.7. — Participants to General Assemblies should state when they register, the Commission or Commissions to which they are interested ; papers will be distributed according such statement.

2. — National Committee Reports

2.1. — National Committee Reports should reach the General Secretariat, *in duplicate*, *at least two months before* the General Assembly (See 1.4 and 1.5).

2.2 — For convenience purposes such reports should be issued in separate parts corresponding to each Commission of U.R.S.I.

2.3. — According to a resolution adopted in 1954, every individual paper submitted to the General Assembly, whether or not selected by the Commission Chairmen for discussion purposes, should be included by title and short abstract in the report of the author's National Committee.

2.4. — Due to the fact that current need are well covered by « Science Abstracts » and the « Bulletin signalétique » and also by reference lists published in radio periodicals, National Committees are invited not to include in their reports bibliographies mentioning all the literature published on fields relevant to the various Commissions.

2.5. — National Committees are requested to add, if possible, to the original text the translation in the other official language of U.R.S.I.

2.6. — National Committee Reports are reproduced through the care of the Secretary General and distributed at the opening of the General Assembly according to the wishes expressed by the participants (1.7).

2.7. — Administrative reports or reports on the general activities of National Committee are not distributed ; such reports are printed in the *Information Bulletin*.

3. — Commission Reports

3.1. — Such reports should reach the General Secretariat, *in duplicate*, at least *two months* before the General Assembly. Should a Chairman wish to have this report circulated among the Official Members of the Commission, it should reach the General Secretariat *at least four months* before the General Assembly (See 1.4 and 1.5).

3.2. — Commission Chairmen are kindly requested to take useful steps in order to provide the Secretary General, at the latest

at the opening of the General Assembly, with the translation of the report in the official language which has not been used for the origenal text.

3.3. — Commission reports are reproduced by the care of the General Secretary and distributed at the opening of the General Assembly to the participants according to their wishes (1.7).

4. — Sub-Commission and Working Groups Reports

4.1. — Such reports should reach the General Secretariat, *in triplicate, at least three months* before the opening of the General Assembly. One copy will be sent to the President of the Commission by the care of the Secretary General.

Should a Sub-Commission or Working Group Chairman wish to have his report distributed to the members of his Committee before the General Assembly, he should forward the number of copies requested to the Secretary General or send the original text, *at least four months* before the General Assembly.

4.2. — The reports should be drafted in one of U.R.S.I. official languages with, as far as possible, a translation in the other language (See 1.4 and 1.5).

4.3. — They will be reproduced and distributed at the opening of the General Assembly according to the wishes of the participants (1.7).

5. — Individuals Papers

5.1. — Individual papers submitted to the General Assembly should reach the Secretary General *at least four months* before the General Assembly.

5.2. — Only papers forwarded by National Committees under their responsability and by Commission Chairmen will be accepted by the Secretary General. Papers which are not accepted are not returned to their authors.

5.3. — Such papers should fulfil the following additional conditions :

(*a*) mention the Commission or Sub-Commission to which they refer ;

(*b*) be related to one of the topics suggested for discussion by one of the Commission Chairmen ; such topics will be announced

in due time by the Chairmen of the Commission or by the Secretary General ;

(*c*) not exceed 1500 words and not include more than three line figures ;

(*d*) include a short summary of 25 to 100 words according to the length of the paper ;

(*e*) be sent *in duplicate* to the Secretary General (See also 1.4 and 1.5).

5.4. — The Presidents of the Commissions will be invited to select those papers they want to have reproduced and distributed for the sessions held during the General Assembly, according to the wishes of the participants (1.7).

Applications

LETTER TO ALL NATIONAL COMMITTEES

18 February, 1956.

Dear Mr. President,

At the request of the General Arrangements Committee for the 1957 General Assembly, I want to give you further information on section 8 (Opportunities for financial assistance) of the booklet announced in my letter n° 8852 of 28 October, 1955. Although the date mentioned is past, requests can still be considered. However, plans must be made very early because :

(*a*) much detailed work involved in arranging for lectureships, etc. will require starting arrangements soon ;

(*b*) the arrangements to insure that visa application will not delay travel must be started a long time in advance ;

(*c*) delegates must give early attention to their reservations for travel (ship, air, etc.) ; a large fraction of the available space is reserved more than a year in advance.

Considerations (*b*) and (*c*) apply to all delegates as well as to those who will seek financial assistance for their travel.

Moreover, the General Arrangements Committee would be grateful to National Committees to supply soon an estimate of the number of its delegates and of accompanying wives or other persons ; the specific naming of delegates will have to come later.

Some copies of the First Announcement booklet are still available at my office.

Hoping you will kept the Members of your National Committee informed of the contents of this letter,

I remain,

Yours sincerely,

The Secretary General,
(*sgd*) HERBAYS.

NATIONAL COMMITTEES

France

At the last General Assembly of the French National Committee the following were elected as officers.

President : B. DECAUX.

Vice-Presidents : Ingénieur Général A. ANGOT ;
M. LAFFINEUR ;
M. PONTE.

Secretary General : J. VOGE, 196, rue de Paris, Bagneux, Seine, France.

Treasurer : P. ABADIE.

COLLOQUIUM ON TROPOSPHERIC AND IONOSPHERIC PROPAGATION

The French National Committee of U.R.S.I. considers the organization at Paris, in September 1956, of a Colloquium devoted to theoretical and practical problems on tropospheric and ionospheric propagation, and to diffraction problems connected to propagation matters.

The date planed for this meeting would be from September 17 to 21, 1956, after the C.C.I.R. Plenary Meeting of Warsov.

Readers wishing to take part to this colloquium or to submit papers are kindly requested to apply to the Comité National de Radioélectricité Scientifique, 196, rue de Paris, Bagneux, France.

Morocco

NEW ADDRESS

Since December 1, 1955, the address of the Morocco National Committee is as follows : Institut Scientifique Chérifien, Avenue Biarnay, Rabat.

Netherlands

SUMMER SESSION OF THE NETHERLANDS UNIVERSITIES

The 1956 Summer Session of the Netherlands Universities will be held at the University of Delft from July 20 to Augustus 9, 1956. This course will deal with the subject : « Communications in our shrinking modern world ».

Further information are available by writing to Mrs A. F. P. Volten, Secretary, Netherlands Universities Foundation for International Cooperation, 27, Molenstraat, The Hague Netherlands.

Poland

NEW ADDRESS

Henceforth all correspondence to the Polish National Committee or to Polish National Members of Committee should be sent c/o Dr. K. Bochenek, Polska Akademia Nauk, Palac Kultury i Nauki, Warsaw.

Sweden

MEETING

The Swedish National Committee usually holds its full meetings in Stockholm. On the 2nd and 3rd June 1955 the Committee, however, met in Gothenburg inder the chairmanship of Dr Sterky, President. The first day was devoted to sessions and demonstrations of institutions for electronics, telecommunication and electrical measurements of Chalmers' Institute of Technology.

On the next day, the Committee paid a visit to the wave propagation observatory of Chalmers' Institute at Råö and to the coast station « Gothenburg Radio » of the Swedish Telecommunications Administration. The Råö Observatory was shown by its director, Professor O. E. H. Rydbeck and special attention was given to the installations for radio-astronomical research.

COMMISSIONS

Membership

The Finnish National Committee appointed the following :

Official Members :

Commission II : Professor V. VAÏSÄLÄ, Meteorological Institute, The University Helsinki ; instead of Prof. V. YLOSTALO.

Commission III : Professor. V. YLOSTALO, Finland's Institute of Technology, Helsinki.

Members :

Commission II : Mr. Chr. SUCKSDORFF.

Commission III : Mr. S. WARTIOVAARA.

Commission IV : Mr. P. JÄRVI.

Commission V : Mr. J. RIIHIMA.

Commission VI : Dr. P. MATTILA.

Commission I

On Radio Measurements and Standards

TIME SIGNALS AND TIME MEASUREMENT

RESOLUTIONS OF THE I.A.U. GENERAL ASSEMBLY CONCERNED WITH COMMISSION 31 (COMMISSION INTERNATIONALE DE L'HEURE)

Considering the resolution of the Commission Internationale de l'Heure, the General Assembly adopted at Dublin, on September 5, 1955, the following resolutions :

1. The General Assembly of the I.A.U. approve the definition of the second proposed by the Comité International des Poids et Mesures, as follows :

The second is the fraction 1 : 31 556 925.975 (1) of the lenght of the tropical year from 1900.0 (1).

2. It is urged that observatories cooperating in the international time service should receive transmissions of radio time signals from distant stations in addition to those from near stations in order to facilitate determination of the apparent speed of propagation of radio waves.

3. The I.A.U. considering the inconvenience arising from the use of many different types of radio time signals, recommends for permanent retention only the English system ; the use of the three systems, American, ONOGO, and rythme, may be continued for a provisional period.

4. The I.A.U. recommends that all modifications in the programme of radio time signal transmissions should be communicated to the Central Bureau of Astronomical Telegrams in Copenhagen and published in the circulars issued by the Bureau.

5. The I.A.U. recommends that observatories cooperating in the International Time Service, should not change their conventional adopted longitudes : such changes impaire the homogeneity of the international results.

It is further recommended that the adopted longitude should refer to a fixed point in the observatory, and that any changes in the positions of instruments used for determination of time should be communicated to the Bureau International de l'Heure.

6. The I.A.U. instructs the B.I.H. to compute for the various observatories cooperating in the international time service the longitude corrections due to the motion of the pole, using for this purpose the values of the polar motion supplied by the Central Bureau of the International Latitude Service : extrapolated corrections for several month in advance shall be provided for current use. The x and y component of the polar motion used for the computation of these corrections should also be published in the *Bulletin Horaire.*

7. The B.I.H. shall adopt and shall publish in advance each year corrections for annual fluctuation in the speed of rotation

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(1) The more precise value required for exact agreement with Newcomb's Tables of the Sun is 1 : 31 556 925. 974 74).

of the earth. These corrections shall be used by all observatories in the determination of Universal Time. Studies of the annual fluctuations shall be continued, especially with the aid of atomic standards of frequency.

8. The I.A.U. recommends that the bulletins published by observatories cooperating in the international time service should contain the quantities to be added to the times of reception of radio time signals tabulated in UT to allow for the effects of polar motion and the annual fluctuation in the rotation of the earth.

9. The I.A.U. recommends that, to facilitate intercomparisons between time-keeping establishments, data tabulated at intervals of 5 days, 10 days, and so on should be given for days on which the number of Julian Days elapsed at Greenwich noon is divisible by the tabular intervals.

10. The I.A.U. draws attention to the importance of the establishment of time services of high precision in equatorial regions.

11. In view of the high precision which has been achieved in intercomparisons of time and frequency, and in the measurement of variations in propagation time, by means of the experimental frequency transmissions on a frequency of 60 kc/s, which precision is not attainable on any of the frequencies allocated by the C.C.I.R. for Standard frequency transmission the I.A.U. desires to draw the attention of the C.C.I.R. to the importance of frequencies being allocated for the continuation and extension of standards frequency transmissions on frequencies below 100 kc/s.

(Reprint from the *Bulletin Horaire du Bureau International de l'heure* « (B.I.H.) », nº 3 (Série 4), May-June 1955).

Commission II

On Radio and Troposphère

OFFICIAL MEMBERS

The present address of Dr. J. B. Smyth, U. S. A. Official Member to Commission II is as follows : Smyth Research Associates, San Diego 3, California, U. S. A.

REPORT OF SUB-COMMISSION II OF THE JAPANESE NATIONAL COMMITTEE

by H. HATAKEYAMA, *Chairman*

1. — SCIENTIFIC ACTIVITIES

The Radio Research Laboratories carried out radio propagation experiments as tabulated in the following table.

Frequency band	Propagation distance	Remarks
1. 159 Mc/s	400 km	Diffraction field from an isolated Mountain (Mt. Fuji).
2. 300 Mc/s	250 km	Diffraction field from a Mountain (Mt. Yamizo).
3. 159 Mc/s	350 km	Long distance propagation over plain and mountaneous terrain.
4. 60, 150, 470 and 3000 Mc/s	350 km	Diffraction field from Mt. Fuji.
5. 60 Mc/s	40 km, 190 km	Fading in the diffraction field.

In the experiments nº 1, nº 2 and nº 4, high field strength was observed behind the mountains. The field intensities of VHF waves were very strong and stable, while those of UHF and SHF wave were unstable. In nº 3 experiment, fading was considerably large compared with other experiments. The diversity effect was examined and found to be not always effective. Fading due to the air stream at medium height of the atmosphere was found. Nº 5 experiment was carried out to examine the fading of VHF waves.

The Technical Research Laboratory of NHK conducted several propagation tests with an intention to establish the nation-wide TV interlink network by utilizing the long distance propagation of the TV broadcasting waves themselves as much as possible. Typical one of these tests is the measurement of the field intensities of JOAK-TV (103.25 Mc/s, 63.5 kW) and JOAX-TV (171.25 Mc/s,

100 kW) waves during a few weeks in Autumn 1954, at the summit of Mt Yoneyama in Niigata prefecture, 993 m above the sea level and some 210 km apart from their sending station in Tokyo. The propagation paths for these channels are almost the same and are screened by a single mountain ridge which is about 1 800 m above the sea level.

The Electrical Communication Laboratory, Nippon Telephone and Telegraph Corporation, carried out experiment of multi-ray propagation. In order to analyse the characteristics of multi-ray propagation of microwave, « Wobbling Frequency Method » was adopted. The laboratory has been conducting measurement of vertical structure of the lower atmosphere in order to obtain the vertical distribution of refractive index of the air up to the hight of 300 meters. Twelve sets of meteorological instruments were installed on the transmitting tower of NKH Broadcasting station at Kawaguchi near Tokyo. At the same time propagation test of 4000 Mc/s wave has been carried out between the tower (at the hight of 50 and 300 meters) and Mf. Tsukuba (250 m above the sea level).

2. — Procedures taken for the Recommendations in the Hague Assembly

For Recommendations 1 and 2, wave propagation tests were carried out on different terrains and under different meteorological and climatological conditions as mentioned in the first paragraph of this report. Micrometeorological measurement is made on the antenna tower of NHK Broadcasting Station at Kawaguchi by the Electrical Communication Laboratory, Nippon Telephone and Telegraph Corporation. Discussions on the relation between the fading of VHF, UHF and SHF have been made in Sub-Committee II of the Japanese National Committee.

Commission III
On Ionospheric Radio

THE FORTHCOMING SUNSPOT MAXIMUM

As is welle known, different astronomical observatories throughout the world keep a constant watch on the sun in order to determine the daily occurrence of the number of sunspots. The latter

exert a very pronounced influence on the ionisation of the ionosphere, which in turn determines the propagation conditions of radio waves. As is also well known the approximate length of a cycle is about 11 years.

The Secretariat of the C.C.I.R. constantly follows, with great interest, the results of these astronomical observations and the predictions made by several radio organisations of the expected values of the sun's activity in the months to come.

We wish to draw the attention of all users of radio waves to the unexpected very rapid rise of the observed « provisional sunspot numbers » which took place during November 1955. Indeed this rapid rise far superseded all predictions known to us.

There is an empirical rule, deduced from many earlier observations, stating that a forthcoming sunspot maximum will be the higher the faster the sunspot numbers increase during the beginning of the build-up of a new cycle. The last minimum occurred during the middle of 1954, and at present we are in the build-up phase of a new cycle. This build-up is now occurring at an exceptionally rapid rate so that, in all probability, the next sunspot maximum will be of outstanding intensity. Professor M. Waldmeier, Director of the Zurich Astronomical Observatory, the well known expert in this field, expects the highest « smoothed monthly relative number » to be about 150, or even larger. Moreover, he expects the coming sunspot maximum to surpass all the sunspot maxima so far observed, and he predicts that this maximum will be reached as early as the middle of 1957.

If the above extrapolations prove to be accurate we may expect the change to higher frequencies for long distance radio communications to be necessary sooner than might have been generally thought. It is for this reason that we herewith draw the attention of all concerned to this unexpected phenomenon.

Prof. Dr. Balth. VAN DER POL,
Director, C.C.I.R.

Commission V

On Radio-Astronomy

RADIO ASTRONOMY OBSERVATORY

(From *Telecommunication Journ.*, nº 10, Oct. 1955)

A new observatory to be known as the Mullard Observatory, is to be set up by the University of Cambridge as a result of an offer from the Mullard Company to provide £. 100 000 over a period of ten years for radioastronomy research.

(Source : *Wireless World*).

Commission VI

On Radio Waves and Circuits

SYMPOSIUM ON ELECTROMAGNETIC THEORY OF WAVES

The Proceedings of the Symposium on Electromagnetic Theory of Waves held at Michigan from 20 to 21 June 1955 (see *Inf. Bull.*, **90**, 13-16) are appearing as a special issue (nominally the September issue) of the Transactions of Professional Group on Antennas and Propagation of the I.R.E.

SUB-COMMISSION VI.3

ON ELECTROMAGNETIC THEORY (ANTENNAS AND WAVEGUIDES)

Membership

Chairman ; Dr. G. SINCLAIR, Assoc. Professor, Department of Electrical Engineering University of Toronto, Ontario, Canada.

Members : P. BAUDOUX (Belgium) ;
C. J. BOUWKAMP (Netherlands) ;
L. J. CHU (U. S. A.) ;
E. C. JORDAN (U. S. A.) ;
B. A. S. JOSEPHSON (Sweden) ;
H. L. KNUDSEN (Denmark) ;

H. MEINKE (Germany);
L. G. A. ROBIN(France);
K. M. SIEGEL (U. S. A.);
R. C. SPENCER (U. S. A.).

Commission VII
On Radio Electronics

PREPARATION OF THE XIIth GENERAL ASSEMBLY

We have received the following letters which were sent to Official Members of the Commission.

November 23, 1955.

Dear Col. Herbays,

In August and September 1957, the International Scientific Radio Union, U.R.S.I., will again hold a General Assembly, this time at Boulder, Colorado in the United States of America. It is time that Commission VII began to organize for that meeting and it is with this in mind that I am writing to you now.

As you know, I am President of Commission VII and Prof. Dr. Ir. J. L. H. Jonker of the Netherlands is Vice-President. Professor H. P. Koening of Canada is the Secretary. After the meetings in The Hague were over last year, we three along with Professor Shepherd, Dr. Molnar and Prof. Chodorow of the United States and Professor Sayer of England met to discover what was good and what was bad about the organization of Commission VII for The Hague meetings. Many good ideas emerged in that meeting; you may assume that what you find good in this letter is the result of our discussion. I have added a number of ideas of my own and if you disagree with the suggestions that follow, you may conclude that these are my own contributions.

A number of points have been decided for us by U.R.S.I. in General Assembly and are not open for our discussion at this time. First, this is a Radio Union and the subjects discussed in all Commission meetings must bear on Scientific Radio. This was felt so strongly at The Hague Assembly that the names of all Commissions were changed so as to include the word Radio.

Secondly, the word scientific has been included in the title of the Union to call our attention to the fact that U.R.S.I. is a research organization. Finally, Commission VII is the Commission on Radio Electronics and our field is narrowed to electronics. I feel that these three afford us a sufficient criterion to guide our proceedings : our subjects must be of a research nature in the field of electronics and must be directly related to the advance of Radio Science.

A decision also was made in the General Asesmbly concerning the nature of our meetings. The meetings are not to be used for the purpose of reading papers, as is the case in many scientific societies, but rather are to be used for the purpose of discussing outstanding problems in our field. The mechanism by which we provoke discussion is our own business, but I believe we would do well to follow the example of other Commissions that have been successful in this matter. In the paragraphs that follow, I will outline the method that will be used by Commission VII.

In the next few months, it will be our task to select the list of four subjects that are to be discussed at four technical meetings when we meet at Boulder, Colorado. Having selected our topics, it will then be our task to select four outstanding authorities in these fields to lead our discussions. It will be the task of these outstanding authorities, in the subsequent six months, to prepare a provocative, one-hour paper which is not a survey of the field but rather an exposition of the problems that lie on the present frontier of the subject or which even lie slightly beyond the frontier. I will ask each of these leaders to supply me, well in advance of the meeting, with a copy of his paper so that I can have it reproduced and given to you at Boulder. In addition, I shall ask our authority for a much shorter outline of his paper which I can reproduce and mail to you some months in advance of the meeting so that you can prepare your discussion. Each individual meeting then consists of a very provocative paper of about one hour in length, followed by a discussion of about one and one-half hours in length. I have suggested only four technical meetings, partly because of the difficulty of maintaining such a high standard and partly because most of you will want to attend many meetings of other Commissions.

Very shortly I shall make some suggestions concerning topics and ask you to help me in this matter, but before I do, notice the following time-table. If meetings of this type are to be successful, I believe that we must adhere rigidly to this time-table and in turn, this requires your cooperation in the matter of replies to letters such as this. Would you help me in this matter ?

PROPOSED TIME — TABLE OF EVENTS

December 30, 1955 : Your reply to this letter received here.

March 1, 1956 : Your reply to a second letter from me (if necessary) received here. Four topics selected for our Boulder meeting.

November 1, 1956 : All correspondence on the topic of the four authorities completed. The four authorities will have been selected and will have agreed to act.

May 1, 1957 : Papers and Outlines received here from the four authorities.

May 15, 1957 : Outlines of the four papers mailed to you from this office so that you may prepare your discussion.

May 30, 1957 : Outlines received by you.

August 22, 1957 : Meetings at Boulder commence.

In discussion between our small group after The Hague Assembly, the topics that were suggested were as follows :

(*a*) Gas Electronics :

1. Atomic Collision Phenomena.
2. Discharges.

(*b*) Solid State Physics :

1. Emission.
2. Semiconducting devices.
3. Ferrites.

(*c*) Behaviour of Electron Streams.

(*d*) Electron Tubes.

I have attempted to apply the criterion that I mentioned earlier to these topics and in my opinion, a number of them do not qualify. Some of you are authorities on these particular subjects and I would welcome guidance from you on what we may include and what

we must exclude. I would suppose that Gas Electronics is of great importance in the discussions of Commissions III (Ionospheric Radio) and V (Radio Astronomy) but if we choose it as one of our own topics, can we make it a radio topic or does it become pure physics unrelated to radio. Solid State Physics, on the whole, is a topic for the International Union of Pure and Applied Physics. Can we narrow the topics to solid state electronics and see that it relates to radio ? The subject of Electron Tubes is very apt to deal with Engineering or Development and so should be disqualified in another way. In addition, all these subjects are too broad ; if we are really going to have successful discussions, the interest must be narrowed to a workable size. I suggest the following topics, not that I hope to impose them on you, but rather in order to give you further material for constructive criticism.

1. The source and nature of noise in electron beams.
2. The physics of the cathode.
3. Noise in semiconducting devices.
4. The interaction of waves in electron streams with wave propagating structures.
5. The formation, focussing and propagation of electron beams.
6. Atomic collision phenomena in gas discharges.

In reply to this letter, *would you send me the list of the six topics that you feel should be discussed at the Boulder meetings* ; please place these topics in your order of priority. On December 30th, in order to arrive at an idea of preference by members attending the meetings, I shall weight your list by the number of votes carried by your country in U.R.S.I. and on that basis, shall attempt to select the four topics to be discussed ; I shall mail the result to you immediately after so that you will have a further chance to comment. It would be helpful to me if you would include with your list a few short notes justifying the inclusion of your topics in our program.

Sincerely yours,

(*sgd*) G. A. Woonton,
President, Commission VII,

January 24, 1956.

Dear Col. Herbays,

In my last letter I asked for suggestions concerning the topics to be discussed by Commission VII at the next U.R.S.I. meeting to be held at Boulder, Colorado. The interest which has been taken in that letter has been very gratifying and I have now received enough replies so that I can list these topics with some certainty that they meet with your approval. The four topics that have been chosen are :

1. The Physics of the Cathode.
2. The Physics of Semi-Conducting Devices for Radio Application.
3. The Source and Nature of Noise in Electron Beams.
4. Gas Discharge Phenomena.

I will give the complete list of proposals and some of the comments that I have received a little later in this letter.

It is now our task to choose four eminent authorities, one for each of these four topics, who will be willing to prepare provocative, one-hour papers to be delivered at the Boulder meetings. You will recal from my last letter that it will be the duty of these authorities to outline the problems that await solution in their fields ; the purposes of the papers are to provoke discussion, so that up to the minute ideas can be interchanged at the meeting and, by laying bare the problems, to stimulate fresh researches which will advance our knowledge in the field of Scientific Radio. *Would you give your most careful consideration to these four topics and (by March first) send me a list of the four (or more) people whom you consider to be the world authorities best qualified to prepare and deliver these four papers.* In my opinion the wisdom with which we make these choices will have much to do with the success or failure of our Boulder meetings.

The following table lists the topics which were suggested in the various replies and indicates the preference which was given to them. In arriving at preferences, I gave a weight of four to the topic which was listed as a first choice and graded the weight down to only one for the fifth and sixth choices. In some cases where the topics were not in order of priority, I attempted to read the letter carefully and decide from its tone what order of priority was intended. On the whole, I believe the table to

be a fair statement of the interests of the members of Commission VII.

Topic	Preference
1. The Physics of the Cathode	25
2. The Physics of Semi-Conducting Devices for Radio Application	19
3. The Source and Nature of Noise in Electron Beams	17
4. Gas Discharge Phenomena	13
5. Interaction of Waves in Electron Streams with Propagating Structures	9
6. Formation, Focussing and Propagation of Electron Beams	9
7. Ferromagnetic Materials and Ferrites	6
8. Electroluminescence	1
9. The Physical and Cheminal Structure of Dielectrics	1

Topic number two, « The Physics of Semi-Conducting Devices for Radio Application », has been broadened from the earlier topic, « Noise in Semi-Conducting Devices » as a result of the wise counsel received from Dr. Jonker, Dr. Shepherd, and Dr. Schaetti (Switzerland).

Judging from your replies, I was mistaken in supposing that Commission VII should not consider topic number four, « Gas Discharge Phenomena ». The feeling that this topic should be retained was expressed in many different ways and from the replies. I was not able to find a title that expressed the fact that the phenomena in which we were interested were definitely related to scientific radio. *Perhaps you would help me find a better title* which would express the breadth of our interest and at the same time bring in the relation to radio matters. Dr. Jonker suggests that we make the restriction by specifying the frequencies in which we are interested.

I shall look forward to receiving your replies about the first of March.

Sincerely yours,

(*sgd*) G. A. Woonton,
Chairman, Commission VII,
Eaton Electronics Research Laboratory,
McGill University, Montreal, Canada.

CONGRESS ON MICROWAVE VACUUM TUBES

A Congress on Microwave Vacuum Tubes will be held at Paris from May 29 to June 2, 1956.

Further informations are available at Congrès pour tubes hyperfréquences, S.I.T.V., 44, rue de Rennes, Paris 6e, or at the Société des Radioélectriciens, 10, Avenue Pierre Larousse, Malakoff (Seine), France.

ELECTRON TUBE RESEARCH CONFERENCE

An Electron Tube Research Conference, sponsored by the Institute of Radio Engineers, is to be held in Boulder, Colorado between June 27th and 29th next summer, that is in 1956. Requests for further information or invitations to the Conference should be addressed to the Conference Chairman : Mr. S. E. Webber, General Electric Research Laboratory, The Knolls, Schenectady, New York, U. S. A.

MIXED COMMISSIONS

Ionosphere

HOURLY VALUES OF COS χ

According to resolutions adopted by the Mixed Commission on Ionosphere at the Brussels Meeting, August 1954, the Radio Research Board of the Council of Scientific and Industrial Research of India has prepared a Special Bulletin nº 1. This Bulletin gives the hourly values of cos χ for the 15th of each month, every hour from sunrise to sunset for the following ionospheric stations : Delhi, Ahmedabad, Haringhata, Calcutta, Bombay, Madras, Tiruchirapalli and Kodaikanal (Indian National Committee of U.R.S.I., National Physical Laboratory, New Delhi, 12, India).

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

Documents submitted to the September Meeting

(*See Inf. Bull.*, **94**, 34)

The Determination of Ionospheric Drift Velocities from Three-Receiver Fading Records

Cavendish Laboratory, Cambridge

Introduction

In a widely used method for the measurement of horizontal drift velocities in the ionosphere (1-5) the variations of amplitude of a downcoming radio wave are recorded at three points. These points are separated by distances of the order of one wavelength. Frequently the fading curves have considerable similarity but are displaced in time relative to each other. From the mean time shifts it is possible to deduce the mean velocity with which the amplitude pattern drifts over the ground.

This method has been used at Cambridge since January 1949, and as a result of this work considerable experience has been gained in the analysis of records. The purpose of these notes is to explain the method used for the analysis of the records obtained at Cambridge, and to suggest that a similar method be adopted by other workers. In particular it is desirable that all should use the same method during the International Geophysical Year, 1957-8.

The full statistical analysis of three-receiver fading records has been discussed in several papers (6-11), and this work has given useful information about various sources of error which may arise

in the method. These statistical methods are, however, so laborious that they can be applied to only a small number of records. The remainder must be analysed by simpler and more approximate methods. We shall discuss here only these simple methods which have, in fact, been used for the majority of the records analysed at Cambridge.

Methods similar to those described here may also be used for the analysis of records of the scintillations of radio stars made at suitable spaced points (12-14).

The analysis of the records divides itself into four stages :

(1) The determination of the mean time shifts.

(2) The selection of reliable records.

(3) The determination of the magnitude and direction of the drift velocity from the mean time shifts.

(4) The final presentation of the results.

§ 1. — The Determination of the Mean Time Shifts

Typical records of the amplitude at three spaced points are shown in Fig. : 1(*a*). It is assumed for the present that the three receivers, O, A, B, are located along NS and EW lines as in Fig : 1(*b*).

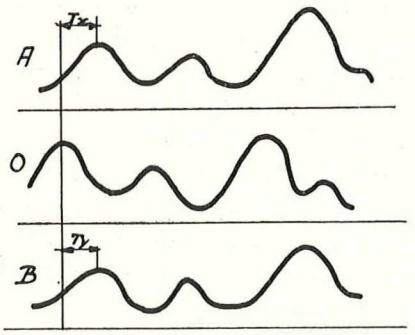

Fig. 1(*a*)

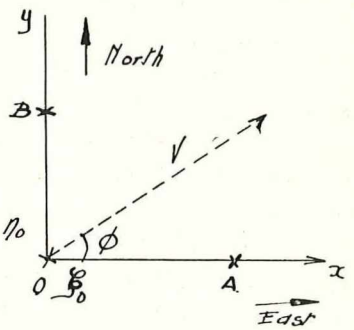

Fig. 1(*b*)

The values of the time delays, T_x of each maximum and minimum of receiver A behind the corresponding one for O are first measured. The sign convention is that T_x is recorded as positive if A *lags* behind O, as in the Figure. The mean of these values, $\overline{T}_x$, is deter-

mined. Similarly $\overline{T}_y$ is determined from the records of receivers O and B ; T_y is regarded as positive if B lags behind O.

If the recordings are made photographically, reasons of economy will probably limit the recording times to short periods of the order of 5 minutes every hour or every half hour. Each recording period will then contain something of the order of 10 to 60 maxima, depending on the frequency in use and the speed of fading at the time.

If the records are made with an automatic recorder of the type described by Phillips (15), in which the values of T_x and T_y are recorded directly as ballistic deflections of a pen recorder, the apparatus may run continuously. At Cambridge this is the method now used for routine observations. A paper speed of 1 foot per hour is used, and half-hourly averages of T_x and T_y are taken. It is too laborious to calculate the mean values properly from the individual ballistic deflections, because the number is so large. Instead mean values are estimated by eye.

§ 2. — The Selection of Reliable Records

Whether the time shifts are obtained from fading curves or from a Phillips recorder, it is necessary to have criteria for the selection of records which will give reliable values of drift velocity.

In the first place, the records must be rejected if there is evidence that an interfering signal or other disturbance was present. Such disturbances are not easy to detect on the Phillips records, but a photographic (P′, *t*) record (which is always made during the observations so that the height of reflection is known) gives a useful guide as to the times when interference was present. The (P′, *t*) record runs at a speed of about one foot per hour.

Records giving apparent velocities greater than 100 m/sec should be suspected, and carefully examined. A high velocity corresponds to a *small* value for the mean time shifts. A small value for $\overline{T}_x$, say, can arise in two ways. The individual time displacements T_x may be all small, and nearly all of one sign. In this case the small value for $\overline{T}_x$ is acceptable. If, however, the individual values T_x are considerably larger than $\overline{T}_x$, and about half are positive and half negative, then the small or zero value of $\overline{T}_x$ is not accepted. This phenomenon arises from a condition

in which the fading is mainly due to random movements rather than a steady drift of the amplitude pattern (6). It is, however, permissible to accept results for which *one* pair of receivers shows this type of behaviour, provided the other pair shows time displacements which are consistent in sign. This state of affairs is, in fact, to be expected whenever the direction of the drift is approximately along a line joining one pair of receivers (11).

If the mean time shifts change in the course of a few minutes, the records are rejected for the purpose of routine observations, since half hourly or hourly averages would then be of little significance. Thus, for photographic recording, the results are rejected if the *mean* time shifts change sign during the course of the 2 ½ or 5 minute observing period. For the Phillips records, the results are rejected if the time displacements change sign during the half-hour period which the mean is to be calculated.

There is a special phenomenon sometimes observed on the Phillips records which requires separate discussion. It occurs mainly with F region reflections during the day-time. It is found that when the fading is too slow to permit satisfactory measurements there are occasional bursts of rapid fading, lasting for a few minutes, which give consistent drift velocities. In this case, the velocity indicated by such a burst is taken as characteristic of the half-hour period within which it occurred, the assumption being that the drift velocity was really present all the time, but that it could only be observed when the layer was sufficiently irregular to produce rapid fading.

The records are usually rejected if more than one echo is present inside the selecting strobe. This situation may arise if the apparatus is left to run unattended and the strobe is made wide, to accommodate diurnal changes of height. The times when more than one echo were within the strobe can be found from an inspection of the (P′, *l*) film, which also gives an indication of the relative strenghts of the echoes. If an echo is much stronger than the rest, it may be permissible to accept the results, and to take them as applicable to this echo.

Apparent movements deduced from an F echo are always open to doubt, when a Sporadic E echo is present at the same time, whether or not inside the strobe, since the wave may then be strongly affected by its passage through the E region.

§ 3. — Determination of the Magnitude and Direction of the Drift Velocity from the Mean Time Shifts

The velocity of drift can be determined most simply if the observing points A, O, B lie along the sides of a right-angled triangle with OA (of length ξ_0) in an EW line, and OB (of length η_0) in a NS line, as shown in Fig : 1(*b*). We consider this case first, in § 3(*a*). It may, however, be impossible to use this arrangement in practice, because of the nature of the site. We shall therefore consider in § 3(*b*) the case in which the three receivers are in any position.

(*a*) *Receivers along EW and NS lines.* — Let the magnitude of the velocity of the diffraction pattern be V, and its direction be specified by an angle Φ, measured anticlockwise from the x-axis, as shown in Figure 1(*b*). Then V and Φ are given by :

$$\frac{1}{V^2} = \frac{1}{V'^2_x} + \frac{1}{V'^2_y}$$

$$\tan \Phi = \frac{V'_x}{V'_y},$$

where V'_x and V'_y are the apparent components of velocity along OA and OB, i. e.

$$V'_x = \frac{\xi_0}{\overline{T}_x}$$

$$V'_y = \frac{\eta_0}{\overline{T}_y}$$

When V and Φ are known, the true components V_x and V_y along OA and OB may be found from the equations :

$$V_x = V \cos \Phi$$

$$V_y = V \sin \Phi$$

Fig : 2 shows a graphical construction which simplifies the determination of V_x and V_y when V'_x and V'_y are known. Lengths Oa and Ob proportional to V'_x and V'_y are marked off along two lines ar right angles. A perpendicular is drawn from O to *ab*.

This perpendicular represents the drift velocity in magnitude and direction, and its components V_x and V_y can immediately be read off.

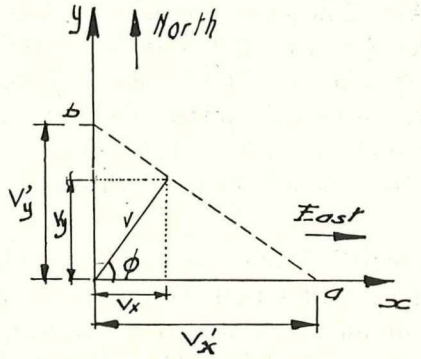

FIG. 2

(*b*) *Receivers in any position.* — Let Ox and Oy be EW and NS lines, and let the receivers O, A, B be in any position (Fig. 3). The angle AOB is not necessarily a right angle. The apparent components V'_A and V'_B along OA and OB are calculated as before,

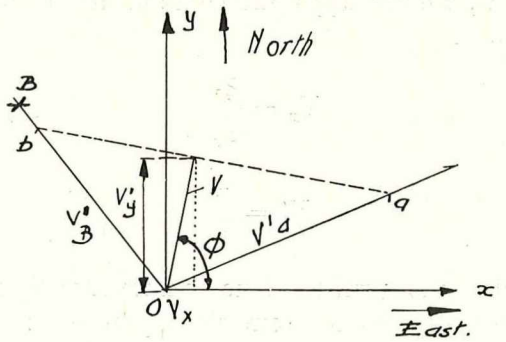

FIG. 3

by dividing the receiver separations by the mean time displacements. Lengths Oa and Ob, proportional to V'_A and V'_B are marked off along OA and OB. Then a perpendicular from O to ab represents the drift velocity in magnitude and direction (7). Its components V_x and V_y along Ox and Oy can immediately be read off.

The diagram is drawn for the case where the velocity components are all positive ; it is of course equally applicable in the general case, with suitable extensions of the axes.

§ 4. — Final Presentation of Results

It was agreed at the Xth General Assembly of U.R.S.I. that the directions of ionospheric drift velocities should be given as the direction *towards which* the motion takes place. (This is the opposite to the convention used by meteorologists for wind directions). This convention is implied in the discussion already given, where the drift velocity was represented by a vector V, Φ, the direction of the vector indicating the direction of the motion. In accordance with this convention it seems logical to regard the EW component V_x as positive when it is directed towards the East, and the NS component as positive when it is directed towards the North. This is the usual sign convention for rectangular axes Ox, Oy (Figs. 1, 2, 4). It is suggested, therefore, that the results should be presented as a table of values of the two components, the sign attached to each component indicating the sense of the movement in accordance with the above convention. The figures finally quoted should give the horizontal velocity of the ionospheric irregularities. This is half the velocity of the diffraction pattern over the ground for the reflection method, with which we are mainly concerned here (3). (In the radio star scintillation method the velocity of the irregularities is *equal* to that of the diffraction pattern, apart from a correction due to the rotation of the earth (14). The velocities should be in metres/sec, and may be given at hourly or half-hourly intervals, as appropriate to the nature of the observations. A typical table of results for one day's observations might appear as shown in Fig. 4. Use

L.M.T	01	02	03	04	05	06	07	T.M.A.
Heigt	300 F	300 F	350 F	C	300 F	120 E	40 E	Hauteur
NS	N 1	+100	+70	C	-20	0	-20	NS
EW	N 1	-100	-100	C	-100	-50	-60	EW

Fig. 4

24-10-1953. — 2.4 Mc/s

may be made of the standard symbols already employed in the publication of critical frequency and other ionospheric data. The most useful of these symbols for the present purpose are the following :

( ) Doubtful value.

B Not measurable because of high absorption.

C Equipment or power failure.

F Spread echo.

K Ionospheric disturbance in progress.

N Nature of record makes it unsuitable for analysis, or makes the results doubtful.

For drift measurements this may be subdivided as follows :

N 1 Fading too slow to give results.

N 2 Fading slow with occasional bursts of rapid fading. The value given is deduced from the rapid fading.

N 3 Fast fading, but individual time shifts erratic in sign, indicating no mean drift.

N 4 Mean time shifts too variable within each half hour.

N 5 F Reflection ; may be influenced by Sporadic E, present on the same frequency.

N 6 Two echoes within the strobe.

The velocity components $\frac{1}{2}V_x$, $\frac{1}{2}V_y$, have in general been found more useful for later calculations than the values of $\frac{1}{2}V$ and Φ. It is convenient to give the times as *local times* at the place of observation, since most of the systematic variations are likely to be a function of local time rather than G.M.T.

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Observations at Cambridge of Ionospheric Drifts at Points Separated 7.5 km

by B. H. Briggs, Cavendish Laboratory, Cambridge

The primary object of these experiments was to see whether the horizontal drift velocities as determined by the pulse fading method were the same at two points in the ionosphere separated horizontally by 7.5 km.

It was not practicable to set up a complete three receiver recording arrangement at a distant site. Instead a distant transmitter was set up at a point 15 km West of Cambridge, and the echoes from it were recorded with receivers at Cambridge. The results were compared with those obtained from the local transmitter at Cambridge, which operated on the same frequency. The echoes from the distant transmitter would be reflected at a point in the ionosphere distant 7.5 km away from the reflection point for the local transmitter. The heights of reflection would be very nearly the same for the two transmitters.

The receiving apparatus consisted of three spaced aerials (a pair EW and a pair NS) and four separate receivers. The receivers operated two Phillips automatic delay-recorders. In this type of recorder, the time delays between corresponding maxima of signal at the spaced aerials are recorded as ballistic deflections of a pen recorder. From the record the magnitude of the time delays can be obtained from the lengths of the ballistic deflections, and the fading speed en be determined by counting the number of deflections per minute.

Owing to the fact that only four receivers were available it was not possible to record both the NS and EW components for both the local and the distant transmitters simultaneously. (This would have required six receivers and four delay-recorders). Instead the NS and EW components were recorded alternately for 1/4 hour periods. Thus one pair of receivers was adjusted to receive only the local transmitter, and was switched alternately to the NS and EW aerials. The other pair received only the distant transmitter, and was similarly switched alternately to the NS and EW aerials. The two transmitters were arranged to transmit their pulses at different times so that the corresponding echoes could be selected by suitable adjustments of the strobes in the receivers.

Observations were made at intervals between December 1952 and February 1953, during a total of 157 hours. A frequency of 4 Mc/s was used and the observations were confined to the F Region.

It was unfortunate that the particular period during which the observations were made was characterised by particularly slow fading. For this reason, the time-delay measuring apparatus did not operate well, and there were few occasions when a consistent drift was recorded. On the occasions when such drifts were recorded, they were found to be similar in magnitude and direction for the two transmitters. This suggests that the drift velocity is the same at two points separated by 7 km ½. More results are needed to confirm this point, and the experiments are being continued.

More definite evidence on a different, though related, question was obtained from these experiments when the records were compared with others of a different type made during the same period. The other records showed the amplitudes of the echoes from the distant transmitter and the loacl transmitter recorded on one receiving aerial, and the phase heights of reflection for the distant transmitter and the local transmitter. The latter type of record often showed travelling disturbances, in which there was a temporary increase of phase height, observed first on one transmitter and later on the other transmitter. It was found that these disturbances were accompanied by two other phenomena :

(I) Increases of amplitude, presumably due to « focussing ».

(II) An increase of fading speed, presumably due to a diffraction pattern produced on the ground which contained irregularities much smaller in size than the main disturbances in the ionosphere. The movement over the ground of this fine scale amplitude pattern would account for the rapid fading.

On the Phillips automatic delay-records, the passage of a disturbance of this type was observed as a sudden increase of fading rate. The time of onset of the rapid fading was different for the local transmitter and for the distant transmitter, and from this time difference an apparent EW component of drift velocity could be determined. Moreover, the time delays at the three closely spaced aerials could also be determined since the increased fading rate during a disturbance enabled the time-delay recorder to operate satisfactorily. The velocity deduced in the usual way from these time delays gave the velocity of the fine scale diffraction pattern associated with the disturbance.

It will be seen that there were four independent methods for determining the velocity of the disturbances, viz :

1. The time displacements of the variations of phase height for the distant transmitter and the local transmitter.
2. The time displacement of the amplitude bursts.
3. The time displacements of the onset of rapid fading, as determined from the Phillips records.
4. The velocity of the fine scale diffraction pattern as determined in the usual way from the Phillips records.

In all cases it was found that these methods gave the same value for the apparent EW component of velocity, within the experimental error. In all the cases recorded the direction of movement was to wards the East.

Meeting of the Canadian National Commission III

At a meeting, held in Ottawa, December 21, 1955, Canadian Commission III reviewed proposals for ionospheric projects which would form part of the activities for I.G.Y. The following program was approved.

1. — Data Centre

The Radio Physics Laboratory, Ottawa, has assumed responsibility for the collection of ionospheric data, for the organization of its analysis, and for its onward transmission to Regional Centres.

2. — Vertical Incidence Recorders

New vertical incidence portable recorders will be established at Meanook, Victoria, Yellowknife and Alert. These will be of a new design with 1 kW peak power. If they prove satisfactory, they may be operated also at Mould Bay, Isachsen, Clyde River and Frobisher Bay.

3. — Oblique Incidence Recorders

In addition to the existing program a new receiver will be established at Alert. The present program includes transmitters and receivers at Winnipeg and Resolute Bay and receivers at Churchill and Baker Lake.

4. — Tides

Measurements of E layer tides will be made at Churchill as well as at Ottawa.

5. — Absorption

The program of pulse echo absorption measurements includes operation at Ottawa, Resolute Bay, Baker Lake, in addition to the present measurements at Churchill and Winnipeg.

6. — Cosmic Noise

Measurements will be made at Churchill and Ottawa on 27 and 50 Mc/s. I.G.Y. interest is in the disturbed ionosphere, particularly the observation of cosmic noise sources through visible auroral displays.

7. — Solar Noise

Measurements will be made at Ottawa on 50 and 500 Mc/s. It is intended that R.P.L. become one of the contributing solar observatories for I.G.Y. R.P.L. interest is in the correlation of solar events and ionospheric events within the auroral zone.

8. — Assistance to Auroral and Magnetic Program

R.P.L. will assist in the operation of auroral and magnetic equipment at Eskimo Point, Gillam, The Pas, and Churchill. The auroral and magnetic programs are under the direction of the National Research Council, University of Saskatchewan, and the Dominion Observatory.

9. — Scatter (Back and Forward)

Transmitters will be installed at Yellowknife on 35 and 50 Mc/s, and receivers at Baker Lake, Churchill, The Pas, Saskatoon and Sulphur Mountain.

10. — Whistlers

Audio frequency atmospherics will be investigated at Ottawa and at another station (probably Churchill) in relation to the upper atmosphere and auroral zone phenomena.

11. — Data Handling Centre

A modest data handling centre will be established at R.P.L. Much of the benefit to be derived from participation in the I.G.Y. is contingent upon adequate facilities for the analysis and correlation of the results obtained. It is anticipated that several such centres will be established in Canada during I.G.Y. and it is hoped that exchange of data (say, in the form of punched cards) will be possible.

World Days

Copy of the Calendar of World Days Appended to *Information Bulletin* n° 90 are available at the General Secretariat of U.R.S.I.

URSIGRAMS

Codes

New Codes will be published during the year. This publication will be printed separately.

The first part will deal with the various codes used for coding messages which, until now, were named « Ursigrams ».

The second part will only give new codes to be used during the International Geophysical Year, for the transmission of Abbreviated Ursigrams or « Interchange Ursigrams ». Such messages will be used principally to interchange informations for the determination of World Days, Alerts and World Intervals. The drafting of such abbreviated Ursigrams was decided during a meeting of the Ursigram Committee held in September 1955 in Bagneux (France).

The proceedings of this meeting was published in *Information Bulletin* n° 94.

Members of National Committees wishing to obtain codes are requested to apply to their National Committee.

Indicators

Indicators used since 1-7-1954 (from 1-7-1952 for CHROM and CORON)

	CHROM	CORON	CORAY	ESFRE	FODEU	MAGNE	PERTU	SOLER
01 = Arcetri	+							
02 = Cambridge	+							
03 = Canberra	+							
04 = Greenwich	+							
05 = Huancayo	+							
06 = Kharkov	+							
07 = Kodaïkanal	+							
08 = McMath	+							
09 = Mount Wilson	+							
10 = Meudon	+							
11 = Ondrejov	+							
12 = Edinburg	+							
13 = Tachkent	+							
14								
15 = Zürich	+							
16 = Kanzelhöhe	+	+						
17 = Schauinsland	+	+						
18 = Wendelstein	+	+						
19 = Stockholm	+							
20 = Tokio	+							
21 = Tortosa	+							
22 = Capri (st. Suéd.)	+							
23 = Cheltenham						+		
24 = Wingst						+		
25 = Fort Belvoir						+	+	
26 = Kakioka						+		
27								
28 = Chambon la Forêt						+		
29 = Tamanrasset						+		
30 = Arosa		+						
31 = U. S. Naval	+							
32 = Sacramento Peak	+	+						+
33 = Boulder	+							+
34 = Climax	+	+						
35 = Norikura		+						
36 = Pic du Midi		+						
37								
38								
39								
40								

	CHROM	CORON	CORAY	ESFRE	FODEU	MAGNE	PERTU	SOLER
41 = Meudon 555 Mc/s								+
42 = Meudon 255 Mc/s								+
43 = Meudon 200 Mc/s								+
44 = Meudon 3000 Mc/s								+
45 = Marcoussis 158 Mc/s								+
46 = NERA Mc/s				+	+		+	+
47 = NERA 200 Mc/s								+
48 = NERA 545 Mc/s								+
49 = NERA 3000 Mc/s								+
50 = NERA 9100 Mc/s								+
51 = Mitaka 200 Mc/s								+
52 = Mitaka 100 Mc/s								+
53 = Mitaka 60 Mc/s								+
54 = Mitaka								+
55 = Mitaka								+
56								
57								
58								
59								
60								
61 = Amsterdam (Lab. Phys.)			+					
62 = Fribourg/Brisgau			+					
63 = Heidelberg			+					
64								
65 = Predigtstuhl			+					
66								
67								
68 = Wallgau			+					
69 = Weissenau			+					
70 = Zugspitze			+					
71 = Lindau				+	+		+	
72 = Darmstadt							+	
73 = Neuershausen							+	
74 = Casablanca				+	+		+	
75 = Bagneux							+	
76 = Kerguelen							+	
77 = Poitiers							+	
78 = Anchorage							+	
79 = Washington							+	
80								
81 = Leidsendam				+	+		+	
82 = Terre Adélie				+	+		+	

Indicators used from 1-7-1952 to 30-6-1954

CORAY

01 = Amsterdam
02 = Fribourg/Brisgau
04 = Pic du Midi
05 = Predigtstuhl
08 = Wallgau
09 = Weissenau
10 = Zugspitze
11 = Heidelberg

PERTU

01 = Bagneux
02 = Casablanca
04 = Darmstadt
05 = Hambourg
07 = Lindau
09 = NERA
12 = Poitiers
14 = Schauinsland
17 = Wendelstein

MAGNE

11 = Wingst
18 = Chambon la Forêt
23 = Darmstadt
26 = Kakioka
31 = Tamanrasset

SOLER

01 =	Meudon	555 Mc/s
02 =	Meudon	255 Mc/s
05 =	Marcoussis	158 Mc/s
06 =	NERA	140 Mc/s
07 =	NERA	200 Mc/s

SOLER du JAPON

01 =	Mitaka	200 Mc/s
02 =	Mitaka	100 Mc/s
03 =	Mitaka	60 Mc/s

Meeting of the Ursigram Committee

(*Inf. Bull.*, **94**, 46-59)

Erratum

P. 54, lines 12-14. To be read as follows :

(13) The Centres should prepare, or in any case, assist organizations preparing the weekly mail data summaries. These should include data on the day of mailing.

P. 56, line 19, read :

Telegrams : FTZ Darmstadt (Telex 0.412.911).

IONOSPHERIC STATIONS

List of Ionospherics Stations

In order to help ionosphere research, particularly during the International Geophysical Year, according to a decision taken in 1954 under the proposal of the Mixed Commission on the Ionosphere supported by the U.R.S.I.-A.G.I. Commission, we started the drafting of a comprehensive list of ionospheric stations operating now or planned for the A.G.I.

The work will be established in two parts, the first will be a list with technical particulars, of vertical incidence sounding stations. The second part will be a list of stations carrying out measurement and observation of phenomena effecting ionospheric radio wave propagation, e. i. drifts, tides, absorption, atmospheric noise, etc... This latter part will include only general information e. i. location research and observation, publication of results, etc...

Those whose cooperation is asked for this work are kindly requested to give it as quickly as possible.

New Stations

ARGENTINA

The ionospheric station « Buenos Aires » started its observations on January 1, 1956. All letters to this station should be addressed to Jefe de la Estación Ionosferica « Buenos Aires » Avda Libertatore Gral. San Martin nº 327, Vicente López (F.N.G.B.M.), Republica Argentina.

GERMANY

We are informed by the German National Committee that an additional station has been definitively planned at Tsumeb (South-West Africa), near 19º S and 17º E. The equipment of that

station will be similar to that used at Lindau. Most probably further information will be available next July.

SWEDEN

The Board of Swedish Telecommunications has ordered an ionospheric recorder N. P. L. Pattern Mark II, to be delivered in January or February 1957. The new apparatus will replace the old recorder at Luleå and will be installed in good time before the beginning of the International Geophysical Year.

INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS

Resolutions

passed by the Seventh General Assembly of I. C. S. U.
Oslo, August 9-12, 1955

1. — Admission of the International Union of Scientific Psychology to I.C.S.U.

Resolved.

That consideration of the admission of the International Union of Scientific Psychology to I.C.S.U. be deferred and that the International Union of Biological Sciences be invited to convene a committee of representatives of the International Unions of
Biological Sciences,
Physiological Sciences,
Mathematics,
Pure and Applied Physics,
to prepare a report for the next meeting of the Executive Board on the place which Scientific Psychology might occupy in the framework of the I.C.S.U. organisation.

2. — National Membership of I.C.S.U.

The General Assembly :
decides that the Bureau be asked to invite all countries which adhere to one or more unions of I.C.S.U. to apply for membership of I.C.S.U.

3. — Possible Reorganisation of I.C.S.U.

The General Assembly :
decides to defer all projects for the reorganisation of I.C.S.U. for the time being but invites the Bureau to consider closely from time to time any possible changes in the structure and functions of I.C.S.U. which would lead to more efficient working.

4. — Annual Dues of National Members

The General Assembly :

decide that the annual dues of National Members to I.C.S.U. for the years 1956-57 and 1957-58 shall be determined according to the following scheme :

Category	Unit Subscription U.S. Dollars
I	20
II	40
III	80
IV	150
V	300
VI	600

Each National Member selects its own category and the amount of the dues of each National Member shall be determined by multiplying the amount of the unit in the chosen category by the number of unions to which the National Member adheres, but there shall be a minimum subscription of 100 U.S. dollars.

The General Assembly :

decides that the Bureau be asked to consider the provisional allocation of National Members to categories, and to submit its suggestions to the respective National Members for their consideration.

5. — Annual dues of Scientific Members

The General Assembly :

decides that authority be given to the Executive Board at its next meeting to determine the rate of the annual dues of the Scientific Members and to determine the date on which any new rate of such annual dues is introduced.

6. — Defaulting Countries

The General Assembly :

decides that these countries which have defaulted in their payment of annual subscriptions (Argentine, Bulgaria, Cuba, Hungary and Roumania) be considered by the General Assembly as having resigned from I.C.S.U.

7. — Scientific Representation at the Ninth General Conference of U.N.E.S.C.O.

The General Assembly :

decides that the Bureau be instructed to send to the ninth General Conference of U.N.E.S.C.O. which will take place in New Delhi in 1956 an I.C.S.U. observer who is independent of any national delegation and who is thoroughly acquainted with I.C.S.U.'s activities and with U.N.E.S.C.O. General Conference procedure.

— that each National Member be asked to approach the U.N.E.S.C.O. National Commission on its own country, so as to inform the Commission of the Work of I.C.S.U. and to urge the Commission to recommend to its Government the inclusion of at least one scientist on the national delegation to the ninth General Conference of U.N.E.S.C.O.

8. — Proposed Symposium on the Organisation of International Science

The General Assembly :

decides that the bureau be requested to consider the appointment of a special committee to plan a symposium on the organisation of international science to be held at the time of the VIII General Assembly in 1958, if after careful study, in consultation with U.N.E.S.C.O., such action is indicated.

9. — Biological Effects of Nuclear Radiations

The General Assembly of I.C.S.U. :

recognizing the rapidly increasing importance of nuclear energy processes in human affairs ;

recognizing that these processes have biological effects and other consequences ;

recognizing the duties of scientists to study and to evaluate these effects on living systems ;

recognizing the importance of preparing and of making generally available authoritative scientific statements on this subject ;

recognizing that valuable studies can be accelerated and rendered more effective by further international cooperation.

Resolves that the national and scientific members of I.C.S.U. be invited to undertake studies appropriate to their respective functions on the biological and other effects of nuclear radiations as a basis for the scientific assessment of their implications with respect to living systems : and, further, being advised that the United Nations is about to consider calling for active moves for the clarification of issues connected with the biological effects of nuclear radiations.

Also resolves :

1) that I.C.S.U. offers to the United Nations, through U.N.E.S.C.O., its services in connection with the scientific aspects of such matters.

2) that the Bureau be instructed to establish a special Committe to delineate the problems to be explored and to coordinate and to integrate the information resulting from the studies undertaken.

10. — Regime of the High Seas : The Continental Shelf

The International Council of Scientific Unions, met in General Assembly at Oslo, August 9-12, 1955,

Resolves to ask the Director General U.N.E.S.C.O. to transmit to the Secretary General of the United Nations its request : namely,

that the International Law Commission consider the incorporation, in the « Comments on the Draft Articles » contained in the Report which the Commission will submi- to the United Nations for 1956, of the form and meaning of the Resolution of the I.C.S.U. already transmitted to the Secretary General of the United Nations (together with the supporting resolutions of the International Union of Biological Sciences) ;

and resolves further :

that the adhering organizations in the countries represented on the International Law Commission : namely Brazil, Mexico, Netherlands, U.S.A., U.S.S.R., U.K., India, Sweden, France, Greece be instructed to impress upon their representative on the Commission the urgency of framing and incorporating such a comment in the 1956 Report.

INTERNATIONAL RADIO CONSULTATIVE COMMITTEE (C.C.I.R.)

Assistance to the VIIIth Plenary Session

Letter to National Committees

November 30, 1955.

Dear Mr. President,

At the invitation of the Administration of the People's Republic of Poland, the VIIIth Plenary Assembly of the International Radio Consultative Committee (C.C.I.R.) will be held in Warsaw, in the Palace of Culture and Science, from 9th August to 13th September 1956. The provisional draft time-table is as follows :

Tuesday, 7th August	09.30-12.00 14.00-18.00	Registration.
Wednesday, 8th August	09.30-12.00 14.00-18.00	Registration (continued).
	10.00	Meeting of Heads of delegations.
	15.00	Meeting of Chairmen of Study Groups.
Thursday, 9th August	11.00	Formal opening of the VIIIth Plenary Assembly.
	15.00	First Plenary Session.
Friday, 10th August to Friday, 31st August		Study Group Meetings (and Plenary sessions, if required).
Monday, 3rd September to Thursday, 13th Septem.		Plenary Sessions.

The C.C.I.R. has invited U.R.S.I. to attend this meeting as consultant. As previously U.R.S.I. will be represented by a delegation under the chairmanships of Dr. Dellinger. Members of National Committees attending the Plenary Assembly are invited to join the delegation.

In order to inform C.C.I.R. and the Head of our delegation I should very much appreciate to be informed *before February* 1st, 1956, of the names of the members of your National Committee attending the Plenary Assembly and wishing to join the U.R.S.I. delegation.

Yours sincerely,

The Secretary General,
(sgd) HERBAYS

Documents received at the General Secretariat

On Study Programme n° 52 (IV) from the Federal Republic of Germany. Variation in time of the ground wave field.

On Study Programme n° 53 (IV) from the United Kingdom. Ground wave propagation over mixed paths. Review of recent progress.

On Study Programme n° 54 (IV) from the Cie Générale de TSF. The various theories on the propagation of ultra-short waves beyond the horizon.

Résumé of the work accomplished by Study Group n° *IV* (on Ground Propagation).

Summary of U.S.A. work on Study Program 67 (Pulsation Transmission Tests at oblique incidence).

U. S. A. Report on Automatic Measurement of Atmospheric Radio Noise (Re-Recommendation 119).

U. S. A. Report on Measurement of Atmospheric Radio Noise (Re Study Program 65).

Deviations and adjustments of station (Data sent to all participants in the work of C.C.I.R. Study Group VII, in accordance with C.C.I.R. Recommendations n° 122 (Standard Frequency Transmissions and Time Signals).

— British station M.S.F. Rugby (July-September 1954. January March 1955, April-June, 1955).

— Stations WWV Washington D. C., and WWVH, Maui T.H. of the National Bureau of Standards (April-June 1955, July-September 1955).

— Station ZUO of the Union Observatory of Johannesburg (April-June 1955, July-September, 1955).

INTERNATIONAL GEOPHYSICAL YEAR

National Committee Reports to the 3rd Meeting of C. S. A. G. I. (II)

(See *Inf. Bull.*, **94**, 64-93)

CZECOSLOVAKIA

(*Translation*)

V. — Ionosphere

Programme of the Geophysic Institute of the Academy of Sciences :

(1) Recording every 30 minutes of the characteristics : *h*E1, E2, F1, F2 ; *fo*E, F1, F2 ; *f*Es, *fb*E, F1, F2.

(2) During ionospheric storms or other features, recording, if needed, several times every minute.

(3) Recording of the reflection coefficient of long waves from E layer, on various frequencies at stations located in the Polar zone.

(4) Recording of the strength and number of ionospheric disturbances on very long waves.

(5) Observations on 35-70 MHz wave propagation.

(6) Conditions permitting, whistlers observations.

(7) Distribution of ionospheric predictions.

HUNGARY

(*Translation*)

V. — Ionosphere

(*a*) Hourly measurements of echoes on 1-20 Mc/s, pulse power 10-15 kW, by the vertical incidence method.

Determination of E, F1, F2 layer vertical heights and of E, F1, F2, F3 critical frequencies.

(*b*) Beginning of planned oblique incidence measurements in co-operation with the Graz ionospheric station.

(*c*) Ionospheric echo measurements during every 15 minutes the World Days.

Observing Station : Budapest-Meteorological Observatory : $\varphi = 47°26'$ N, $\lambda = 19°11'$ E, H = 139 m.

ICELAND

V. — Ionosphere

Ionospheric observations will be made at the Ionospheric Station at Reykjavik, which has already been in operation for several years. Its geographic location is 64°08′ N, 21°47′ W. The observations are vertical incidence (P′, *f*) recordings with Model C2 recorder, 18 sec sweep, 1-25 Mc/sec. Sounding every 15 minutes.

INDIA

I. — World Days

Observations will be made, and in some cases intensified, during World Days and special world intervals.

Kodaikanal will receive notices of « Alerts » and of S.W.I. and will transmit them by adding in plain language at the end of the URSIGRAMS broadcast by the A.I.M.B.C., New Delhi. Kodaikanal will also issue its own « Alerts ». The participating organizations will also be informed by land-line telegrams.

V. — Ionosphere

A. — Vertical Incidence Ionospheric Observations

Vertical incidence ionospheric observations will be made at the following eight stations, namely : Delhi, Bombay, Madras, Tiruchirapally and Trivandrum (All India Radio), Haringhata (Calcutta) (Institute of Radiophysics and Electronics), Ahmedabad (Physical Research Laboratory), and Kodaikanal (India Meteorological Department). Of these seven are already operating. The station at Trivandrum will be set up by the All India Radio, under the sponsorship of the Council of Scientific and Industrial Research. Although round-the-clock observations are not being made at present at all these stations, it is expected that all the eight stations will make 24-hour observations during the I.G.Y.

Publications. — Detailed Ionospherie data of Delhi, Bombay, Madras, Tiruchirapally, Haringhata and Ahmedabad are now published in a co-ordinated bulletin (R.R.C-A) of the Radio Research Committee. Data of the remaining two stations will also be included in this bulletin in due time.

B. — Ionospheric Drift Measurements

Ionospheric drift measurements are at present being made at Ahmedabad (Physical Research Lab.) and Waltair (Anhdra University) and will be continued during the International Geophysical Year. Three additional stations are planned for the International Geophysical Year, namely : Haringhata (Calcutta) (Institute of Radiophysics and Electronics), Banaras (Banaras University) and Delhi (Delhi University).

The spaced-receiver pulse technique will be used in all the stations, and both E and F region drifts will be studied.

C. — Atmospheric and Terrestrial Noise Studies

The sferic stations of the India Meteorological Department at Delhi and Calcutta will detect storms, using Lugeon Narrow-Sector equipment at 27 kc/s, and will also study the sudden enhancement of atmospherics at this frequency. Waveform study will be made at Banaras and Poona by the respective Universities.

D. — Absorption Measurements

Absorption measurements are planned at five stations, namely : Delhi (A.I.R. and N.P.L.) : Ahmedabad (Physical Research Lab.), Haringhata (Calcutta) (Institute of Radiophysics and Electronics), Waltair (Andhra University), Madras (Madras Institute of Technology).

Observations are already being taken at Delhi (A.I.R.), Ahmedabad and Waltair. At Delhi and Waltair, measurements are made by the pulse technique, while at Ahmedabad, the extra-terrestrial method is being used. Waltair is supplementing the pulse observations by CW method.

Ionospheric absorption measurements by the extraterrestrial method are planned at Delhi (National Physical Laboratory) and Madras, which will also use the pulse technique.

VI. — Solar Activity

A. — Programme at Kodaikanal

VIII. — Latitudes and Longitudes

The Survey of India is interested in accurate time in connection with longitude determination and in reception of wireless signals for longitude and pendulum observations in the field. They are equipped to receive long and short wave rhythmic time signals by the semi-automatic extinction method and are taking action to acquire an up-to-date automatic registering equipment.

ITALY

According to the suggestions of C.S.A.G.I. hitherto outlined, the Italian Committee, with the aid of existing scientific institutions and facilities, has prepared the following program, which in the near future may be specified in greater detail and eventually expansed in some Working Group.

I. — World Days

The Italian Committee, in order to receive and promulgate notices of Alerts and S.W.I. rapidly, is trying to obtain from the Italian Government the supply of a telegraphic network or of

preferential telephonic messages to the main Institutions and Geophysical Observatories which actually are not supplied.

V. — Ionosphere

In accordance with the resolution 8.1.5. of the C.S.A.G.I. meeting at Rome (cf. *C.S.A.G.I. Bulletin d'Information*, n° 4 and *U.R.S.I. Inf. Bull.*, **89**, 26) the « Istituto Nazionale di Geofisica » has constructed a vertical incidence sounding station at S. Alessio (Roma 41°.9 N ; 12°.5 E).

The most important characteristics of the sounding apparatus used in this station are the following :

1) Frequency sweep : 1-20 Mc/s, 40 sec.
2) Pulse length 100 μsec.
3) Pulse rate 50 per sec.
4) 10 kW peak power.
5) Normal recording every hour, with the possibility of recording every five minutes.

The station is equipped with two similar sounding apparatus which ensures the continuity of the service.

Equipment for a noise level measurement station using the Thomas method will be established by the Istituto Nazionale di Geofisica in the Ionospheric Observatory of S. Alessio (Roma) which will be in operation at least for the period of the International Geophysical Year.

In accordance with paragraph V 3.1 of the *C.S.A.G.I. Bulletin d'Information* n° 4, (*U.R.S.I., Inf. Bull*, **89**) efforts will be made for the establishment of a station for vertical incidence ionospheric absorption measurements using the pulse reflection method in middle Italy with the standards recommended by C.S.A.G.I.

Another temporary station for ionospheric absorption measurements, using the continuous wave method, will be operated near Rome.

The Centro Italo Swedese di Elettrofisica in Bologna has planned the recording of atmospheric waveforms with two recording radio-direction finders.

VI. — Solar Activity

The following program will be performed by the Astrophysical Observatory of Arcetri (Florence).

The equipment available for solar researches consists of :

(*c*) Radiotelescope on the frequency of 200 Mc/s employing a set of 4 helical antennae equatorially mounted for continuous observation of the solar flux. This instrument is at present under test and will enter operation at the end of 1955.

The routine work performed is as follows :

5° Measurements of the mean flux level and its variability at the frequency of 200 Mc/s.

During the R.W.D. the program will be intensified and the sun will be kept under observation for the whole day.

Before the beginning of the International Geophysical Year a new radiotelescope operating on the frequency of 10 000 Mc/s will be ready, and probably an interferometer for the localisation of the active regions on the sun surface will be completed.

The program sketched may be expanded in the next years ; it is hoped to be able to study the scintillation of radio stars and to start soon measurements of S.E.A. on a frequency of 27 Mc/s with an apparatus which is now under development.

VIII. — Longitude and Latitude

This activity will be organized by the Commissione Geodetica Italiana through a special Sub-Commission.

The participation of two first-order stations (Milano and Torino) supplied with adequate transit instruments, recorders and quartz crystal clocks and in close conjunction with the standard time service of the Istituto Elettrotecnico Nazionale, Torino, will be assured.

JAPAN

A. — General Report

1. The Japanese National Committee for the International Geophysical Year has actually started the first year's work of its five year (1955-59) program for the International Geophysical Year.

All Japanese A.G.I. stations, now operating and under construction, are indicated in the attached list.

2. In reponse to the resolution of the Rome Meeting of the C.S.A.G.I. in 1954, Japan has decided to carry on upper atmosphere exploration by means of sounding rockets during the International Geophysical Year. The sounding rockets will be completed in Japan before the beginning of the International Geophysical Year. The expected maximum height of rocket flight is about 100 km, and approximately ten flights will be conducted during the A.G.I. period. The elements of observation will be pressure, temperature, solar spectrum, number density of electrons and others.

3. Japan is considering sending expedition parties to the Antarctica area during the International Geophysical Year. The party would carry on one year observation of meteorology, geomagnetism the ionosphere, cosmic-rays, aurorae, and earthquakes, and also would carry out geographical and geological expeditions.

4. Japan earnestly wishes to establish suitable networks of all kinds for A.G.I. geophysical observations along the 140° E meridian line by cooperating closely with her neighbouring countries.

B. — Individual Programs

I. — *World Days*

Regional Centre : Radio Research Laboratories, Ministry of Postal Services.

Location : Koganei-machi, Kita-tama-gun, Tokio.

Long. and Lat. : 139°29′ E, 35°42′ N.

Plan of interconnection between regional centres :

Transmitting power : Greater than 3 kW.

Antenna : Rhombic antennae.

Frequency : Undecided.

Plan of regional warning distribution :

(*a*) Facilities same as mentioned above except for an omnidirectional antenna.

(*b*) Facilities broadcasting the Japanese Standard Frequencies (J.J.Y.) :

Frequencies : 15, 8, 4, 2.5 Mc/s.

Transmitting Power : 2 kW on 8 and 4 Mc/s ;
1 kW on 15 and 2.5 Mc/s.

V. — Ionosphere

(*a*) *Every* 15 *minute observation*

Station	Latitude	Longitude	Status
Wakkanai	45°22′ N	141°41′ E	O
Akita	39°41′ N	140°06′ E	O
Kokubunji	35°42′ N	139°29′ E	O
Yamagawa	31°12′ N	130°37′ E	O

(*b*) *Special observation*

Station	Observations	Latitude	Longitude	Status
Kokubunji.....	Ionospheric wind	35°42′ N	E 139°29′	P
Kakioka.....	Ionospheric turbulence	36°14′ N	E 140°11′	P
Kyoto	Ionospheric pulsations	35°02′ N	E 135°47′	P

(*c*) *Atmospherics*

Station	Observations	Latitude	Longitude	Status
Toyokawa	Long wave atmospherics	34°50′ N	137°22′ E	O
Toyokawa	Whistler atmospherics	34°50′ N	137°22′ E	P

VI. — Solar Activity

(2) *Solar Radio Observation*

Observing Station	Latitude	Longitude	Frequency (Mc/s)	Type of Observation	Type of Aerials	Operation
Tokyo Astronomical Observatory, Mitaka, Tokyo	N 35°40′	E 139°33′	60	R : W	Twin Yagi	O
			60	I : W	3 Twin Yagis	P
			100	R : W	Twin Yagi	O
			100	I : W	3 Twin Yagis	P
			200	RP (1) : W	10 m dish	O
			200	I : N	3,4 × 10 arrays	P
			300-1000	SP : D	2 rhombics	P
			3000	R : W	2 m dish	O
			9000	RP : W	1.5 m dish	P
The Research Institute of Atmospherics, Toyokawa	N 34°50′	E 137°22′	1000	RP : W		P
			3750	R : W	2.5 m dish	O
			4000	IP (2) : N	1.5 m dishes	O
Hiraiso Radio Wave Observatory Radio Research Laboraries, Hiraiso	N 36°21′	E 140°38′	200	R : W	4 × 6 arrays	O
			600	R : W	(dish)	P

Abbreviations :

R : radiometer
I : interferometer
P : polarization
S : dynamic spectra
O : in regular operation
P : in preparation
(1) : 6 components of polarization
(2) : 8 element interferometer
W : Whole day observation (00-08 h U.T. regularly. To be extended in summer)
N : A few hours around local noon (03 h U.T. approx.)
D : disturbed days only.

Publications :

Mitaka :

Bulletin of the Solar Phenomena, Tokyo Astronomical Observatory University of Tokyo (data of the regular observation).

Toyokawa :

Publications of the Astronomical Society of Japan (detailed discussions).

Report of Ionosphere Research in Japan (idem).

Bulletin of the Research Institute of Almospherics, Nagoya University (both).

VIII. — Longitudes and Latitudes

(*a*) *Tokyo* : The Tokyo Astronomical Observatory.

Location : 9 h 18 m 10 s 100 E, 35°40′ 21″4 N.

Programme : Reception of radio time signals from Europe, N. and S. America, Hawaii, Australia and Asia, transmission of time signals from Tokyo on J.J.Y., J.J.C., and special time signals on commercial waves for Europe participation of the world wide experiment for precise comparison of time signals.

(*b*) *Mizusawa* : International Latitude Observatory at Mizusawa.

Location : 9 h 24 m 31 s 50 E, 39°08′03″.4 N (P.Z.T.).

Programme : time keeping with a couple of quartz crystal clocks ; reception of radio time signals as similar as those at Tokyo.

XI. — Rockets

Japan has started to construct sounding rockets for the purpose of exploration of the upper atmosphere during the International Geophysical Year. At the present stage, research and examinations of model missiles are still going on, but it is expected that sounding rockets with several pieces of geophysical equipment will fly up to about 100 km in height before the beginning of the International Geophysical Year.

Tentative schedule of rocket soundings in Japan is as follows :

Locality : North-East part of Japan.

Maximum height of flight : about 100 km.

Number of rocket flights : 10 during the A.G.I. period.

Elements of geophysical observations :

(*a*) pressure,

(*b*) temperature,

(*c*) solar spectrum,

(*d*) density number of electrons.

MOROCCO

(*Translation*)

Ionosphere

Observations planned for the I.G.Y.

Ionospheric soundings every hours, and every fiften minutes during world days (Equipments in operation at present at Casablanca [1]).

Recording of oblique incidence pulses between Freiburg and Casablanca (Equipments under test at present in Casablanca).

Field strength recording on decametre wavelengths conjointly with sudden fading observations (Equipment at present operating at Casablanca).

Investigation on echo polarization, and more particularly for echoes reflected by the lower ionosphere, has been planned. Part of the equipment is under construction and part is under study, due to the displacement of the station to Rabat it is doubful whether the equipment will be ready for the I.G.Y.

Statistical recording of atmospherics on 10 000 m wavelength (Equipment already in operation in Rabat).

Direction finding of atmospheric sources with a narrow sector direction finder (Equipment already in operation in Rabat).

Direction finding of atmospherics with cathode ray direction finder (Equipment already in operation at Casablanca).

Observation and recording of « Whistlers » on magnetic band (Equipment under test at Casablanca).

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[1] The ionospheric sounding station at Casablanca will be deplaced to Rabat in 1956, secondary activities of the station will be pursued at Rabat as soon as possible, taking in account man power possibilities.

NETHERLANDS

I. — World Days

The Netherlands receiving station NERA of the Netherlands P.T.T. will take care for the receiving and promulgating of notices of Alerts and Special World Days to the observatories in the Netherlands, Surinam and Netherlands New Guinea.

VI. — Solar Activity

The Netherlands receiving station NERA of the P.T.T. will cooperate in the solar-flare patrol, and in furnishing data for the Ursigrams. The « Stichting Zon- en Melkwegstraling » will try to make absolute measurements of the radio radiation of the sun on some accurately timed moments at the new observatory Dwingelo (52°49′ N, 6°24′ E) if possible on more than one frequency. These measurements might enable other observers to calibrate their results.

A survey of radio bursts of the sun on a frequency 400 Mc/s is planned. A paraboloid mirror (7.5 m diameter) with quick-run recording will be used.

NEW-ZEALAND

I. — World Days

It is intented that stations operated by New Zealand will follow the general scheme for intensified observation on World Days.

Detailed arrangements for the reception of notices of Alerts and Special World Days will be advised later.

IV. — Aurora and Airglow

The following auroral stations are proposed or already in operation :

Specifications : Ra : radar observations.

Station	Status	Specification	Coordinates
Invercargill	P	Ra	S 46°25′ E 168°19′

V. — Ionosphere

The following ionospheric stations are planned or already in operation for vertical incidence recording :

Equipment :

Pan : panoramic ionosonde (N.Z. pattern).

J-28 : automatic ionosonde (Australian type J-28).

h't : height-time recorder.

Station	Status	Equipment	Coordinates	
Rarotonga, Cook Is.	O	Pan	S 21°12′	W159°46′
Godley Head (Christchurch) New Zealand	O	Pan, *h't*	S 43°34′	E 172°48′
Campbell Island, New Zealand	O	J-28	S 52°32′	E 169°09′
McMurdo Sound, Antarctica	P	Pan, *h't*	S 78°	E 167°

It is proposed that a study of radio propagation through the auroral zone be made by means of a pulse transmitter at McMurdo Sound with receiving points at Campbell Island, Invercargill (S 46°25′, E 168°19′) and Wellington (S 41°15′, E 174°41′). It would be advantageous to have additional receiving points at Mawson and Adelie Land in Antarctica, and Macquarie Island and at Hobart (Tasmania).

It is further proposed that a receiving station be established near Invercargill, similar to the one already operating at Seagrove (S 37°05′, E 174°47′), for measuring the direction of arrival of radio waves propagated through the auroral zone.

It is intended that the ionosphere drift recordings being made at Wellington (S 41°14′ E 174°55′) should be continued.

Ionospheric data are at present included in « Solar, Magnetic and Ionospheric Data for (month » published monthly by the Geophysical Observatory, Christchurch, of the Departemnt of Scientific and Industrial Research.

SWEDEN

The Swedish National Committee for the Geophysical Year 1957-58 has received a Government grant to cover the expenses of the Swedish participation in the Geophysical Year. In addition to the maintenance of the permanent observatories already established in Sweden, the plans include the following special projects for the Geophysical Year :

(*d*) Ionospheric measurements and aurora photography in Sweden directed by : Mr. W. Stoffregen, Upsala Ionospheric Observatory, Uppsala 11, Sweden.

(*e*) Ionospheric and radioastronomical measurements in Sweden, directed by : Prof. O. Rydbeck, Chalmers University of Technology, Gothenburg, Sweden.

The details of the program are given in the following descriptions, which are arranged according to disciplines as in the C.S.A.G.I. Bulletins.

I. — World Days

Detailed plans for observations on World Days have not yet been considered, but it can be expected that the Swedish observing stations will increase their activities on World Days in accordance with international recommendations.

Solar eclipse expeditions are not planned. Meteor observations are being considered, but have not yet been decided upon, by Prof. O Rydbeck.

To transmit notices of Alerts and Special World Days a central is planned in Stockholm (address : Mr. S. Geijer, Royal Board of Telecommunications, Stockholm 16) to receive reports from Swedish observatories (Kiruna, Uppsala, Luleå, Stockholm, etc.)

From Stockholm reports can be sent by telex to Darmstadt in Germany, and from Darmstadt directly to the Bureau Ionospherique in Paris. In the opposite direction notices of Alerts and Special World Days from Darmstadt will be received by the central in Stockholm and distributed to the Swedish observatories.

V. — Ionosphere

Station	Country	Latitude	Longitude	Region or Belt
Kiruna	Sweden	67°50′	E 20°26′	NA
Luleå	Sweden	65°36′	E 22°07′	NA
Lycksele	Sweden	64°37′	E 18°40′	NA
Uppsala	Sweden	59°48′	E 17°35′	NB

XV. — Publication

Ionosphere. — Data from Kiruna, Luleå and Uppsala are published in « Ionospheric Data issued by the Central Radio Propagation Laboratory, Boulder, Colorado ».

Data from Kiruna can also be obtained from the Research Laboratory of Electronics, Chalmers University of Technology, Gothenburg. Data from Luleå can be obtained from the Royal Board of Telecommunications, Radio Department, Stockholm 16. Data from Uppsala and Lycksele can be obtained from the Research Institute of National Defence, Stockholm 80.

UNION OF SOUTH AFRICA

V. — Ionosphere

Interim Report of the Sub-Committee of the Ionosphere

General. — Ionospheric investigations are in progress in the Union of South Africa at Rhodes University, Grahamstown, the University of Natal, Durban and the Telecommunications Research Laboratory of the S.A.C.S.I.R. in Johannesburg.

Investigations into atmospheric noise and waveforms are in progress at the Bernard Price Institute of Geophysical Research of the University of the Witwatersrand, Johannesburg, at the University of Natal, Durban and at the Telecommunications Research Laboratory. The study of Whistlers may be undertaken at Rhodes University during the Geophysical Year.

Ionospheric Observations

Vertical Incidence Recording. — Existing stations : The existing vertical incidence ionosphere recorders operated by or on behalf of the Telecommunications Research Laboratory are expected to continue in operation throughout the period of the International Geophysical Year. Details of these stations are as follows :

(*a*) Location :

Johannesburg (26°10′ S, 28°5′ E), operated by T.R.L.

Cape Town (34°9′ S, 18°19′ E), operated by South African Post Office.

Nairobi (1° S, 37° E), operated by East African Meteorological Department.

(*b*) Recording characteristics :

Duration of sweep : approximately 7 seconds.

Frequency range : 1-15 Mc/s (the upper limit can be raised to 20 Mc/s when necessary).

Measurements are made every 20 minutes. The time used is 30° E.M.T.

Power output : of the order of 1 kilowatt.

(*c*) Scaling of the records.

The records from all three stations are at present scaled and published by the Telecommunications Research Laboratory. Arrangements can be made to operate these recorders at one minute intervals, should this be necessary, on World Days.

Additional Station

The C.S.A.G.I. recommendation regarding the desirability of a station in Angola or South-West Africa has been noted but no action is proposed in view of the possibility of an expedition to this region under the auspices of the Institut für Ionosphärenforschung of the Max Planck Gesellschaft zur Fördering der Wissenschaften e. V., Germany.

Ionospheric Absorption, Scattering and Drifts

Equipment is being developed in the Telecommunications Research Laboratory primarily for the investigation of the lower absorbing layers of the ionosphere by the observation of cross-modulation phenomena. This equipment will also be used for :

(*a*) the investigation of the same layers by the observation of partial reflections ;

(*b*) the measurement of ionospheric absorption by recording the field strength of an ionospheric echo ;

(*c*) back scatter observations (fixed frequencies) ;

(*d*) the observation of E layer h′ tidal variations ;

(*e*) the observation of ionospheric drifts by the three receiver method.

This work is, in the main, part of the normal programme of the Laboratory.

In view of the fact that certain items of the equipment will be common to two or more of these investigations full participation on World Days may not be possible.

Observation of the ionosphere by the study of the scintillation of radio stars may be undertaken at the University of Natal.

The vertical incidence ionosphere recording stations at Cape Town and Johannesburg will be available for the observation of the movement of large scale irregularities, particularly if the participation of a third recorder in South Africa can be arranged. The co-operation of Rhodes University in the operation of their vertical incidence recording equipment in Grahamstown is probable.

Atmospheric and terrestrial noise observations

Noise Levels. — The measurement of atmospheric and terrestrial noise levels in the 50 kc/s-25 Mc/s region near Johannesburg, will be undertaken by the Telecommunications Research Laboratory provided the necessary equipment is made available by the C.R.P.L.

The Laboratory can also arrange to record noise levels at a frequency of 27 kc/s or lower near Johannesburg.

Waveform of atmospherics. — Waveforms will be recorded photographically at Johannesburg and at Durban during specified short intervals on World Days.

As there is no sferics network in South Africa, crossed-coil aerials will be used to indicate the direction of origin of the atmospheric. It may then in some cases be possible to get definite correlations with simultaneous observations taken in other countries having radio-goniometers.

Whistling Atmospherics. — The Thayer School of Engineering, U.S.A. has proposed that simultaneous observations be taken at the U.S.A. airbase in Tripoli and at Grahamstown where arrangements are being made by the Physics Department of Rhodes University.

These places lie at opposite ends of a magnetic line of force. They are considered important because there are very few other pairs of place which both lie in accessible regions of the world.

As no whistling atmospherics have been detected at Johannesburg, which is probably too near the magnetic equator, observations cannot be made at the Bernard Price Institute as promised.

Report of Working Group N° VI. Solar activity

submitted to the Meeting of C. S. A. G. I.

(*Excerpl*)

1. — Introduction

The following report deals with geographical data which must be improved by National Committees for the International Geophysical Year. The material in this report has been obtained from the reports of the various national committees presented to the Brussels Meeting of C.S.A.G.I. and from supplementary reports by representatives of national committees. The working group N*b* VI (Solar Activity) will be greateful for corrections and further additions to this list.

B. — Solar Observatories (Radio Emission)

D = Dynamic Spectra I = Interferometer

Observing Station	Country	Latitude	Longitude	Frequency (Mc/s)
Cavendish Laboratory, Cambridge	Great Britain	+51°13′	E 0°06′	38, 81,5, 164 (ou 175), 500. I
Observatorio del Ebro, Apartado, 9, Tortosa	Spain	+40°49′	E 0°30′	255, 550
Observatoire de Meudon, Seine-et-Oise	France	+48°48′	E 2°15′	200, 545

Observing station	Country	Latitude	Longitude	Frequency (Mc/s)
Observatoire Radio-Astronomique de Nançais, Cher	France	—	—	169, 10 000. I
Radio Observing Station, Nederhorst den Berg	Netherlands	+52°14′	E 5°05′	200, 545, 3000, 10 000. I
Observatoire Royal, Station de Humain	Belgium	+50°12′	E 5°21′	169, 600, 900. I
Kootwijk	Netherlands	+52°09′	E 5°50′	3000, 9100
Observatorio Astrophysico di Arcetri, Firenze	Italy	43°45′+	E 6°15′	200
Dwingelo	Netherlands	+52°49′	E 6°24′	400, 1420
University Observatory Helsinki	Finland	+60°09′	E 25°0′	200
Institut pour la Recherche Scientifique en Afrique Centrale, Lwiro, Bukavu, Congo Belge	Belgium	— 2°16′	E 28°49′	169
Central Astronomical Observatory, U. S. S. R., Acad. Sc. Poulkovo	U. S. S. R.	59°46′+	E 30°15′	6000, 10 000
Research Institute of Terrestrial Magnetism, Murmansk	U. S. S. R.	+68°58′	E 33°05′	3000, 10 000
Astrophysical Observatory, Crimea	U. S. S. R.	+44°24′	E 34°00′	209, 600, 3000, 10 000
Research Institute of Terrestrial Magnetism Moscow	U. S. S. R.	+55°29′	E 37°19′	209, 600
Mt. Sta. State Astronomical Observatory, U. S. S. R., Acad. Sc., Kislovodsk	U. S. S. R.	+43°44′	E 42°30′	175, 3000

Observing Station	Country	Latitude	Longitude	Frequency (Mc/s)
Gorky	U. S. S. R.	+56°19′	E 44°00′	209, 3000, 10 000
Kodaikanal Observatory	India	+10°14′	E 77°30′	200
Research Institute of Terrestrial Magnetism, Irkutsk	U. S. S. R.	+52°28′	E 104°02′	10 000
Research Institute of Atmospherics, Nagoya University, Toyokawa	Japan	+34°50′	E 137°22′	1000, 3750, 4000. I
Tokyo Astronomical Observator, Mitaka, Tokyo	Japan	+35°40′	E 139°33′	60, 100, 200, 3000, 9000, D, I
Hollandia, New Guinea	Netherlands	— 2°05′	E 140°08′	200, 545
Hiraiso Radio Observatory, Radio Research Laboratory, Hiraiso	Japan	+36°21′	E 140°38′	200, 600
Commonwealth Scientific and Industrial Research Organization, Sydney	Australia	—33°51′	E 151°00′	62 up to 9400. I, D
Maui, Hawai	U. S. A.	+20°50′	W 156°30′	
Tahiti	France	—17°29′	W 149°29′	
Upper Air Research Observatory, Sunspot, New Mexico	U. S. A.	+32°43′	W 105°45′	D
Central Radio Propagation Laboratory, Boulder, Colorado	U. S. A.	+40°02′	W 105°18′	200
University of Michigan, Observatories Ann Arbor, Mich.	U. S. A.	+42°17′	W 83°46′	D
Naval Research Laboratory, Washington, D.C.	U. S. A.	+38°55′	W 77°04′	3000, 10 000, 35 300. D
Radio Astronomy Laboratory, Cornell University, Ithaca, New York	U. S. A.	42°27′+	W 76°31′	200. I

Observing Station	Country	Latitude	Longitude	Frequency (Mc/s)
National Research Council, Ottawa	Canada	+45°24′	W 75°45′	2800. I
Radio Propagation Laboratories, Defence Research Board, Ottawa	Canada	+45°20′	W 75°41′	50, 500
Paramaribo, Surinam	Netherlands	+ 5°08′	W. 55°03′	200, 545
Jodrell Bank Experimental Station, Macclesfield, Cheshire	Great Britain	+53°13′	W 2°18′	80

Report of Working Group on Longitudes and Latitudes

(*Translation*)

(*c*) Experiments on determination of radio signal propagation time

The Working Group on Longitudes and Latitudes was gratified to learn that the Rome recommendation on preliminary experiments undertaken by U.R.S.I. for the determination of time signal propagation time by means of duplex measurements, has been applied. It noted that considerable progress have already been attained both in experimental technique and in the number of worldwide observations it appreciates the work carried out by the laboratories which gave some attention to this matter.

The Working Group nevertheless, found necessary to gather a very great quantity of results before any reliable conclusion can be deduced at least on the statistical viewpoint.

The Working Group recognized the amount of work involved in such experiments and recommended to pursue them during the next year with the same periodicity if possible.

The Ionospheric Eclipse of October 23, 1957

by Simone Daro Gossner
U. S. Naval Observatory, Washington 25, D.C.

(*Document circulated at the C.S.A.G.I. Brussels Meeting*, 1955)

The solar eclipse of October 23, 1957, will present unusual geometric conditions owing to the fact that the axis of umbra will pass very near the surface of the earth without actually touching it.

At the surface there will be a total eclipse of brief duration in a small area off Bruce Coast (Weddel Sea) in Antarctica, because the cone of umbra will touch the earth even though its axis will not.

The nearest approach of the axis of umbra to the surface will be 33 km, and the eclipse will thus be central in the ionosphere.

If central lines are computed in the conventional manner (observer above the fundamental plane, i. e. $\xi > 0$), for heights of 100, 200, and 300 km, it is found that the ionospheric eclipse would be observable only from relatively inaccessible regions of Queen Maud Land and Coats Land. But because the axis of umbra does not intersect the earth at any time, a second intersection with each ionospheric layer will occur at every instant. Geometrically, this is the case of the observer located below the fundamental plane, i. e. $\xi < 0$, and the computation is similar to that of eclipse phenomena below the horizon.

The central lines generated by this second intersection were computed for heights of 100, 200, and 300 km, and it was found that, for vertical sounding, they will be observable in the general area of the Falkland Islands Dependency (Palmer Peninsula). The positions of the central lines at five-minute intervals were listed in *Bulletin d'Information du C.S.A.G.I.*, n° 4, 68 to 72, (*U.R.S.I., Inf. Bull.*, **90**, 23-36), and are again listed in Tables I*a*, I*b* and I*c*, together with the half-width of path and duration of totality. They are plotted in figure 1. The shaded area on the figure shows the region where the eclipse will be total at the surface. The sections of the central lines corresponding to $\xi > 0$ are located east of the curve marked « Middle at Sunrise », whereas those corresponding to $\xi < 0$ are located west of that curve.

At those times which the eclipse is total at the surface, the earth cuts off a portion of the cone of umbra, thereby reducting

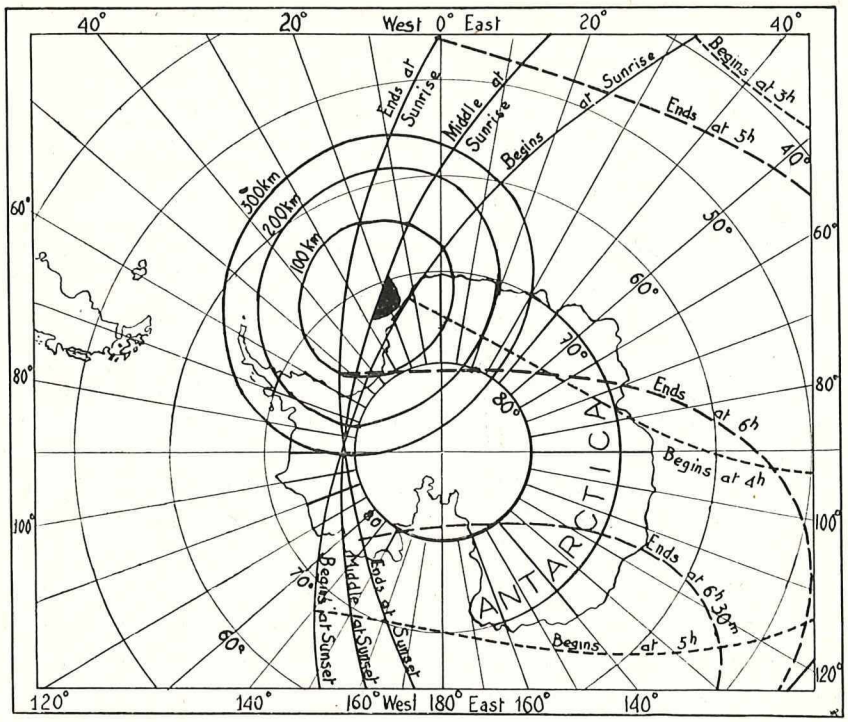

FIG. 1

the half-width of the path on the westernmost side of the central lines generated by the second intersection. These modified values of the half-width are given in a note at the bottom of Tables I*a*, I*b*, and I*c*.

The possibility of a deflection of the central lines owing to refraction was investigated. Since only the order of magnitude of the displacement was sought, the conditions of the International Standard Atmosphere were assumed. It was found that the maximum displacement would be of the order of 2 km.

For the purpose of interpreting ionospheric observations of the second intersections, it will be of value to know what parts of the atmosphere are intersected at every instant by the cone of umbra. Pertinent data at five-minute intervals are listed in Table II. They may be interpolated linearly for intermediate times. In using these values, it should be noted that the westernmost edge of the path corresponds to the side of the umbral cone nearest to the surface of the earth.

TABLE Ia. — *Central Line at 100 km*

U.T.	$\zeta > 0$				$\zeta < 0$			
	Latitude	Longitude	Half-Width	Duration	Latitude	Longitude	Hal-Width	Duration
4h38.0m	—64°12′	+ 7°49′	279 km	68s	—64°12′	+ 7°49′	279 km	68s
40	66 44	0 25	304	74	63 02	17 15	246	62
45	70 08	— 3 41	303	78	63 19	27 11	227	59
50	73 00	3 56	293	80	64 23	34 35	224 (1)	57
55	75 39	— 0 55	283	80	65 57	41 01	230 (2)	57
5 00	77 59	+ 7 07	278	79	68 07	46 51	244	58
05	79 22	24 22	278	75	71 18	51 44	266	60
5 08.5	—76 45	+49 09	284	68	—76 45	+49 09	284	68

(1) 217 km on western side.
(2) 209 km on western side.

TABLE Ib. — *Central Line at 200 km*

U.T.	$\zeta > 0$				$\zeta < 0$			
	Latitude	Longitude	Half-Width	Duration	Latitude	Longitude	Hal-Width	Duration
4h29.1m	—59°56′	+ 1°21′	177 km	68s	—59°56′	+ 1°21′	177 km	68s
30	61 35	— 4 45	191	73	58 51	8 07	162	63
35	65 15	12 54	203	71	58 18	20 01	142	57
40	68 06	16 50	202	85	58 44	27 57	134	54
45	70 47	19 12	198	87	59 33	34 45	131	52
50	73 24	20 23	194	88	60 39	41 00	131 (1)	51
55	76 02	20 10	190	88	62 01	46 57	133 (2)	51
5 00	78 42	17 39	186	87	63 43	52 47	137	51
05	81 22	—10 18	183	85	65 45	58 38	144	52
10	83 37	+ 9 30	182	82	68 32	64 35	154	55
15	83 19	50 52	181	76	72 43	70 45	167	60
5 17.5	—78 28	+71 51	178	67	—78 28	+71 51	178	67

(1) 127 km on western side.
(2) 121 km on western side.

TABLE Ic. — *Central Line at 300 km*

U.T.	$\zeta > 0$				$\zeta < 0$			
	Latitude	Longitude	Half-Width	Duration	Latitude	Longitude	Half-Width	Duration
4h22.6m	−56°52′	— 2°39′	140 km	68s	−56°52′	— 2°39′	140 km	68s
25	59 49	12 49	158	78	55 15	9 00	120	59
30	62 56	19 35	165	85	54 59	18 53	108	54
35	65 33	23 51	166	89	55 19	26 20	102	51
40	68 02	27 05	164	92	55 58	32 51	99	49
45	70 27	29 41	161	94	56 49	38 53	97	47
50	72 53	31 47	159	94	57 53	44 39	97 (1)	47
55	75 23	33 22	156	94	59 08	50 17	98 (2)	47
5 00	77 57	34 15	153	94	60 36	55 52	101	47
05	80 41	33 44	151	92	62 20	61 33	104	48
10	83 36	29 30	149	89	64 25	67 25	109	49
15	86 33	— 8 37	147	86	67 03	73 44	116	52
20	86 27	+68 26	145	80	70 46	81 01	126	56
5 24.0	−78 38	+90 12	140	67	−78 38	+90 12	140	67

(1) 94 km on western side.
(2) 89 km on western side.

TABLE II. — *Least Distance of Umbra to Earth's Surface*

U.T.	Least Distance of Axis	Radius of Umbra	Least Distance of nearest edge of Umbra
4h25m	259 km	38 km	221 km
30	187	38	149
35	129	38	91
40	84	38	46
45	53	38	15
50	36	38	—
55	34	37	—
5 00	46	37	9
05	73	37	36
10	113	37	76
15	168	37	131
20	236	37	199

Resolutions adopted by the Third Plenary Meeting of C. S. A. G. I.

Only General Resolutions and these concerned with U.R.S.I.'s activity are given.

General Resolutions

1. The C.S.A.G.I. expresses its appreciation to the Belgian Royal Academy for the quarters so graciously made available for the organisation of the Third Plenary Conference of the C.S.A.G.I.

The Committee asks Prof. Cox, Perpetual Secretary of the Belgian Royal Academy, to transmit these expression of appreciation to the Academic authorities and to accept for himself and his collaborators the deep gratitude of the C.S.A.G.I.

2. The C.S.A.G.I. expresses its appreciation to the Minister of Public Instruction for the generous assistance which permitted organization of a tour to the two beautiful cities of Ghent and Bruges.

3. The Special Committee for the International Geophysical Year of the International Council of Scientific Unions, having met in plenary session at Brussels, September 12, 1955, and having been informed that the Secretariat of U.N.E.S.C.O. proposes to make the International Geophysical Year the theme of the U.N.E.S.C.O. Traveling Exhibition for 1957,

conveys to the Director General of the U.N.E.S.C.O. its warm appreciation of this plan,

expresses the hope that the Executive Board of the U.N.E.S.C.O. at its 42nd Session in November 1955, will endorse the inclusion of the project in the Draft Program of the Department of Natural Sciences for 1957-1958 which will be submitted to the Ninth General Conference of the U.N.E.S.C.O. at New Delhi in 1956,

and offers such information concerning the technical program for the I.G.Y. as may be needed for carrying out the plan.

4. The C.S.A.G.I. declares that the operations of the International Geophysical Year will commence at 0 h. U.T. on July 1, 1957 and will continue for 18 months, terminating at 24 h. U.T. on December 31, 1958. A ten-day test interval, commencing 0 h. U.T. on June 20, 1957, will precede the beginning of the I.G.Y.

5. The C.S.A.G.I. suggests that National I.G.Y. Committees should consider the advisability of arranging discussions or regional conferences with neighboring countries to promote the more successful execution of the I.G.Y. program ; it requests information

concerning any such discussions or conferences that may be arranged, and concerning their results.

6. The C.S.A.G.I. recommends that the participating nations should incorporate the recommendations presented in the several reports and resolutions dealing with the various geophysical fields to be investigated during the I.G.Y., within their respective national programs, so far as this is possible and appropriate.

7. The C.S.A.G.I. urges the several nations not now participating in the International Geophysical Year to form I.G.Y. national committees and to expedite the planning of their participation in the International Geophysical Year.

8. The C.S.A.G.I. expresses its appreciation to the national committees sending delegates and participants to the C.S.A.G.I. Brussels Meeting, September 8-14, 1955 and records its gratitude to these committees, their delegates and participants for the considerable assistance rendered to the C.S.A.G.I. in the formulation of the I.G.Y. programs, reports and resolutions.

9. The C.S.A.G.I. expresses its appreciation to the International Geodesic and Geophysic Union for its co-operation in the formulation of the several technical programs of mutual interest to the I.G.G.U. and the C.S.A.G.I., and invites the attention of the I.G.G.U. to the results of the C.S.A.G.I. Brussels Meeting, at which valuable contributions of the I.G.G.U. Committee for the A.G.I. were incorporated in the C.S.A.G.I. programs, reports and resolutions, and invites the further interest, advice, and aid of the I.G.G.U. in the I.G.Y. work.

10. The C.S.A.G.I. expresses its appreciation to the U.R.S.I. for the co-operation of its I.G.Y. Committee in the formulation of the several technical programs of mutual interest to the U.R.S.I. and C.S.A.G.I., and invites the attention of U.R.S.I. to the results of the C.S.A.G.I. Brussels Meeting, at which the valuable contributions of the U.R.S.I.-A.G.I. Committee were incorporated in the C.S.A.G.I. programs, reports and resolutions and invites the further interest, advice and aid of U.R.S.I. in the I.G.Y. work.

11. The C.S.A.G.I. expresses its appreciation to the Sub-Commission on Cosmic Ray Intensity Variations of the International

Union of Pure and Applied Physics for its co-operation in the formulation of the I.G.Y. Cosmic Ray Program, and invites the further interest, advice and aid of the I.U.P.A.P. in the work of the I.G.Y., which is of mutual interest to the I.U.P.A.P. and the C.S.A.G.I.

12. The C.S.A.G.I. expresses its appreciation to the World Meteorological Organization for its co-operation in the formulation of the several technical programs of mutual interest to the W.M.O. and the C.S.A.G.I., and invites the attention of the W.M.O. to the results of the C.S.A.G.I. Brussels meeting, at which valuable contributions of the W.M.O. were incorporated in the C.S.A.G.I. programs, reports, and resolutions, and invites the further interest, advice and aid of the W.M.O. in the I.G.Y. work.

13. The Secretary-General of C.S.A.G.I. is authorized with respect to the several reports and resolutions of the several working groups of C.S.A.G.I. :

(*a*) to make revisions and to edit as necessary in order to provide for clarity and continuity in the final published report of the Rome Meeting ; and

(*b*) to combine resolutions involving the same substance when this is advisable for clarity and conciseness, upon consultation with the reporter of the interested working groups or the Bureau of C.S.A.G.I.

Archives and Publications

1. The C.S.A.G.I. resolves that all observational data to be exchanged in accordance with the I.G.Y. program shall be available to scientists and scientific institutions in all countries. The C.S.A.G.I. will designate a number of World Archives at which the data relating to different subjects will be assembled and from which copies can be obtained, on payment of cost of reproduction if necessary.

2. The C.S.A.G.I. will publish in appropriate form information as to the data to be contributed by National Committees to the World Archives.

3. The C.S.A.G.I. will issue a series of notes reporting on the progress of national I.G.Y. plans, and giving accounts of difficulties encountered and solved or to be solved, and other technical information of value to the I.G.Y.

4. The C.S.A.G.I. recommends that, so far as appropriate, tabular I.G.Y. data should be arranged for handling by machines.

5. The C.S.A.G.I. will publish a guide to the availability of I.G.Y. data, and will issue periodically bibliographies of I.G.Y. publications and discussions of I.G.Y. data.

Resolutions on World Days

I.1. — The C.S.A.G.I. invites offers for the establishment of World Day Centers and World Day Associate Centers in countries in a position to undertake the centralization of distribution of *Alerts* and *Special World Intervals* (S.W.I.) information and of short-time data summaries. In general, however, the network to be arranged by the Ursigram Committee should be such that any center must be in regular communication with not more than other centers.

I.2. — The C.S.A.G.I. notes that the plan for Alerts and S.W.I. reported to the Rome meeting [1] seems to meet with general agreement. It is recognized that the plans for announcing the beginning of S.W.I. 19 hours in advance may have to be revised by the A.G.I. World Warning Agency on the basis of trials of prediction methods and of the actual efficiency of the communication network. In particular, it may prove desirable to shorten the advance notice interval to less than 19 hours.

I.3. — The C.S.A.G.I. notes that the schedule of World Meteorological intervals (W.M.I.) included in the report [1] of the Rome meeting seems generally acceptable, with the qualification that some meteorological measurements should be continued beyond W.M.I. by stations in a position to do so, in the event that the expected stratospheric changes have not occurred by the end of the stated W.M.I. interval.

I.4. — The C.S.A.G.I. notes that the calendar of Regular World Days (R.W.D.) included in the report of the Rome meeting appears to be generally acceptable.

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[1] *Bull. Inf. C.S.A.G.I.*, nº 4, 66-92, 1955 ; *U.R.S.I. Inf. Bull.*, **90**, 18-50.

I.5. — The C.S.A.G.I. endorses the principles in the report prepared by the Chairman of the Ursigram Committee [1] on the type of data to comprise the various grades of Ursigrams, and notes especially the principle that these distributions should fill evident needs.

I.6. — The C.S.A.G.I. repeats its previous recommendation that each National I.G.Y. Committee shall assume responsibility for arranging for efficient distribution to its A.G.I. stations of World Day information and any data summaries which may be requested, and invites the close cooperation of National Committees with the Ursigram Committee in arranging the A.G.I. warning network.

Resolutions on Geomagnetism

III.1. — The C.S.A.G.I. endorses the suggestion of the International Association of Geomagnetism and Aeronomy (I.A.G.A.) that the Association Committee on Observatories be charged with the preparation of a list of all I.G.Y. magnetic stations, with detailed information as to instrumental equipment and availability of data at each station.

III.2. — The C.S.A.G.I. emphasizes the great scientific interest of magnetic observations from stations near the paths of the solar eclipses occurring during the I.G.Y., two total and one annular, and recommends that efforts be made to secure all possible observations of this kind.

III.3. — The C.S.A.G.I. recommends that ionospheric observatories install simple geomagnetic recorders with visible trace, and also, if convenient, alarm systems, in order to learn as soon as possible of the beginning of magnetic disturbances, as a useful supplement to the system of World Alert periods. This would serve mainly the purposes of ionospheric research. More value would result from the use of good standard geomagnetic recorders. Advice on this subject is available from the I.A.G.A. Committee on Magnetic Instruments, through Dr. V. Laursen, General Secretary, I.A.G.A.

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[1] *U.R.S.I. Inf. Bull.*, **94**, 42-46.

III.4. — The C.S.A.G.I. urges National Committees to approach their Governments in the interest of protecting geomagnetic observatories from disturbances by direct current lines, for instance those used for electric railways.

Resolutions on Aurora and Airglow

IV.1. — The C.S.A.G.I. *resolves* that the Area Centers proposed in *C.S.A.G.I. Bulletin d'Information* nº 4 be adopted and that instead of one World Center proposed in that document not more than 4 World Centers of Archives be established, one in the U. S. S. R., another in the U. S. A. and the remainder to be decided by the C.S.A.G.I. from among the applicants.

IV.3. — The C.S.A.G.I. *resolves* that in view of the existing nets of stations making visual observations in Great Britain, Scandinavia, U. S. S. R. and New Zealand, a manual for the visual observation of aurora be prepared by mutual agreement among Paton (U.K.), Gartlein (U. S. A.), Isaev (U. S. S. R.) and Thompsen (New Zealand), using as a basis a report prepared by C. W. Gartlein « Simplified Punch Card Reporting of Visual Auroras », and

Resolves further that the visual observations of auroras be forwarded to the area centers for punching the cards and for assisting in preparing maps of the distribution of auroras, and forwarding to the World Centers or Archives.

IV.5. — The C.S.A.G.I., considering that the manual for observations in ionospheric physics will include sections on radio and radar observations of auroras, resolves that observations of auroras using radio and radar techniques follow the procedures adopted by Section V, Ionosphere.

Resolutions on Ionosphere

The C.S.A.G.I. endorses the resolutions adopted by the U.R.S.I.-A.G.I. Committee (See *U.R.S.I., Inf. Bull.*, **94**, 31-34).

Resolutions on Solar Activity

VI.1. — The C.S.A.G.I. recommends that indices of solar activity should be based on the total area of the calcium plages and given at 6-hour intervals on the scale 0, 1/2, 1, 2, 3, 4. Co-

operating observatories are requested to make measurements of plage areas twice daily at an interval of approximately 6 hours, and to send the data to Arcetri, for the preparation of the 6-hourly indices.

VI.2. — The C.S.A.G.I. recommends the following procedure for reporting information on solar activity :

(*a*) The occurrence of large flares (3+) and large radio outbursts should be communicated to reporting centers immediately, by telephone or telegram.

(*b*) Daily reports of solar activity should be sent to World Day Centers, to provide them with the data required for fixing Special World Intervals.

(*c*) Material for the weekly reports on solar activity, to be prepared regionally for current use, should be sent by mail.

VI.3. — The C.S.A.G.I. recommends that weekly reports of solar activity should be prepared on a regional basis, to provide dissemination of information of importance for various geophysical observations. Such weekly reports should contain a solar map for each day, showing approximate positions of spots, flares, dark filaments, prominences, and coronal isophotes together with explanatory notes.

These reports would be of ephemeral value so that great accuracy in the details shown on the charts is not necessary. It is important that they should be prepared and distributed with the minimum of delay. It is suggested that the reports for the U. S. A. should be prepared at the High Altitude Observatory, Boulder; for Western Europe at the Meudon or Uccle Observatory; and for Japan, Australia, New Zealand, and other countries in the same longitude, at the Tokyo Observatory.

Resolutions on Longitude and Latitude

VIII.1. — The C.S.A.G.I. confirms the resolutions adopted by the Second C.S.A.G.I. Conference held at Rome in 1954 (cf. *C.S.A.G.I. Bull. Inf.*, nº 4, 163-173, 1955 and *U.R.S.I., Inf. Bull.*, **90**, 50-58).

It also makes the following additional recommendation :

« 2.2.4. — Regardless of the instrument used, at least two series of observations should be made during the night, one before and one after, midnight. »

Likewise, it completes resolution 2.4.2. by adding the following paragraph :

« The C.S.A.G.I. emphasizes that resumption, for the I.G.Y., of the time signals formerly transmitted by Annapolis N.S.S. at 10 000 meter wavelengths would be of fundamental importance. Moreover, such transmissions have been requested repeatedly by the U.R.S.I. and the I.A.U., in particular at the Dublin meeting. »

Resolutions on Rockets and Satellites

XI.1. — The C.S.A.G.I. reaffirms the resolutions adopted at its second meeting held in Rome in 1954 (1).

XI.2. — In order that the national programs for rocket firings can be integrated into a truly international program, the C.S.A.G.I. urges each National Committee sponsoring a rocket program to provide the C.S.A.G.I. with the following detailed information :

(i) Individual experiments to be performed.

(ii) Planned schedule of firings, giving geographic location, proposed date of launching, and time of day.

(iii) Type of vehicle to be used.

In addition it is recommended that each National Committee sponsoring a rocket program be prepared to furnish to all interested parties upon request the following further details of each experiment to be performed :

(i) Objective.

(ii) Method.

(iii) Theoretical basis.

(iv) Instruments to be used.

(v) Accuracies expected.

(vi) Altitude range of the experiment.

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(1) *C.S.A.G.I. Bull. Inf.*, nº 4, p. 178-179, 1955.

XI.3. — The C.S.A.G.I. wishes to place particular stress on the Rome recommendation that the small-rocket program be expanded, and to point out that by this means it may be possible to fill currently existing gaps in the geographic distribution of I.G.Y. rocket soundings.

The National Committees should take note of the fact that there is a great need for additional firings along the 10° E and 140° E meridians and along the equatorial belt.

XI.4. — The C.S.A.G.I. urges prompt publication in the open literature of all scientific data obtained by rockets and artificial satellites during the I.G.Y., whether or not the data ware obtained under the auspices of the individual National Committees.

XI.5. — The C.S.A.G.I. recommends that a World Information Center for geophysical and astrophysical scientific data obtained by rockets and satellite vehicles be established, to function as a directory and reference agency for pending and completed experiments.

XI.6. — The C.S.A.G.I. recommends the following publication policy for the rocket-satellite programs :

(i) That each operating agency report to its National Committee, within one week, the accomplishment of each firing and an estimate of its scientific results, and that the National Committee forward this information on a continuing basis to the World Information Center.

(ii) That final results be published as promptly as possible in established journals of widespread circulation throughout the world.

(iii) That each operating agency maintain a file of original data, register the original data with the appropriate World Information Center, and make it available upon request for examination by interested agencies.

XI.7. — The C.S.A.G.I. gratefully accepts the offer received from the United States National Committee to undertake the establishment of the Rocket-Satellite World Information Center referred to in Resolution 5 above.

Organisation of the further work of the C. S. A. G. I.

The C.S.A.G.I. recognizes that the work of planning the program of the I.G.Y. 1957-1958 will be substantially completed at the end of this Third General Assembly although some additions may be found desirable even after the publication of the report of this Assembly. Henceforward the efforts of the C.S.A.G.I. must be devoted mainly to promoting the execution of the program, and to planning the most effective ways of publishing, distributing and analyzing the I.G.Y. data during and after 1957-1958. These purposes will require the continuance of the C.S.A.G.I. for some few years after 1958, and then it should be dissolved.

The C.S.A.G.I. authorizes the Bureau to promote the execution and, if need arises, the extension of the I.G.Y. program, by acts and decisions currently required.

Reporters

The C.S.A.G.I. appoints Reporters as follows from among its own members, to advise the Bureau on matters that arise concerning the various parts of the I.G.Y. program :

I. World Days : Mr. Shapley.
II. Meteorology : Dr. Van Mieghem.
III. Geomagnetism : Dr. Laursen.
IV. Aurora and Airglow : Professor Chapman.
V. Ionosphere : Dr. Beynon.
VI. Solar Activity : Sir Harold Spencer Jones.
VII. Cosmic Rays : Professor Simpson.
VIII. Longitudes and Latitudes : Professeur Danjon.
IX. Glaciology and Climatology : Mr. Wordie.
X. Oceonography : Mr. Laclavère.
XI. Rockets and Satellites : Dr Berkner.
XII. Seismology : Dr. Beloussov.
XIII. Gravimetry : Father Lejay.

Advisory I.G.Y. Committees

The working groups that have advised the C.S.A.G.I. during its three planning Assemblies have been appointed on each occasion only for the duration of each Assembly. The International Unions have permanent functions extending indefinitely beyond the time when the C.S.A.G.I. will be dissolved ; the C.S.A.G.I. regards them as best fitted to provide continuing I.G.Y. committees to assist the C.S.A.G.I. in regard to the various branches of the I.G.Y. program, and to be available for consultation by the corresponding Reporters. Valuable aid of this kind has been received from the Union-I.G.Y. committees appointed by U.R.S.I. and I.U.G.G. The Unions and International Associations are invited to set up or to maintain such Advisory I.G.Y. committees for each branch of the I.G.Y. program. Each such committee is invited to keep the corresponding Reporter and the General Secretary of the C.S.A.G.I. informed of its work, and of any recommendations it may wish to make : and also to invite them to any meetings the committee may hold. The General Secretary will acquaint the National I.G.Y. committees of such recommendations when the Bureau considers this appropriate. The Unions and International Associations may find it desirable to continue such I.G.Y. committees for some time after the C.S.A.G.I. is dissolved, to promote the further analysis of the I.G.Y. data.

Where some branch of the I.G.Y. program needs consideration by such an advisory committee, but no Union or Association has appointed an appropriate committee, the corresponding Reporter, with the approval of the Bureau, may arrange the formation and meetings of an *ad hoc* committee ; but the C.S.A.G.I. hopes that any such committee will be absorbed by the appropriate Union or Association as soon thereafter as feasible.

Collection and distribution of I.G.Y. news

National I.G.Y. Committees are asked to send annual reports to the General Secretary during the years 1956-7-8, indicating the stages reached in the execution of their I.G.Y. program ; they are also invited to send current I.G.Y. news to the General Secretary at other times when they deem this appropriate. The General

Secretary will publish such reports and news subject to the approval of the Bureau. The General Secretary is authorized to request information from the National I.G.Y. Committees, and to transmit recommendations to them.

Exceptional developments

Until the completion of the I.G.Y., the Reporters and the C.S.A.G.I. as a whole are requested to keep watch for any exceptional scientific developments within the scope of the I.G.Y., and to take any consequent steps to exploit these developments for the benefit of the whole program.

Adjoint Secretaries

The General Secretary, with the approval of the Bureau and the Finance Committee of the C.S.A.G.I., may delegate any part of his responsibilities to Adjoint Secretaries.

Further meetings

The Bureau may arrange further meetings of the C.S.A.G.I. and the A.C.I.C.Y. as may prove desirable. The Bureau is authorized at its discretion to invite observers or to organize working groups or committees in connection with such meetings.

BIBLIOGRAPHY

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N° 77 (1st Edition). Specification for electrical control equipment installed on motor vehicles.

These publications are on sale at the Central Office of the I.C.E., at the price of Sw. Fr. 5 (10 Fr. for n° 76) per copy, plus postage.

Unesco. *List of Scientific Papers published in the Middle-East* (1st April 1954-30 November 1954), Middle East Science Cooperation Office, 8 Sh. El Salamlik, Garden City, Cairo, July 1955.

Detection of weak periodic signals from noise, by P. Mattila, Helsinki.

Main parts : On the theory of information ; the correlation method in the communication ; a simple electronic correlation ; the detectability of weak signals on the P.P.I. screen.

Bulletin de la Station Ionosphérique de Lwiro (Belgian Congo) de l'Institut pour la Recherche Scientifique en Afrique Centrale (I.R.S.A.C.), Vol. I, Febr. 1952-July 1953, issued by the Institut Royal Météorologique of Belgium.

Scientific Institutions and Scientists in Latin America, Scientific Cooperation Office for Latin America (Unesco), Montevideo, 2nd Volume, 1955.

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Vol. 1, n° 2, September 1955.
n° 3, October 1955.
n° 4, December 1955.

CALENDAR

International Scientific and Technical Conferences

Date	Subject	Convening body and/or Organisers	Location
1956 March 28-April 3	Colloquium on « Frontiers in Physical Optics (I.U.P.A.P.).	Prof. S. S. Ballard, Visibility Laboratory, Scripps Institution of Oceanography, San Diego, 52, California. Prof. W. D. Wright, Imperial College, South Kensington, London, S.W. 7.	Cambridge, Mass. U. S. A.
March 12	World Meteorological Organization. Regional Association VI (Europe), 2nd Session.	W.M.O., Campagne Rigot, 1, Avenue de la Paix, Geneva, Switzerland.	Dubrovnik, Yugoslavia
March or April	O. M. M. Working Group on the International Geophysical Year.	Idem.	Geneva, Switzerland
April 10-12	Theory and Preparation of Properties of Semi-Conducting Materials and Semi-Conducting Devices (The British Physical Society).	Dr. H. H. Hopkins, ThePhysica Society, 1, Lowther Gardens, South Kensington, London, S.W. 7.	Rugby, England

April 17	World Meteorological Organization, Executive Committee.	W.M.O., Campagne Rigot, 1, Avenue de la Paix, Geneva, Switzerland.	Geneva, Switzerland
April 23-25	International Conference on Electron Physics (I.U.P.A.P.)	Dr. L. Marton, Chief, Electron Physics Section, National Bureau of Standards, Washington 25, D.C.	College Park, Maryland
April 25-27	W.M.O. Eastern Caribbean Hurricane Committee, fourth Session.	W.M.O., Campagne Rigot, 1, Avenue de la Paix, Geneva, Switzerland.	Cuidad Trujillo, Dominican Rep.
April 29-May 3	4th Annual Semi-conductor Symposium, Electrochemical Society.	Mr. J. W. Faust, Jr., Westinghouse Research Laboratories, Beulah Road, Pittsburgh 35, Penn.	San Francisco, California
May 21-26	International Colloquium on the Luminescence of Crystalline Inorganic Substances.	Laboratoire de Luminescence, Faculté des Sciences, 12, rue du Cuvier, Paris 5e.	Paris
May 29-June 2	Congress on Microwave Vacuum Tubes.	Congrès pour Tubes Hyperfréquences, S.I.T.V., 44, rue de Rennes, Paris 6e. Société des Radioélectriciens, 10, Avenue Pierre Larousse, Malakoff, Seine, France.	Paris

Date	Subject	Convening body and/or Organisers	Location
June 11-15	Annual Symposium on Molecular Structure and Spectroscopy. I.C.S.U. Joint Commission on Spectroscopy. 4th Meeting.	Prof. H. H. Nielsen, Department of Physics, Ohio State University, Columbus. The Secretary, Joint Commission, Zeeman Laboratorium, Plantage Muidergracht 4, Amsterdam 4, Netherlands.	Columbus, Ohio, U. S. A.
June 15-21	I.C.S.U. Meetings of the Bureau and of the Executive Board.	Dr. R. Fraser, Administrative Secretary, Tavistock Square, 29, London.	Bagnères-de-Bigorre, France
May-June (Tentative)	W.M.O. Radiosonde Comparison Working Group, Second Session.	W.M.O., Campagne Rigot, 1, Avenue de la Paix, Geneva, Switzerland.	Payerne, Switzerland
August 9-Sept. 13	International Radio Consultative Committee, 8th Plenary Assembly.	C.C.I.R. Secretariat, Palais Wilson, Geneva, Switzerland.	Warsaw, Poland
August 28-Sept. 2	Colloquium on the Semi-conductor and Phosphorus (I.U.P.A.P.).	Prof. H. Meier-Leibnitz, Walter-von-Dijck, Platz 1, München 2, Germany.	München, Germany
August 28-Sept. 2	I.U.T.A.M. 9th International Congress.	Prof. F. H. Van den Dungen, Secretary of Union, 41 Avenue de l'Arbalète, Boitsfort, Belgium.	Brussels, Belgium.

August 29-Sept. 5	British Association for the Advancement of Science.	Secretary of Association, Burlington House, Piccadily London W-1.	Sheffield, England
September 5-7	Symposium on Fluid Mechanic (I.U.T.A.M.).	Prof. F. H. Van den Dungen, Secretary I.U.T.A.H., 41, Avenue de l'Arbalète, Boitsfort, Belgium.	Göttingen, Germany
September 10-14	Symposium on Electron Transport in Metals (I.U.P.A.P.).	Prof. P. Fleury, I.U.P.A.P., 3 Boulevard Pasteur, Paris 15e.	Ottawa, Canada
September 17-21.	Colloquium on Ionospheric and Tropospheric Propagation.	Comité National de Radioélectricité Scientifique, 196, rue de Paris, Bagneux, Seine, France.	Paris.
November	Unesco, General Conference.	Unesco, 19, Avenue Kleber, Paris 16e.	New Delhi, India
1957			
July	3rd Symposium on Gas Dynamics of Interstellar Clouds (I.U.T.A.M. and I.A.U.).	Prof. F. H. Van den Dungen, Secretary I.U.T.A.H., 41, Avenue de l'Arbalète, Boitsfort, Belgium.	Undecided
August 15-17	I.C.S.U. Joint Commission Ionosphere.	Dr. W. J. G. Beynon, Secretary, of the Joint Commission, University College, Singleton Park, Swansea, Wales, U.K. Dr. Morgan, Thayer School of Engineering, Dartmouth College, Hanover, New Hampshire, U. S. A.	New-York

Date	Subject	Convening boudy and/or Organiser	Location
August 15-17	I.C.S.U. Joint Commission on Radio-Meteorology.	Dr. W. E. Gordon, Convener, School of Electrical Engineering, College of Engineering, Cornell University, Ithaca, N.Y. U. S. A.	New-York
August 23-Sept. 4	U.R.S.I. XIIth General Assembly ; Meeting of the Board and of the Executive Committee.	Herbays, Secretary General, U.R.S.I., 42, rue des Minimes, Brussel, Belgium. Dr. J. H. Dellinger, Chairman, U.R.S.I. 1957 General Arrangement Committee, National Academy of Science, 210 Constitution Avenue, Washington 25, D.C.	Boulder, Colorado, U. S. A.
September	I.U.P.A.P. General Assembly.	Prof. P. Fleury, Secretary General, I.U.P.A.P., 3, Boulevard Pasteur, Paris 15e.	Rome, Italy
Undecided	International Communication Union Plenipotentiary Conference.	Palais Wilson, Geneva.	Geneva, Switzerland