

International Scientific Radio Union

U. R. S. I.

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XIth GENERAL ASSEMBLY

Proceedings

The Proceedings of the XIth General Assembly (U.R.S.I. Volume X) will be published in eight parts in English language and eight in French language.

Parts 1 to 7 will be devoted to the various Commissions and include the Commission, Sub-Commission and National Committee Reports, the minutes of the sessions, etc.

Part 8 will contain besides the administrative matters (plenary sessions, report the General Secretary and appended documents, etc.), information on the cooperation with C.C.I.R., the International Geophysical Year, etc.

Part 1 (Commission I on Radio Measurements and Standards) is out of press. Copies have been sent to National Committees for distribution.

Supplementary copies are available at the General Secretariat of U.R.S.I. at the price of 60 Belgian francs or \$ 1.20 or 8/8 per copy (postage included).

Report on the Work of Commission III

We have to inform our readers that Dr. M. G. Morgan, Secretary of the U. S. A. National Commission III has drafted a report on the work of Commission III at the General Assembly (Dartmouth College, Thayer School of Engineering, Ionospheric Research, Technical Report n° 6, 1st Dec. 1954 : Commission III Meetings at the XIth General Assembly of U.R.S.I.).

NATIONAL COMMITTEES

Great-Britain

MEMBERSHIP OF THE NATIONAL COMMITTEE

Membership until 31 December 1957

Chairman : Mr. J. A. RATCLIFFE.

Members : The Director of Radio Research (D.S.I.R.).
Dr. R. L. SMITH-ROSE.
Sir Charles DARWIN.
Dr. Willis JACKSON.
Professor H. S. W. MASSEY.
Dr. W. J. B. BEYNON.
Sir Noel ASHBRIDGE.
Sir Archibald GILL.
Sir Edward APPLETON.
Professor A. C. B. LOVELL.
Dr. A. C. BEST.
Mr. F. S. BARTON.
The Chairman of the British Joint Communications-
Electronics Board.
Professor E. G. CULLWICK.
Mr. W. D. OLIPHANT.
Captain C. F. BOOTH.
Mr. F. C. McLEAN.
Dr. L. ESSEN.

Secretary : Dr. D. C. MARTIN, Assistant Secretary, The Royal
Society, Burlington House, London W 1, England.

India

IN MEMORIAM

The Ministry of Natural Resources and Scientific Research of the Government of India has informed us of the death of Dr. S. S. Bhatnagar, D. Sc., F.N.I., F.R.S., Director, Scientific and Industrial Research, and Secretary to the Government of India in the Ministry of National Resources and Scientific Research.

We want to express our deepest sympathy to organizations concerned with this loss.

Poland

MEMBERSHIP OF THE NATIONAL COMMITTEE

President : Prof. P. SZULKIN, Member of the Polish Academy of Science.

Secretary : Dr. Krystyn BOCHENEK, Polska Akademia Nauk, Warszawa, Nowy Swiat, 72.

Members : *Numbers under brackets are those of the Commissions in which the Members are particularly interested.*

- Eng. J. AUERBACH (VI).
- Eng. L. BADIAN (I).
- Eng. W. BARWICZ (VII).
- Eng. S. BELLERT (VI).
- Eng. A. BRAGIŃSKI (I).
- Eng. L. DROZDÓWICZ (VI).
- Eng. J. FABIJAŃSKI (VI).
- Eng. W. FINDEISEN (VI).
- Eng. R. GAJEWSKI (VI).
- Eng. T. GAWRON (VI).
- Eng. Z. GODZIŃSKI (I).
- Eng. W. GOLDE (VI).
- Prof. Dr. J. GROSZKOWSKI (VI-VII).
- Eng. S. HAHN (II-III).
- Eng. J. HELSZTYŃSKI (VI).

- Eng. S. JARKOWSKI (II-III-VI).
Eng. S. JASIŃSKI (II-III).
Prof. A. JELLONEK (I).
Prof. J. KELLOR (I).
Eng. L. KNOCH (I-VI).
Eng. A. KŁOCEK (VI).
Prof. J. KOSACKI (VI).
Eng. J. KROSZCYŃSKI (VI).
Eng. R. KULIKOWSKI (VI).
Prof. Dr. J. LENKOWSKI (VI).
Eng. W. LESICKI (II-III).
Eng. L. LUKASZEWICZ (VI).
Prof. Dr. I. MALECKI (VI).
Prof. R. MANCZARSKI (VI).
Eng. R. MARCZYŃSKI (VI).
Eng. J. OSIOWSKI (VI).
Eng. M. PANECKI (VI).
Eng. B. PASZKOWSKI (VII).
Eng. S. POGORZELSKI (VI).
Eng. W. ROŚIŃSKI (VI-VII).
Prof. Dr. S. RYZKO (VI).
Eng. K. RUTSKA (VI).
Prof. W. ROTKIEWICZ (VI).
Eng. J. SEIDLER (VI).
Eng. S. ŚLAWIŃSKI (VI).
Prof. Dr. A. SMOLINSKI (VI).
Eng. M. SUSKI (I-VI).
Eng. S. SZYSZKIEWICZ (VI).
Dr. S. WĘGRZYN (VI).
Eng. A. WŌJNAR (VI).
Prof. Dr. T. ZAGAJEWSKI (VI).
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COMMISSIONS

Sub-Commissions

At the last General Assembly the following Sub-Commissions were confirmed or appointed.

COMMISSION II

Sub-Commission on *Radio-Meteorology*. Chairman : Dr. E. G. BOWEN, Chief of the Radio-physics Laboratory, Chippendale, N.S.W., Australia.

COMMISSION III

Permanent Sub-Commission on *Ursigrams*. Chairman : Father LEJAY, Bureau Ionosphérique Français, 196, rue de Paris, Bagneux, Seine, France.

Sub-Commission IIIa. On *Ionospheric Observations and Reduction of Data*. Chairman : A. H. SHAPLEY, National Bureau of Standards, Boulder, Colorado, U. S. A.

Sub-Commission IIIb. On *Radio Wave Interaction*. Chairman : Mr. E. PICAULT, 7, rue Huysmans, Paris VI^e, France.

Sub-Commission IIIc. On *Propagation Time of Radio Signals*. Chairman : Prof. M. BOELLA, Politecnico, Via Lamarmora, 40, Torino, Italy.

Sub-Commission IIId. On *Magneto-Ionic Nomenclature*. Chairman : J. A. RATCLIFFE, Esq., Cavendish Laboratory, Cambridge, U. K.

COMMISSION IV

Working Group on *Exchange and Analysis of Waveforms*. Chairman : J. A. RATCLIFFE, Esq., Cavendish Laboratory, Cambridge, U. K.

COMMISSION V

Sub-Commission Va on *World Chain of Radio-Solar Observations*.

Chairman : Dr. Ir. A. H. DE VOOGT, Chief of the Department « Ionosphere and Astronomy », General Direction of P. T. T., 11-12, Kortenaerkade, The Hague, Netherlands.

Sub-Commission Vc on *Basic Solar Index*. Chairman : Prof. S. CHAPMAN, c/o The Royal Society, Burlington House, London W 1, England.

Sub-Commission Vd on *Standardization of Equipment and Measurements*. Chairman : C. L. SEEGER, Sterrewacht, Leiden, Netherlands.

COMMISSION VI

Sub-Commission VI.1. On *Communication and Information Theory*. Chairman : Prof. Dr. B. VAN DER POL, Director C.C.I.R., Palais Wilson, Geneva, Switzerland.

Sub-Commission VI.2. On *Circuit Theory*. Chairman : Prof. B. D. H. TELLEGEN, Philips Research Laboratories, Eindhoven, Netherlands.

Sub-Commission VI.3. On *Electromagnetic Theory (Antennas and Waveguides)*. Chairman : Dr. G. SINCLAIR, Department of Electrical Engineering, Toronto University, Toronto, Ontario, Canada.

Note. — The membership of the Sub-Commissions will be published later.

Official Members of the Polish National Committee

The following were appointed as Official Members by the Polish National Committee.

Commission I : Prof. A. JELLONEK.

Commission II : Prof. S. MANCZARSKI.

Commission III : Eng. S. JOSINSKI.

Commission VI : Prof. Dr. J. LENKOWSKI.

Commission VII : Prof. Dr. GROSZKOWSKI, Member of the Polish Academy of Science.

Correspondence should be forwarded c/o the Secretary of the National Committee : Mr. Krystyn Bochenek, Polska Akademia Nauk, Warszawa, Nowy Swiat, 72.

Commission III

ON IONOSPHERIC RADIO

Conference on Motions in the Upper Atmosphere (September 1953)

The proceedings of this conference held from September 7th to 12th, 1953, under the sponsorship of the National Science Foundation and of the University of New Mexico, are published in the I.U.G.G. News-Letter, n^o 6, July 1954, pp. 299-339.

The following papers were discussed :

- CHAPMAN, S. — Some causes of winds in the ionosphere.
- ELVEY, C. T. — OH bands and their possible relationship to motions in the upper atmosphere.
- MEINEL, A. B. — Velocity determination from auroral displays.
- ROACH, F. E. — Apparent Motions in the upper atmosphere from night-glow observations.
- BRIGGS, B. H. — Detection of ionospheric movements by a radio method.
- WELLS, H. W. — Travelling disturbances in F2-region of Ionosphere.
- McNISH, A. G. — Wind speeds deduced from observed effects of the moon.
- MILLS, B. Y. — Scintillations of Radio Sources.
- BOOKER, H. G. — An interpretation of radio reflections from the aurora.
- FLETCHER, R. D. — Winds in the lower stratosphere.

Films :

- MEINEL, A. B. — Aurora (Yerkes Observatory).
ROACH, F. E. — Airglow pictures taken at Cactus Peak.
McNISH, A. G. — Lunar tidal effects upon the F₂-Layer;
taken at Huncayo.
- HAURWITZ, B. — Periodic winds in the high atmosphere.
PENNDORF, R. — General circulation in the stratosphere below
60 km.
GERSON, N. C. — Seasonal variations in wind velocity.
GERSON, N. C. — Sporadic-E Movements.
CHAPMAN, S. — Remarks concerning International Geophysical
Year, 1957-58.
BRASEFIELD, C. J. — Wind data, especially between 30 and
80 kilometres.
WHIPPLE, F. L. — High-altitude winds by meteor-train photo-
graphy.
MILLMAN, P. M. — Survey of meteor observations and winds
deduced from them.
MANNING, L. A. — Wind velocities from meteor ionization.
NICHOLSON, Seth. R. — Solar radiation.
WULF, O. R. — On the production of glow discharges in the
ionosphere by winds.
SINGER, S. F. — Geomagnetic effects produced by upper-atmo-
sphere winds.
MANGE, P. — Transport processes and the dissociation of oxygen
in the atmosphere.
KENNEDY, W. B. — High-altitude wind measurements by acoustic
propagation studies.
COX, E. F. — Related studies to high-altitude wind measurements
by acoustic propagation methods at Naval Electronic Labora-
tory.
VESTINE, E. H. — Tentative wind systems deduced from dynamo
theory of disturbance.
KAPLAN, J. — Closing remarks.
- Appendix : Table I. — Wind velocities obtained from various
sources (compiled by H. K. Kallmann from papers presented
at this Conference).

Commission VII

ON RADIO ELECTRONICS

Colloquium on Electrical Gas Discharges

Delft, Netherlands, April 25-30, 1955

Organized under the sponsorship of the International Union of Pure and Applied Physics, by the Nederlandse Natuurkundige Vereniging, Section Toegepast Natuurkunde and the Section Wetenschappelijk Onderzoek of the Koninglijk Instituut van Ingenieurs.

Main topics :

Fundamental and new views on the mechanism of gas discharges (Prof. L. B. LOEB, Berkeley).

Instabilities and conditions of stability, oscillations and noise phenomena in gas discharges (Ir. Chr. VAN GEEL, Delft).

Breakdown and working potential as a function of p. d. and the frequency (S. C. BROWN, M.I.T., Cambridge, U. S. A.).

New methods of measuring applied to the research of gas discharges (Dr. M. A. BIONDI, Westinghouse, U. S. A.).

Gas discharges applied to other physical problems as a method of measurement (Prof. FUCHS, Aachen).

Arc discharges (Prof. W. LOCHTE-HOTGREVEN, Kiel).

Spark discharges (Prof. J. M. MEEK, Liverpool).

Miscellaneous (Geiger-Müller counters, ion sources) .

A limited number of papers on each main subject can be read.

Most probably the contributions to the Colloquium will be published in an extra issue of « Applied Scientific Research ».

Sessions will take place at the Laboratorium voor Technische Physica, Technical University, Mijnbouwplein, 11, Delft.

On Thursday, April 28th, a full day technical and scientific excursion to one or more university laboratories or to the Philips' Works will be arranged.

Committee-Chairman : Prof. Dr. H. B. DORGELO.

Secretary : Dr. A. WAGENSVELD, Mijnbouwplein, 11, Delft, Netherlands.

URSIGRAMS

Time Schedule of Ursigram Transmissions

The world Ursigrams are transmitted in the following chronological order.

Time U.T.	Sender	Call Sign	Fre- quency	Wave- length	Wave type	Transmitted data	Codes used
12.00	Tokyo	JJD	8.000	37.5	A1	<div style="display: flex; justify-content: space-between;"> <div style="width: 40%;"> <p style="text-align: center;"><i>Japanese data</i></p> <p>SUN {</p> <p>General activity</p> <p>Chromospheric flares</p> <p>Corona</p> <p>Radio energy</p> <p>Cosmic rays</p> <p>Atmospheric enhancements</p> <p>Sudden fading</p> <p>F2 critical frequencies</p> <p>Terrestrial magnetism</p> </div> <div style="width: 55%; border-left: 1px solid black; padding-left: 5px;"> <p>French CHROM, January 1949</p> <p>Japanese COSOL, December 1951</p> <p>European SOLER, July 1952</p> <p>Japanese CORAY, December 1951.</p> <p>Japanese SPIDE, December 1951</p> <p>Japanese IONOS, December 1951</p> <p>French MAGNE, September 1950</p> </div> </div>	
12.00	Pontoise France	FYP TQC9	90.9 10 775	3 300.3 27.84	A1 A1	<p>Part I : Last data received.</p> <p>Part II : Repetition of the preceding day message (see 20.08 and 21.08 U.T.)</p>	

12.30	Elmshorn near Hamburg	DGE36	5 360	55.97	A3	<p style="text-align: center;"><i>German data</i></p> <p>SUN { General activity } Activity center locations } European CHROM, July 1952 Chromospheric flares } Corona } European CORON, July 1952 Radio Energy } European SOLER, July 1952 Cosmic Rays } European CORAY, July 1952 Atmospheric enhancements } European PERTU, July 1952 Sudden fading } Terrestrial magnetism } European MAGNE, July 1952 F2 critical frequencies } European FODEU, July 1952 Es critical frequencies } European ESFRE, July 1952 The groups are given figure by figure in English language.</p>
13.08	Pontoise	FYP TOG5	90.9 13 873	3 000.3 21.62	A1 A1	Part I : Last data received. Part II : Repetition of the preceding day message (see 20.08 and 21.08 U.T.)
14.00	New Delhi	VVD3	5 205 7 580 13 100 17 550	57.64 39.58 22.90 17.00	A2 A2 A2 A2	<p>SUN { General Activity } Activity center locations } French CHROM, January 1949 Chromospheric flares } Terrestrial Magnetism } French MAGNE, January 1949</p>
15.00	Tokyo	JJD	8 000	37.5	A1	Same kind of data as at 12.00 U.T.
17.00	Tokyo	JJD	8 000	37.5	A1	Same kind of data as at 12.00 U.T.
19.00	Tokyo	JJD	8 000	37.5	A1	Same kind of data as at 12.00 U.T.

Time U.T.	Sender	Call Sign	Frequency	Wave-length	Wave type	Transmitted data	Codes used
20.08	Pontoise	FYP TQC9	90.9 10 775	3 300.3 27.84	A1 A1	<p><i>Data from France, Germany, Morocco (Casablanca) Netherlands and South of Algeria (Tamanrasset).</i></p> <p>SUN {</p> <ul style="list-style-type: none"> General activity Activity center locations Chromospheric flares Corona Radio energy Atmospheric enhancements Sudden fading Terrestrial magnetism F2 critical frequencies Es critical frequencies <p>}</p>	<p>European CHROM, July 1952</p> <p>European CORON, July 1952</p> <p>European SOLER, July 1952</p> <p>European PERTU, July 1952</p> <p>European MAGNE, July 1952</p> <p>European FODEU, July 1952</p> <p>European ESFRE, July 1952</p>
21.00	Elmshorn near Hamburg	From Oct. 1, 1952 to March 31, 1953 DGC27	3 070	97.72	A3	<p>The radiotelephonic message is, in principle, the same as the radiotelegraphic message of Pontoise at 20.08.</p> <p>Groups are given digit by digit in English language.</p>	
		From April 1, 1953 to Sept. 30, 1953 DGD62	4 625	64.86	A3		
21.08	Pontoise	FYP FYA3	90.9 7 428	3 300.3 40.39	A1 A1	<p>Repetition of the Pontoise message at 20.08 U.T.</p>	
23.30	Tokyo	JJD	9 175	32.7	A1	<p>Same kind of data as at 12.00 U.T.</p>	

INTERNATIONAL GEOPHYSICAL YEAR

Ionosphere

EXCERPT OF THE MINUTES OF THE ROME MEETING OF C. S. A. G. I.

(September 30 - October 4, 1954)

WORKING GROUP ON THE IONOSPHERE

- W. J. G. BEYNON (Correspondent).
- L. V. BERKNER (C.S.A.G.I.).
- M. NICOLET (C.S.A.G.I.).
- F. DAVIES (Canada).
- A. H. DE VOOGT (Netherlands).
- W. DIEMINGER (Germany).
- P. DOMINICI (Italy).
- N. C. GERSON (U. S. A.).
- L. HARANG (Norway).
- N. Herlofson (Sweden).
- P. LEJAY (France).
- K. MADER (Austria).
- K. MAEDA (Japan).
- F. MARIANI (Italy).
- S. MATSUSHITA (Japan).
- K. R. RAMANATHAN (India).
- I. RANZI (Italy).
- K. RAWER (Observer).
- A. K. SHAPLEY (U. S. A.).
- E. TRYGGVASON (Iceland).
- A. J. YRIBERRY (Argentina).

RESOLUTIONS ADOPTED AT THE PLENARY SESSION

7. The C.S.A.G.I. expresses its appreciation to the U.R.S.I. for the cooperation of its International Geophysical Year 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. Rome 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 effort of the A.G.I.

8. The C.S.A.G.I. expresses its appreciation to the Mixed Commission on the Ionosphere, which at the Brussels Meeting, August 1954, devoted part of its program to the A.G.I. and furnished a number of valuable resolutions for the guidance of C.S.A.G.I., and invites the attention of the M.C.I. to the results of the C.S.A.G.I. Rome Meeting at which the M.C.I. contributions were incorporated in the C.S.A.G.I. program, reports and resolutions, and invites the further interest, advice, and aid of the M.C.I. in the efforts of the A.G.I.

SUMMARY OF THE WORK CARRIED OUT IN ROME

The C.S.A.G.I. has considered the world program for ionosphere observations during the A.G.I. It is expected that during the A.G.I. regular vertical incidence soundings will be made at more than 100 stations. This compares with 5 or 6 ionospheric stations operating during the second Polar Year of 1932.

Careful consideration has been given to the world distribution of observatories and to the types of observations which should be made. The C.S.A.G.I. has already recommended that first priority should be given to $P'f$ observations and this type of measurement should be made at every station. In addition studies of ionospheric absorption, which provide valuable information as to the lowest part of the ionosphere, are expected to be made at more than twenty stations during the A.G.I. The subject of movements in the ionosphere is of special interest in relation to geomagnetic problems and also as part of a general investigation of movement in the terrestrial atmosphere. Plans are being made for extensive studies during the A.G.I. for such movements in the ionosphere.

If plans now being proposed are carried out, it can be expected that a fairly complete coverage will be ensured not only for temperate latitudes but also covering the equatorial arctic and antarctic zones.

REPORT PRESENTED

by W. J. G. BEYNON

1. — INTRODUCTION

C.S.A.G.I. has considered the world program for ionospheric observations during the International Geophysical Year, the discussions being based on documents received from the National Committees, the U.R.S.I.-A.G.I. Committee, and from the Mixed Commission on the Ionosphere. In some cases supplementary information has been received from national representatives present at the meeting of C.S.A.G.I.

A survey of the national committee reports (*Bulletin of Information of C.S.A.G.I.*, n° III and *U.R.S.I. Inf. Bull.*, 80 and 81) received indicates that there is general agreement with the broad plans prepared at the last meeting of C.S.A.G.I. (see *Bulletin of Information*, n° II and *U.R.S.I. Inf. Bull.*, 83).

2. — WORLD DISTRIBUTION OF IONOSPHERIC VERTICAL INCIDENCE SOUNDING STATIONS

C.S.A.G.I. has given detailed consideration to the world distribution of vertical incidence ionospheric sounding stations and recommendations are made with the object of ensuring adequate coverage in the various zones recommended for special attention (see C.S.A.G.I. resolutions of 1953, *Bulletin of Information*, n° II and *U.R.S.I. Inf. Bull.*, 83). C.S.A.G.I. notes with great satisfaction the recent additions to the network of ionospheric stations : Bangui, Elisabethville, Paramaribo and Talara.

TABLE I. — *List of recommended vertical incidence ionospheric stations, with approximate geographical coordinates.*

Name	Lat.	Long.	Name	Lat.	Long.
Florida	26° N	80° W	Iwo Jima	25° N	141° E
Gao.....	16° N	0°	Palau Is.	7° N	135° E
Colombo	7° N	80° E	Christmas Is. ...	2° N	157° W
Bunia	2° N	30° E	Quito	1° S	79° W
Djakarta	6° S	107° E	Marquesas Is. ..	9° S	140° W
Cape York	11° S	142° E	La Paz	16° S	68° W
or P. Moresby ..	9° S	147° E	...	c23° E	c17° E
Tucumán	27° S	65° W	Conception	37° S	73° W
...	c45° S	c68° W	Bouvet I.	55° S	4° E
Knox Coast	67° S	105° E	Mawson	68° S	63° E
Peter Is	68° S	91° W	Astrid Coast. ...	70° S	10° E
Enderby Land ..	75° S	62° E	Ross Is.	77° S	169° E
Vahsel Bay	77° S	35° W			

A full list of existing and definitively planned stations will be given in XII (Geographical Distribution).

The C.S.A.G.I. recommendations for 24 additional stations are summarized in Table I. The following summarizes briefly the present situation with respect to these zones :

2.1. ARTIC ZONE. — In general there seems every promise of a fair distribution of stations in the arctic zone, with sixteen existing or definitely planned stations above 60° N; of these seven lie within the auroral zone (see Table II). No information is available yet on possible polar stations in the longitude range 30° E-170° W.

C.S.A.G.I. hopes that during the International Geophysical Year adequate provision will be made by the U.S.S.R. for vertical incidence ionospheric observations in this zone.

TABLE II. — *Arctic Zone : Ionospheric Stations*

Existing Stations : Tromsø, Kiruna, Luleå, Point Barrow, College, Baker Lake, Churchill, Resolute Bay, Godhavn, Narsarssuak, Reykjavik, Anchorage.

Definitely planned : Cape Linné, Nurmijärvi, Sodankilä, Thule, Jan Mayen.

2.2. ANTARCTIC ZONE. — At the present time, there are no regular ionospheric soundings above about 65° S. Information available indicates that this deficiency will be at least partially met during the International Geophysical Year. Between 50° and 65° S there are at present five stations making regular observations. During or before the International Geophysical Year this number will be increased to at least ten stations, three of which will lie within 10° of the south pole.

C.S.A.G.I. recommendations are made for locating an additional eight station in this region if expeditions can be organized. (See Table III).

TABLE III. — *Antarctic Zone* : Ionospheric Stations

Existing Stations : Kerguelen, Macquarie, Campbell, Falklands, Deception Islands.

Definitely planned : Terre Adélie, Little America, Southern Polar Plateau, Rockefeller Plateau (Marie Byrd Land), Port Lockroy.

Recommended : Bouvet I., Astrid Coast, Knox Coast, Ross I., Peter I., Vahsel Bay, Mawson (Camp Coast), Enderby Land.

2.3. EQUATORIAL ZONE. — Locations of stations in the tropics have been considered in relation to the geographic, geomagnetic, and dip equators. C.S.A.G.I. has considered a number of north-south sections across the equatorial region at which observing stations already exist and proposals for additional stations are indicated in Table IV:

TABLE IV. — *Equatorial Belt* : Ionospheric Stations

Longitude	10° E	30° E	80°
Existing Stations (a)	Tamanrasset Ibadan Bangui Léopoldville	Djibouti Lwiro Nairobi	Delhi Ahmedabad (Calcutta) Bombay Madras Kodaikanal
Definitely planned		Elisabethville Khartoum	Trivandrum
Recommended	Gao	Bunia	Colombo

Longitude	120° E	140° E	160° W	80/70° W
Existing Stations (a)	Okinawa Formosa Baguio Nha-Trang Singapore	Guam	Maui Raratonga	Talara Huancayo (Sao Paolo)
Definitely planned		Yap Hollandia	(Palmyra) (b)	Paramaribo La Quiaca
Recommended	Djakarta	Palau Cape York	Marquesas Isl. Christmas Isl.	Quito La Paz Tucumán

(a) Besides these there exist two isolated stations in the Equator Belt viz. Dakar and Djibouti.

(b) It is suggested to replace the proposed Palmyra station by Christmas Isl.

More specific recommendations concerning the implementation of the additional eleven equatorial stations are given in the formal resolutions.

2.4. MERIDIAN 10° E. — The distribution of stations near this meridian is highly concentrated in Europe but additional stations are certainly required at lower latitudes and in the southern hemisphere. C.S.A.G.I. makes special recommendations for locating four additional stations along this meridian. (See Table V).

TABLE V. — Longitude 10° E : Ionospheric stations

Existing Stations : Tromsø, Kiruna, Luleå, Oslo-Kjeller, Uppsala, De Bilt, Lindau, Freiburg, Graz, Schwarzenburg, Poitiers, Tortosa, Tamanrasset, Ibadan, Bangui, Léopoldville, Capetown.

Definitely planned : Cape Linné, Italy, Bizerte.

Recommended : Gao, 15° E, 23° S, Bouvet I., Astrid Coast.

2.5. MERIDIAN 140° E. — Near this meridian it is known that eleven stations will be in regular operation in or before the International Geophysical Year.

C.S.A.G.I. makes special recommendations for the establishment of three additional stations (Table VI). All these stations are located below 45° N and it is hoped that U.S.S.R. will take steps to complete the northerly section of this chain.

TABLE VI. — *Longitude 140° E* : Ionospheric Stations

Existing Stations : Wakkanai, Akita, Kokubunji, Yamagawa, Guam, Townsville, Canberra, Hobart.
Definitely planned : Yap, Hollandia, Terre Adélie.
Recommended : Iwo Jima, Palau, Cape York.

2.6. MERIDIAN 70°-80° W. — Fourteen stations are expected to be in regular operation near the 70°-80° W meridians. In the northern hemisphere the chain is fairly satisfactory but additional stations are certainly required in the southern hemisphere.

C.S.A.G.I. makes specific proposals for completing this chain. (See Table VII).

TABLE VII. — *Longitude 70/80° W* : Ionospheric Stations

Existing Stations : (Resolute Bay), (Baker Lake), (Churchill), Ottawa, Forth Monmouth, Washington, Panama, Talara, Huancayo, (Falklands), Deception Is., Port Lockroy.
Definitely planned : (Thule), La Quiaca.
Recommended : Florida, Quito, La Paz, Tucumán, c45° S, Concepcion.

Note. — Stations in parentheses lie outside the zone $\pm 10^\circ$ from the standard meridian.

3. — VERTICAL INCIDENCE IONOSPHERIC ABSORPTION MEASUREMENTS

(a) *Pulse reflection methods.* — At present six stations make regular ionospheric measurements using pulse reflection methods. These are Slough, Lindau/Harz, Oslo, Freiburg, Dakar, Singapore. The National Committee reports contain proposals for similar measurements at eleven additional stations, viz : Tromsø, Paris, Tamanrasset, Djibouti, Bangui, Lwiro, Tananarive, Kerguelen, Churchill, Ottawa, Sao Paulo. Of the six stations now making regular observations, four are located in Europe and employ somewhat different techniques.

C.S.A.G.I. suggests that in the immediate future (certainly before the next meeting of C.S.A.G.I.) an intercomparison of

results obtained by the various European groups should be made and agreement established. When this has been done it should not be difficult to ensure that the seventeen stations listed above will provide reliable and comparable absorption data. A study of the location of most of the seventeen stations shows a fair concentration near the 10° E meridian. Accordingly, C.S.A.G.I. feels that, in the immediate planning of additional stations for absorption observations, it would be profitable to develop this chain. It is therefore proposed that absorption measurements should be undertaken during the International Geophysical Year at the following locations : Italy, Bizerte, Gao, Ibadan, Leopoldville, and at a site near the meridian at approximately 20° S. (It is emphasized, however, that absorption experiments at any other new locations should also be encouraged). To ensure comparable results it is recommended in all cases that measurements be undertaken after consultation with one or another of the existing European groups. During the International Geophysical Year it is proposed that absorption measurements be made each day at noon and at least at hourly intervals on World Days.

C.S.A.G.I. notes that the subject of ionospheric absorption measurements is being considered by a special U.R.S.I. committee and expresses the hope that the recommendations of this committee concerning measurement technique will be of such a nature as will permit routine absorption measurements at many additional stations; and it is strongly recommended that organizations responsible for groups of ionospheric stations be fully informed of the discussions of this committee.

(b) *Absorption measurements using radio star radiations.* — Up to the present time only limited information is available concerning ionospheric absorption measurements using this technique, but proposals for such measurements are made in a few National Committee reports.

C.S.A.G.I. recommends that adequate investigations of the possibility of this technique, both for routine ionospheric absorption measurements and for the thorough study of polar black-outs should be made in the immediate future, and if possible, the conclusions made available within the next year.

4. — IONOSPHERIC DRIFT MEASUREMENTS

Details of proposed and existing stations measuring ionospheric drifts are given in Table VIII. C.S.A.G.I. notes that the subject is also being considered by a special U.R.S.I. committee.

TABLE VIII. — *Stations for Drift Observations*

Methods : A. — Pulse Fading (three receivers).
 B. — Radio Stars.
 C. — Meteors Trails.
 D. — Equivalent Height (three receivers).
 Symbols : + operating 0 planned

Stations	E-Region Drift		F-Region Drift		
	A	C	A	B	D
Tromsø	0				
Sodankylä				0	
College	0			0	
Churchill	0				
Oslo-Kjeller	+				
Jodrell Bank		+		+	
Köln	+		+		
Cambridge	+			+	
Swansea					+
Saskatoon				0	
Neuf-Brisach	+		0	0	
Ottawa	0			0	
Pennsyl. State	+				
Boulder	0				
Stanford		+			
Tokyo	0				
Tamanrasset	0				
Calcutta			0		
Ahmedabad			+		
Puerto Rico.....	+		+		
Dakar			+		
Balboa	0				
Bangui	0				
Huancayo.....	0				
Tananarive	0				
Adelaide		+			
Perth.....					+
Sydney				+	+
Terre Adélie	0				

At the present time a number of different methods are being used for drift measurements, and in this connection C.S.A.G.I. recommends that as soon as possible an intercomparison should be made of simultaneous results obtained by these different methods. Furthermore it is also desirable to confirm that consistent results are obtained by the same method at neighbouring locations. These suggestions apply to drift measurement in the case of both regions E and F.

In the light of available information C.S.A.G.I. proposes that during the International Geophysical Year systematic ionospheric drift observations should be made in at least three zones, in a north and south temperate zone and in the equatorial zone. If the effort is available, drift measurements near the auroral zones would also be of interest. Since only a limited number of stations appear likely to make measurements of this kind, it is considered desirable in the first instance to develop a group of observing stations in limited ranges in longitude.

In the northern hemisphere two groups of stations appear possible — one in America and one in Western Europe. Few specific proposals have been received for drift measurements in the southern hemisphere.

C.S.A.G.I. suggested that consideration should be given to the possibility of such measurements being made by the Australian group of stations.

In the equatorial zone, the most favourable possibility is for drift measurements to be made at existing ionospheric stations in Africa, located in the area lying between approximately $\pm 25^\circ$ of the equator and between 20° W to 30° E in longitude.

5. — IONOSPHERIC SCATTER

5.1. BACK SCATTER OBSERVATIONS. — The back scatter technique is valuable in that it will provide ionospheric observations over inaccessible localities. The technique therefore is very profitable for polar zones and large oceanic areas. Back scatter measurements at Dakar, St Johns, Paramaribo and Puerto Rico could provide useful supplementary information over the Atlantic Ocean, and soundings made at Stanford, Anchorage, and Balboa could provide data over the Pacific Ocean. Further details of efforts and planned stations are given in Table IX.

TABLE IX. — *Stations for Backscatter Sounding*

Existing and planned stations :

- (a) Fixed frequency : Slough (U. K.); Boston, Stanford, Washington (U.S.A.); St Johns (Canada); Narsarsuak, Thule (Greenland); Reykjavik (Iceland); Balboa (Canal Zone); Little America, Rockefeller Plateau-Marie Byrd Land (Antarctica).
- (b) Multifrequency : Washington, Boulder, California (U.S.A.); Thule (Greenland); Anchorage (Alaska).

Recommended additional stations. Multifrequency only : Reykjavik, Narsarsuak, St Johns, Dakar, Freiburg, Paramaribo, Porto Rico, Rome.

It is recommended that during the International Geophysical Year systematic back scatter observations be made at least on World Days.

C.S.A.G.I. strongly recommends that in the immediate future direct comparisons be made between ionospheric results obtained from back scatter observations and those obtained by vertical incidence soundings, so that the maximum possible information can be derived from A.G.I. back scatter soundings.

5.2. FORWARD SCATTER SOUNDINGS. — No specific information is yet available concerning forward scatter soundings during the International Geophysical Year but C.S.A.G.I. strongly endorses the proposal of U.R.S.I. in this matter and suggests that National Committees forward their plans to C.S.A.G.I. within the next year.

6. — ATMOSPHERIC AND TERRESTRIAL NOISE OBSERVATIONS

C.S.A.G.I. fully endorses the proposals made by the U.R.S.I.-A.G.I. Committee for atmospheric and terrestrial noise observations during the International Geophysical Year (See section 8.5. below).

7. — (i) SCALING AND INTERPRETATION OF POLAR IONOSPHERIC RECORDS

(ii) CLASSIFICATION OF Es PHENOMENA

(iii) INTERCHANGE OF INFORMATION AND DEVELOPMENT OF CODES

C.S.A.G.I. notes that these problems are being considered by appropriate U.R.S.I. sub-committees and expresses the hope that reports will be available before the next meeting of C.S.A.G.I.

8. -- RESOLUTIONS

8.1. WORLD DISTRIBUTION OF VERTICAL INCIDENCE SOUNDING STATIONS :

8.1.1. C.S.A.G.I. recommends that all existing stations continue operation through the International Geophysical Year.

8.1.2. C.S.A.G.I. endorses the plans of Belgium to install a key station on the geomagnetic equator at Bunia, Belgian Congo.

8.1.3. C.S.A.G.I. recommends that every effort be made to return the Khartoum station to full operation prior to the International Geophysical Year.

8.1.4. C.S.A.G.I. recommends that French authorities should consider the possibility of establishing a station at Gao as part of the proposed equatorial network.

8.1.5. C.S.A.G.I. welcomes the proposal to establish a station for systematic observations in Italy and recommends that it should be located approximately halfway between the existing station at Schwarzenburg and the proposed station near Bizerte, North Africa.

8.1.6. C.S.A.G.I. calls attention to the gap in the ionospheric network in the zone 15° - 23° S, 10° - 20° E. This requirement could be met by a station in Angola or Southwest Africa.

8.1.7. C.S.A.G.I. warmly commends the plan of India to move the station now at Tiruchirapalli to a new site at Trivandrum. The latter location will provide a useful station doublet with Kodaikanal for studying the fine structure of equatorial ionospheric variations.

8.1.8. C.S.A.G.I. strongly recommends the renewal of observations at Colombo, Ceylon, since operations here could make a valuable contribution to equatorial zone stations.

8.1.9. C.S.A.G.I. strongly supports the plan of the Netherlands to install a station at Hollandia.

8.1.10. C.S.A.G.I. calls attention to the gap in the world ionospheric network in the zone 0° - 10° S, 100° - 110° E. This deficiency could be met by a station in Java.

8.1.11. C.S.A.G.I. notes that the former station at Cape York, Australia, provided very important observations over a period of

about four years. C.S.A.G.I. strongly recommends that further data be obtained from this locality during the International Geophysical Year. If possible it is highly desirable that ionospheric observations be resumed at Cape York, but if this proves impracticable, an ionospheric station should be installed in conjunction with the geomagnetic station planned for Port Moresby.

8.1.12. C.S.A.G.I. strongly endorses the U. S. A. plan to install a station at Yap, on the geomagnetic equator during the International Geophysical Year.

8.1.13. C.S.A.G.I. calls attention to the desirability of establishing an ionospheric station at Palau Island, a location which with Guam and Yap would complete a closely-spaced triad across the geomagnetic equator near its most northerly extension. Since there are plans for establishing both geomagnetic and airglow observations at Palau, the usefulness of ionospheric data obtained at this site would be correspondingly enhanced.

8.1.14. C.S.A.G.I. recommends that the French authorities consider the establishment of an ionospheric station in the vicinity of the Marquesas Islands. This would help to fill a large gap in the equatorial Pacific area. (It is pointed out that this location is closely antipodal to Djibouti).

8.1.15. C.S.A.G.I. notes with satisfaction the definite plans of the U. S. A. to make ionospheric observations at Palmyra during the International Geophysical Year. However, it is pointed out that a renewal of observations at Christmas Island would perhaps be of greater value as part of the equatorial network. C.S.A.G.I. recommends that consideration be given to this alternative site.

8.1.16. C.S.A.G.I. recommends that strong consideration be given by the U. S. A. to renewing observations during the International Geophysical Year at a site in Florida near 30° N.

8.1.17. C.S.A.G.I. strongly commends the recent installation of an ionospheric station at Talara by Peru in cooperation with the U. S. A.

C.S.A.G.I. also strongly emphasizes the critical importance for the ionospheric program of the continued operation of both the Talara and Huancayo stations and the maintenance of observations of the highest standard.

8.1.18. C.S.A.G.I. calls attention to the gap in the important equatorial section (along the 75° W meridian chain) near Quito Ecuador, and recommends that observations be made in this locality during the International Geophysical Year.

8.1.19. C.S.A.G.I. calls attention to a gap in the network of stations in the vicinity of La Paz, Bolivia (near 68° W, 17° S). This location is invaluable for equatorial ionospheric studies. C.S.A.G.I. recommends that the Bolivian authorities consider in this way the feasibility of participating in the ionospheric program of the International Geophysical Year.

8.1.20. C.S.A.G.I. welcomes the plan of Argentina to operate additional stations during the International Geophysical Year and suggests that every effort be made to install an automatic recorder at La Quiaca. C.S.A.G.I. further recommends that, as a contribution towards the geomagnetic equatorial network, Tucumán (27° S- 65° W) be considered as the site of a second automatic ionospheric station. C.S.A.G.I. also endorses the Argentine plan for semi-automatic stations along the southern coast of Argentina and recommends that in siting these every effort be made to avoid overlapping with existing stations in respect of geomagnetic latitudes. It is recommended that one of these should be at approximately 45° S.

8.1.21. C.S.A.G.I. recommends the installation of a new station at or near Concepcion, Chile (37° S- 73° W).

8.1.22. C.S.A.G.I. notes the important geophysical work which has been carried on in the southern hemisphere at Kerguelen, Campbell and Macquarie Islands, and strongly recommends that the responsible authorities continue the observations, including ionospheric, at least through the International Geophysical Year.

8.1.23. C.S.A.G.I. recommends the installation of an ionospheric station on Bouvet Island (55° S, 4° E). At present no ionospheric station exists near the 10° E meridian south of latitude 35° S.

8.1.24. C.S.A.G.I. strongly recommends that during the International Geophysical Year a special effort be made to obtain ionospheric data in the Antarctica. C.S.A.G.I. strongly supports

the proposals which have been made to establish ionospheric stations at :

Terre Adelie	(140° E-67° S)
Mawson	(63° E-68° S)
Port Lockroy	(64° W-65° S)
Marie Byrd Land (Rockefeller Plateau)	(120° W-80° S)
Little America	(164° W-79° S)
South Polar Plateau	(90° S)

Furthermore, to ensure a more complete antarctic network, C.S.A.G.I. recommends that additional stations should be established at or near the following localities :

Knox Coast	(105° E-67° S)
Enderby Land	(62° E-75° S)
Princess Astrid Coast	(10° E-70° S)
Vahsel Bay	(35° W-77° S)
Peter Island	(90° W-68° S)

8.1.25. C.S.A.G.I. recognizes that some of the recommended sites for A.G.I. stations are in remote parts of the world or in areas where scientific activity on the scale recommended may be difficult to implement by the responsible authorities. It calls attention to the success which may be achieved through the cooperation of several nations in the establishment, equipping, or operation of such stations. Accordingly, C.S.A.G.I. recommends that consideration be given to such cooperation in establishing some of the stations listed above ; for example Bouvet, Concepcion, Tucumán, Java, etc., and expeditions to the Antarctica.

8.2. VERTICAL SOUNDINGS FROM AIRCRAFT. — C.S.A.G.I. endorses the U. S. A. plan to make ionospheric soundings from aircraft and recommends that emphasis be placed on polar and equatorial flight paths which pass over two or more operating stations. Furthermore, whenever possible, flights should be undertaken on regular World Days or during Special World Intervals.

8.3. IONOSPHERIC ABSORPTION NETWORK :

8.3.1. Vertical incidence sounding methods : C.S.A.G.I. recommends that in the immediate future an intercomparison should be made of absorption results obtained by different vertical incidence sounding methods.

8.3.2. Absorption measurements using cosmic noise sources : C.S.A.G.I. recommends that in the immediate future careful studies should be made to explore fully the possibility of this method of measuring both normal ionospheric absorption and the abnormal absorption which occurs during polar blackouts.

8.3.3. C.S.A.G.I. calls attention of the U.R.S.I. sub-committee on ionospheric absorption measurements to these resolutions.

8.4. IONOSPHERIC DRIFTS :

8.4.1. C.S.A.G.I. recommends that during the International Geophysical Year advantage be taken of the high concentration of ionospheric sounding stations in Europe for the purpose of studying large scale movements.

8.4.2. C.S.A.G.I. recommends that in the immediate future an intercomparison should be made of drift measurements made by different techniques and also of simultaneous measurements undertaken by the same techniques at neighbouring : sites. The attention of the U.R.S.I. sub-committee on ionospheric drifts is drawn to this resolution.

9. — RESOLUTIONS OF THE MIXED COMMISSION ON THE IONOSPHERE AND U.R.S.I.

C.S.A.G.I. endorses the following resolutions which were formulated by the Mixed Commission on the Ionosphere (M.C.I.) at its meeting in Brussels, August, 1954, and by U.R.S.I. at its XIth General Assembly at the Hague, August, 1954.

9.1. DATA ON IONOSPHERIC STATIONS. — The M.C.I. stresses the need for a document giving full information concerning all ionospheric stations expected to be in operation during the International Geophysical Year and invites National Committees to submit such information to the Secretary General of U.R.S.I. on the lines of the request already published in U.R.S.I. *Information Bulletin*, n° 84.

The Secretary General of U.R.S.I. and the Secretary of the M.C.I. will then cooperate to produce a document containing all necessary information concerning ionospheric stations. The M.C.I. recommends that the document should be published as a Special Report by U.R.S.I.

9.2. CALCULATION OF SOLAR ZENITH ANGLES. — The M.C.I. recommends that each ionospheric station (or the responsible organization) should undertake the calculation of the solar zenith angles appropriate to its location.

The calculations should be made for the 15th days of each month at hourly intervals from sunrise to sunset, due consideration being given to factors such the equation of time and local time corrections.

9.3. THE IONOSPHERIC PARAMETER f_{\min} AND « M » FACTORS. — The M.C.I. recommends every ionospheric station to make observations of « M » factors and of f_{\min} , and in the case of the latter to attempt to give some significance to such measurements by making adequate calibration of their equipment. (It is of course understood that the critical frequency measurements will continue to be of first priority in vertical incidence P'f measurements).

9.4. PUBLICATION OF IONOSPHERIC DATA. — The M.C.I. recommends that during the International Geophysical Year all ionospheric stations should publish both mean and median values. It is further recommended that whenever possible hourly values of the parameters should be published, and in cases where this may not be possible it is suggested that such hourly values should always be available to bona-fide applicants.

9.5. BACK SCATTER OBSERVATIONS. — The M.C.I. recommends that ionospheric stations should be encouraged to make systematic back scatter observations during the International Geophysical Year, at least on World Days, so to provide ionospheric information for localities not readily accessible to direct vertical incidence sounding.

9.6. IONOSPHERIC INDEX OF SOLAR ACTIVITY. — The M.C.I. stresses the importance of developing an ionospheric index of solar activity for each day of the International Geophysical Year. It is proposed that a Sub-Committee of the M.C.I. consisting of Dr. Bartels (convenor), Dr. H. D. Menzel and Professor C. W. Allen shall study the manner in which such indices can be derived. The M.C.I. will inform the International Astronomical Union that is proposing to formulate such indices and will invite the collaboration of astronomers in this work.

9.7. EQUATORIAL OBSERVATIONS DURING THE INTERNATIONAL GEOPHYSICAL YEAR. — The M.C.I. recommends that during the International Geophysical Year, special attention should be given to geophysical phenomena in the equatorial belt (within about $\pm 20^\circ$ of the geomagnetic equator).

9.8. MAGNETIC DISTURBANCE INDEX K_p . — The M.C.I. strongly supports the proposal to make available during the International Geophysical Year values of the magnetic disturbance index K_p at 1/4-hourly intervals in addition to the 3-hourly values now circulated.

9.9. ROCKET RESEARCH AND THE IONOSPHERE. — The M.C.I. strongly reaffirms its earlier resolutions on the importance of rocket research investigations of the ionosphere and urges that the maximum possible use be made of rockets for this work during the International Geophysical Year particularly in the zones (polar and equatorial) already recommended for special studies.

9.10. AIRGLOW OBSERVATIONS. — The M.C.I. recommends that cooperating countries on or near the selected meridians be invited of night-time airglow and of movements of irregularities in its luminosity.

9.11. CENTRAL BUREAU FOR IONOSPHERIC DATA OF THE INTERNATIONAL GEOPHYSICAL YEAR. — The M.C.I. recommends that consideration be given by U.R.S.I. to establishing a special bureau for collecting all ionospheric data in microfilm form during the International Geophysical Year.

9.12. INTERCHANGE OF IONOSPHERIC DATA. — The M.C.I. strongly supports the following resolution which will come before the next Assembly of U.R.S.I. :

« Since the effectiveness of an international program of research depends on the sharing of observational results among participants, U.R.S.I. favours a free interchange of ionospheric data between countries in expectation that a similar exchange of information will be encouraged by other countries ».

9.13. PREPARATION FOR THE PROGRAM OF THE INTERNATIONAL GEOPHYSICAL YEAR. — The M.C.I. stresses the importance of getting all new equipment fully working before the International Geophysical Year, so as to ensure complete readiness

when the International Geophysical Year commences. The Commission also wishes to emphasize the need of Government support now for the various national projects planned as part of the International Geophysical Year program.

U.R.S.I. also adopted the following Resolutions :

9.14. STUDY OF SOLAR RADIATION IN THE HIGH ATMOSPHERE.

— U.R.S.I. recognises the extreme importance of continuous observations, from above the E-region, of extraterrestrial radiations, especially during the forthcoming International Geophysical Year.

U.R.S.I. therefore draws attention to the fact that an extension of present isolated rocket observations by means of instrumented earth satellite vehicles would allow the continuous monitoring of solar ultraviolet and X-radiation intensity and its effects on the ionosphere, particularly during solar flares thereby greatly enhancing our scientific knowledge of the thermosphere.

9.15. MEASUREMENTS OF h_m . — U.R.S.I. recommends that in future ionospheric work $h_m F_2$ (h' for $f/fc = 0.834$) as well as $h' F_2$ shall be observed and recorded.

9.16. GEOMAGNETIC VARIOGRAPHS. — U.R.S.I. approves the proposal for the development of simple geomagnetic variographs with visible recording and a warning device, to be used for recognising the outbreak of magnetic storms and to facilitate the scheduling of detailed ionospheric observations during periods of known disturbance.

9.17. RADIO STAR SCINTILLATIONS. — Observations of the scintillation of radio stars should be carried out on a world-wide basis :

- (i) to determine drift motions in the upper L-region ;
- (ii) to investigate the nature and origin of the diffracting screen which causes the scintillations ;
- (iii) as an adjunct to the study of aurorae.

U.R.S.I. recommends that these measurements be made in the following way :

(a) By observing the Cygnus and Cassiopeia radio sources near vertical incidence in the latitude belt between approximately

N 30° to N 75°. The investigation to be made with three stations separated by a few kilometres, working on a frequency in the range 40 to 90 Mc/s approximately. Continuous observations are desirable, otherwise the emphasis should be on the designated World Days. (By continuous is meant, for example, 5 minutes observations every 30 minutes).

(b) Similar observations in the S hemisphere near vertical incidence are very desirable.

(c) Any observations of the scintillations during the day-time either from radio stars or the sun would be of extreme interest.

It is particularly emphasised that where facilities do not exist for the 3 station work, then observations should be made by one station since this will give the data particularly needed under (ii) and will in any case, give a measure of the drift speed which is closely related to the fluctuation rate :

9.18. METEOR OBSERVATIONS. — U.R.S.I. recommends :

(a) That those stations equipped for measuring winds in the 80 to 100 km height range by the Doppler method on meteor trails should be encouraged to continue during the International Geophysical Year.

(b) That attention be drawn to the possibility of using the meteor height technique for the measurement of scale height and density. The method yields results at least as accurate as the rocket technique and is cheap by comparison. A world-wide survey thus becomes a possibility.

(c) With respect to the continuous observations of meteor activity it is considered that the continuation of the measurements at Manchester (England) will give the necessary information for the N hemisphere. It is strongly urged however that efforts be made to obtain similar data for the S hemisphere by observations either in Australia or New Zealand.

9.19. FORWARD SCATTER OBSERVATIONS. — U.R.S.I. recommends :

That plans for the International Geophysical Year should include systematic *vhf* forward scatter observations with high power by both continuous wave and pulse method. Such observations

should be made at all latitudes, but especially in polar latitudes and possibly near the magnetic equator.

9.20. ATMOSPHERIC AND TERRESTRIAL NOISE OBSERVATIONS.
— In the course of the International Geophysical Year U.R.S.I. recommends that the following observations be carried out :

9.20.1. Measurements of the atmospheric noise and level should be made at as many sites as possible and the work should be extended to both high and low latitudes and also extended to very low frequencies. The subjective and objective methods should be compared.

9.20.2. Participating nations should, as far as possible, equip their stations with goniometers permitting the location of storm centers.

9.20.3. Observations should be carried out at different parts of the globe to study the relationship between the enhancement of atmospherics on 27 kc/s and solar chromospheric eruption.

9.20.4. Groups of observers in different parts of the world should make simultaneous recordings of the form of atmospherics produced by lightning flashes located by goniometers.

9.20.5. According to the theory which has been suggested to explain certain types of « whistling atmospheric », the observation of this phenomena at different latitudes should furnish data on the electron concentration at distance of many earth radii. Therefore it is recommended that observations should be made in many localities during the International Geophysical Year :

- (a) for checking the theory ;
- (b) for studying the high atmosphere if the theory proves correct ;
- (c) for establishing whether there is a correlation between magnetic disturbance and the occurrence of « whistlers » ;
- (d) for studying other manifestations of this type not explained by the theory.

Simultaneous observations should be made near the poles, near the magnetic equator, at 2 or 3 intermediate latitudes with at least one pair of observatories situated at the extremities of a magnetic line of force, and at the intermediate latitudes.

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N° 10. July 1954, Idem between 1st January 1953 and 31st July 1953.

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INTERNATIONAL SCIENTIFIC AND TECHNICAL CONFERENCES

Date	Subject	Organizer	Location
1955 April 4-6	Faraday Society. General Discussion on Microwave and Radio Frequency Spectroscopy.	Dr. F. C. Tompkins Secretary of Faraday Society, 6, Gray Inn Square, London W. C. 1.	Cambridge, England
April 14	W. M. O. 2nd Congress.	Dr. G. Swoboda, Secretary General W. M. O., 1, avenue de la Paix, Geneva.	Geneva, Switzerland
April 25-30	Electrical discharges in gases see p. 11).	Secretary Dr. A. V. Wagenveld, Mijnbouwplein, 11, Delft, Netherlands.	Delft, Netherlands
April	Symposium on Elementary Particles (I.U.P.A.P.).	Prof. P. Fleury, Secretary General I.U.P.A.P., 3, boulevard Pasteur, Paris 15 ^e .	Pisa, Italy
Spring	International Union of Biochemistry, 1st General Assembly.	Prof. M. Florin, Chairman of Interim Council, 17, Place Delcour, Liège, Belgium.	Europe
May 2-5	2nd Annual Symposium on Semiconductors.	Mr. F. J. Bionti, Chairman, Bell Telephone Laboratories, Murray Hill, New-Jersey.	Cincinnati, Ohio

June 6-18	International Organization for Standardization. General Assembly and Council.	I.S.O. General Secretariat, 39, route de Malagnou, Geneva, Switzerland.	Stockholm
June 13-17	Symposium on Molecular Structure and Spectroscopy.	Prof. H. H. Nielsen. Department of Physics, Ohio State University, Columbus 10, Ohio.	Ohio, U.S.A.
June 27-July 9	International Electrotechnical Commission-Meeting.	Secretary : Mr. L. Ruppert, Commission Electrotechnique Internationale, 39, route de Malagnou, Geneva.	London
June 21-27	I.U.P.A.C. 18th General Conference. 14th International Congress.	Prof. R. Delaby, Secrétaire Général I.U.P.A.C., 4, avenue de l'Observatoire, Paris 6 ^e , and Dr R. Morf, Zurich 1.	Zurich, Switzerland
August 1-6	3rd International Congress of Biochemistry.	Prof. C. Liebecq, Secretary General, 17, Place Delcour, Liège.	Brussels
August 8-13	I.C.S.U. 7th General Assembly.	Prof. A. V. Hill General Secretary of I.C.S.U., The Royal Society, Burlington House, London W 1, and Administrative Secretariat of I.C.S.U., 29 Tavistock Square, London, W. C. 1.	Oslo

Date	Subject	Organizer	Location
August 17-24	Australian and New Zealand Association for the Advancement of Science-Meeting.	The Assistant Secretary Gloucester Street, 157, Sydney, Australia.	Melbourne
August 22-24	International Symposium on Solar Eclipses and the Ionosphere. Mixed Commission on the Ionosphere. I.C.S.U.	Dr. W. J. G. Beynon, Secretary of the Mixed Commission, Department of Physics, University College of Swansea, Singleton Park, Swansea, Great Britain.	London
August 25-27	International Symposium on Radio-Astronomy I.A.U. (by invitation).	Prof. P. Th. Oosterhoff, Secretary General I.A.U., Observatory, Leiden, Netherlands.	Manchester, Great Britain
August 29- September 5	U.A.I. 9th General Assembly. Radio-astronomy, comparison of large-scale structure of our galaxy with that of other galaxies; nonstable stars; turbulence in stellar atmospheres; fundamental stars; solar flares; image converters.	Idem.	Dublin, Ireland

August 31- September 7	British Association for the Advancement of Science.	The Secretary, Baas, Burlington House, London, W 1.	Bristol, England
September	U.R.S.I. A.G.I. Committee 2nd Meeting (by invitation).	E. Herbays, Secretary General, U.R.S.I., 42, rue des Minimes, Brussels.	Brussels
September 10-15	International Congress on Cosmic Radiation, Commission on Cosmic Rays of I.U.P.A.P. Primary radiation, extensive air showers, time variations and correlations, and theories of the origin of cosmic rays.	Prof. P. Fleury, Secretary General I.U.P.A.P., 3, boulevard, Pasteur Paris, 15 ^e .	Mexico, D.F., Mexico
September 10-15	Symposium on Cosmological and Geophysical Implications of Cosmic Radiation I.U.P.A.P.	Idem.	Idem
September 12-17	3rd Symposium on Information Theory. The concept of information in mathematics; philosophy; psychology; computers and automata; data handling; sense prosthesis; cryptanalysis; noise; scientific method; physics; economics and social theory.	Dr. E. Collin Cherry, Department of Electrical Engineering, Imperial College of Science and Technology, City and Guild College, Exhibition Road, London, S. W. 7.	London

Date	Subject	Organizer	Location
September 26-28	International Union of Theoretical and Applied Mechanics. Symposium on the Solid State and Plasticity.	Prof. F. H. Van den Dungen, Secretary of I.U.T.A.M., 41, avenue de l'Arbalète, Boitsfort, Belgium.	Madrid
Undecided	Symposium on Ultrasonics I.U.P.A.P.	Prof. P. Fleury, Secretary General, I.U.P.A.P., 3, boulevard Pasteur, Paris 15 ^e .	Marseilles, France
1956	Colloquium on Magnetism I.U.P.A.P.	Sir K. S. Krishnan, Indian National Physical Laboratory, New Delhi, India.	New Delhi
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, U.S.A., and Prof. W. D. Wright, Imperial College, South Kensington, London, S. W. 7.	Boston, Mass., U.S.A.
April	Colloquium on Electron Physics I.U.P.A.P.	Dr. L. Marton, National Bureau of Standards, Washington.	Charlottesville, Virginia

August 8	18th International Congress of Theoretical and Applied Mechanics	Prof. F. H. Van den Dungen, Secretary I.U.T.A.M., 41, Avenue de l'Arbalète, Boitsfort, Belgium.	Brussels
September 10-14	Colloquium on Transport Phenomena in Metals.	Dr. K. C. Mac Donald, National Research Council, Ottawa, Canada.	Ottawa
1957 July 1-December 1958	International Geophysical Year.	M. Nicolet, Secretary General C.S.A.G.I., 3, Avenue Circulaire, Uccle, Belgium.	
August	U.R.S.I. XIIth General Assembly (by invitation).	E. Herbays, Secretary General U.R.S.I., 52, rue des Minimes, Brussels.	Boulder, Colorado U.S.A.

