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International Scientific Radio Union
U. R. S. I.

INFORMATION BULLETIN

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CONTENTS

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Xth GENERAL ASSEMBLY

Publications

We have to inform our readers that fascicules 1 to 8 of the Proceedings of the Xth General Assemblies (Vol. IX) have been sent to the National Committees for distribution to their members. Supplementary copies are available at the following prices :

	B. F.	sh.	U.S.A. Dollars
Fasc. 1 (Administrative proceedings) ..	75	10/1	1.5
Fasc. 2 (Commission I)	50	7/2	1
Fasc. 3 (Commission II)	65	9/4	1.3
Fasc. 4 (Commission III)	80	11/	1.6
Fasc. 5 (Commission IV)	40	5/6	0.8
Fasc. 6 (Commission V)	90	12/8	1.8
Fasc. 7 (Commission VI)	40	5/6	0.8
Fasc. 8 (Commission VII)	50	7/2	1

Fascicule 1 is concerned with the proceedings of the full sessions, the Secretary's report, the list of reports and papers submitted to the General Assembly, the resolutions and the National Committee progress reports.

The fascicule related to Commissions contain the full text of reports submitted to the Commissions, the minutes of sessions and the resolutions submitted to the General Assembly.

COMMISSIONS

Ordinary Members

In accordance with article 4 of the Rules for Commissions, were elected as Ordinary Members :

Commission I :

MMrs. Shogo AMARI (Japan).
Gennosuke HARA (Japan).
Hiroshi SEIMIYA (Japan).

Commission II :

MMrs. Tetsuo KONO (Japan).
Saburo MATSUO (Japan).
Ichiro MURAKAMI (Japan).
Ch. RYTTER (Norway).

Commission VI :

MMrs. Nic. KNUDTZON (Norway).
Toshifusa SAKAMOTO (Japan).
Hideo SEKI (Japan).
Hidetosi TAKAHASI (Japan).
Hideo WAKATA (Japan).

Commission VII :

MMrs. Yoshihiro ASAMI (Japan).
Takeo SEKI (Japan).
Shintaro UDA (Japan).
Yasushi WATANABE (Japan).

INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS

Meeting of the Executive Board

Strasbourg, July 9-10, 1953

The following business was carried out :

1. *Defaulting countries.* — Cuba, Hungary and Roumania, not having paid their dues since 1930, 1930, and 1932 respectively, ceased to be National Members.

2. *Future Structure of I.C.S.U.* — The proposal of the Bureau to group the Unions in 5 Federations, namely :

Cosmical Sciences : I.A.U., U.R.S.I.

Earth Sciences : I.G.G.U.

Mathematical and Physical Sciences : I.M.U., I.U.T.A.M., I.U.P.A.P., I.U.Cr.

Life Sciences : I.U.B.S., I.G.U. and new Unions such as Physiology with I.U.H.S. implaced.

Chemical Sciences : I.U.P.A.C.,

was referred to the Unions for further consideration, before the nexth General Assembly of I.C.S.U. in 1955.

3. *Administration and Liaison with Unesco.* — It was agreed that the administrative office should be moved to London, in November 1953, and remain there during the tenure of the present Secretary General. Liaison with Unesco would be maintained from this office.

4. *Geophysical Year* 1957-1958. — A Resolution to invite the cooperation of the U.S.S.R. in this project was adopted, and transmitted to the Moscow Academy of Sciences.

Symposium on Gas Dynamics of Interstellar Clouds

Reprint from the Quarterly Bulletin of I.C.S.U., *n*° 43,
July-September 1953

This symposium, held in Cambridge, England, from July 6-11, was the second of its kind to be organized jointly by the International Astronomical Union and the International Union of Theoretical and Applied Mechanics, the first having been held in Paris in 1949.

Dr. J. M. Burgers, joint Secretary with H. C. van der Hulst of the meeting, writes from the Technische Hogeschool, Delft :

The discussion at the Symposium, both during the session and on other occasions, were very lively and to the point, since many of the scientists present were acquainted with each other's ideas. The symposium consequently could lead to a considerable depening of insight in several problems concerning the motion of the interstellar gas and it brought a marked advance when compared with the preceding meeting, held in Paris in 1949, without which, however, the present results could not have been achieved. A matter of great importance was the recognition of the decisive influence of gain and loss of energy of the gas through radiative processes, which has a great effect on its equation of state and consequently comes into every problem of motion. It has become clear that collisional phenomena of a variety of types play a complicated role in the energy balance. Another point of great interest is the recognition of a new type of turbulence, in which an irregular collection of compression and expansion waves forms the primary features. This « compressional turbulence » (in which changes of density are preponderant) must be distinguished from the ordinary or « shear turbulence », which is the type appearing in incomprehensible fluids and which thus far has received most attention. In a compressible medium, one form is generated by the other one. In the interstellar gas it is the compressible turbulence which probably plays the primary part ; it is caused by the heating and ionisation of the gas throught the radiation from hight temperature stars, which heating is a random distribution in space and time. In consequence of the non linear character of the equations governing the behaviour of the gas, shock waves

are continually developping out of the system of compression waves ; when shock waves meet in an appropriate way, stronger shock waves can be generated, while on the other hand dissipation of energy through viscous forces, thermal conductivity, electric and magnetic fields, detract energy from the shock waves. The statistical treatment of such a collection of shock waves will form an interesting, but extremely difficult, problem for future work. It is possible that the energy spectrum connected with shock wave turbulence will differ from the energy spectrum found in the case of shear turbulence.

It is intended to publish the Proceeding of the Symposium, in a volume of similar size as that prepared after the Paris Symposium. Again much attention will be given to an adequate rendering of the discussions.

The hope was expressed that a third Symposium may be organised on similar lines, after say a period of 3 years.

MIXED COMMISSION ON THE IONOSPHERE

Summary of the Proceedings at the Brussels Meeting of the Comité Spécial de l'Année Géophysique Internationale (C.S.A.G.I.) (June 30-July 3rd, 1953)

Note. — This brief report of the recent Brussels meeting of C.S.A.G.I. has been prepared by Dr. W. J. G. Beynon for members of the Mixed Commissions on the Ionosphere (M.C.I.) and for the Special A.G.I. Committee of U.R.S.I. It is only intended to cover those aspects of the proceedings of particular interest to the M.C.I. and U.R.S.I. The full report of the meeting will be circulated in due course by the General Secretary of C.S.A.G.I. and should be consulted for further details.

1. The following members and alternates were present :

Prof. S. CHAPMAN, Col. E. HERBAYS (I.C.S.U.) ;
Prof. J. DANJON, Dr. M. NICOLET (I.A.U.) ;
Prof. J. COULOMB, Mr. LACLAVERE, Mr. V. LAURSEN (I.G.G.U.) ;
Dr. L. V. BERKNER, Prof. M. BOELLA, Dr. W. J. G. BEYNON (U.R.S.I.) ;
Prof. J. VAN MIEGHEM (W.M.O.) ;
Mr. J. M. WORDIE (I.G.U.).

In addition the following observers were present :

France : R. P. P. LEJAY (President U.R.S.I.) ;
Austria : Dr. M. TOPERCZER ;
Germany : Prof. J. BARTELS ;
India : Dr. T. V. RAMAMURTI, Dr. V. SARABHAI ;
Japan : Dr. T. NAGATA ;
Netherlands : Dr. J. VELDKAMP ;
Norway : Prof. J. SOLBERG, Dr. L. HARANG ;
Sweden : Dr. N. HERLOFSEN ;
U.S.A. : Dr. W. W. ATWOOD, Dr. J. KAPLAN.

2. At the first session Prof. S. Chapman was elected President of the Commission, Dr. L. V. BERKNER, Vice-President and Dr. M. NICOLET, General Secretary.

Col. Herbays was warmly thanked for his preparatory work as Convenor and Provisional Secretary and he agreed to continue in this office until 31st October, 1953.

3. The Commission received 26 reports concerned with the A.G.I. from National Committees, International Unions and from W.M.O. The need for obtaining the cooperation of the U.S.S.R., in A.G.I. projects was discussed and I.A.U. and W.M.O. were invited to make further efforts to effect such cooperation.

4. The field of work was divided as follows ; Working Parties being appointed to formulate reports and resolutions in the light of the documents received by the Commission. Meteorology, Magnetism, Airglow and Aurorae, Cosmic Rays, Solar Activity, Ionosphere, Longitudes and Latitudes, Glaciology, Oceanography, Publications. The reports and resolutions of these Working. Parties were received and adopted at the Final Session of the Commission and matters of especial interest to U.R.S.I. or M.C.I. are summarised below.

I. — WORLD DAYS

During the A.G.I. there will be a series of « World Days » designated on which special geophysical observations of all kinds will be made. These World Days will be of two kinds « Regular World Days » — two per month near new and full moon and defined in advance by W.M.O. In addition there will be « Special World Days » — again about two per month designated at short notice to cover expected abnormal geophysical conditions. Such abnormal conditions may be storm conditions or periods of extreme quiet.

II. — IONOSPHERE

1. In siting new ionospheric stations priority should be giving to three lines of longitude (near 75° W, 10° E and 140° E), to the auroral zone, and to equatorial regions.

2. Types of measurements.

The following order of priority is suggested :

(*a*) Vertical incidence (h', f) recording — generally at hourly intervals but at 1/4 hour intervals on « World Days ».

(*b*) Vertical Incidence Ionosphere Absorption Measurements — coupled with (P', t) type recording. To be made at least every day at local noon and on World Days at frequent intervals. Use of galactic noise sources suggested for absorption measurements especially in auroral regions during polar black-outs.

(*c*) Wind measurements.

(*d*) Ionosphere storm studies. It is hoped that such studies will be possible within the framework of the programme of normal incidence observations especially those carried out on World Days.

C.S.A.G.I. also recommends the organisation of observations of « whistler » type atmospherics and also of (P', t) ionospheric recording at a suitable station at a time of Giant Magnetic Pulsations (It was recognised that such pulsations are of very infrequent occurrence but the view was expressed that if it could be done some ionospheric measurements coincident with a G.M.P. might prove valuable).

3. The following ionospheric matters were discussed by C.S.A.G.I. and referred to U.R.S.I. for further consideration.

(*a*) The scaling and interpretation of polar ionospheric (h', f) records.

(*b*) The classification and scaling of Sporadic E phenomena.

(*c*) U.R.S.I. is asked to consider the problem of specifying standard methods of measuring ionospheric absorption.

(*d*) The special and important need for developing codes and for disseminating information on geophysical variations during the A.G.I. should be allocated to the Permanent Ursigram Committee of U.R.S.I.

4. Various resolutions already formulated by the M.C.I. were endorsed by C.S.A.G.I. and in addition the following resolution is submitted by C.S.A.G.I. to U.R.S.I. :

« C.S.A.G.I. has formulated the skeleton ionospheric programme for the A.G.I. in relation to other geophysical programmes.

It recommends that U.R.S.I. develops in detail the proposed ionospheric programme, standards of measurement and operational procedures along the basic lines adopted by C.S.A.G.I. and, through its representatives on the C.S.A.G.I., report its conclusions to the next meeting of C.S.A.G.I. »

III. — Latitude and Longitude Determinations

C.S.A.G.I. adopted two resolutions dealing with long distance ionospheric propagation of time signals, one stressed the advantages of the bilateral method (emission and reception at each end of the path) and the other emphasised the need for making time signal measurements for paths along which adequate normal incidence ionospheric data are available.

IV. — Auroral Observations

Nine resolutions dealing with auroral observations during the A.G.I. were adopted by C.S.A.G.I. These are briefly outlined below :

(*a*) Visual observations should be made over as wide an area as possible — if possible to give a complete circumpolar and transpolar survey. The cooperation of air lines, ocean going vessels, weather-ships should be sought in addition to voluntary observers and professional meteorological observers.

(*b*) Spectrographic and photometric work on the aurorae should be undertaken in regions where aurorae occur frequently and the cooperation of astronomical observatories and high altitude stations should be sought.

(*c*) A world-wide coverage of radio observations of aurorae should be attempted with a ring of observing stations placed within the optimum observing belt (geomagnetic colatitude 29° to 32°). Three methods of investigation are recommended (i) the radio echo technique (ii) techniques involving the reception of radio waves from radio stars (iii) observation of radio noise emitted by aurorae.

(*d*) Early plans should be made for developing the instrumentation for visual, photographic, photometric and spectrographic studies of nightglow and aurorae.

(*e*) A number of observatories (including at least one in the Southern hemisphere) should study the temporal variations of main spectral features of the airglow and movements of patchiness.

(*f*) A possible correlation between aurorae at both ends of the same magnetic field line should be investigated.

(*g*) Regional centres should be established to organise visual observations and synthesize the results.

(*h*) In addition to special observations on disturbed days observers should be requested to report a possible complete absence of aurora on extremely quiet days.

(*g*) Appropriate national authorities and meteorological organisations should be approached with a request to assist in the transmission (broadcast or teleprinter) of warnings of impending aurorae to observers in sunlit regions to the west.

V. — Atmospherics

C.S.A.G.I. recommends that during the A.G.I. observations of the « whistler » type atmospheric should be made and makes suggestions for siting six stations for this purpose (see also Troposphere).

VI. — Troposphere

The report of the Working Party on Meteorology is a comprehensive document and envisages a programme covering many aspects of meteorological work.

It considered that the recording of atmospherics and studies of the seasonal variation in storm activity should form part of the meteorological programme during the A.G.I. It was also noted that the Swiss had suggested the establishing of a permanent polar radiometeorological station and had offered to actively help in the equipping of such a station.

Referring to Resolution 5 of Commission II of U.R.S.I. at the Xth General Assembly 1952, the report makes the following comment :

« C.S.A.G.I. would like more precise information on the nature, quality, frequency and density of meteorological observations required by radio workers. »

VII. — Solar Observations

C.S.A.G.I. draws attention of astronomical observatories to the need for maintaining a continuous watch of the sun both visually and on radio frequencies during the A.G.I. and point out the great assistance which polar expeditions might give towards achieving such a continuous watch.

Solar phenomena recommended for special studies include chromospheric flares and the daily photometry of the solar corona not visually but by spectrophotometric methods.

Attention is called to the I.A.T.M.E. plan for the continuous measurements of corpuscular solar radiation as inferred from geomagnetic time variations and also to the possibility of obtaining information on corpuscular radiation and solar activity from cometary observations.

Finally C.S.A.G.I. stresses that attention should be given to the need for ensuring that all results on solar activity during the A.G.I. are published in a form most helpful for geophysical studies.

VIII. — Magnetism

C.S.A.G.I. recommends that during the A.G.I., effort should be concentrated on the following two main problems :

(*a*) The spatial and temporal variations in the form of magnetic perturbations, magnetic storms, bays or pulsations.

(*b*) The daily variations in the three elements in the neighbourhood of the magnetic and geographic equators.

It is stressed that these two studies may profitably be combined with corresponding ionospheric measurements.

Other recommendations for the magnetic programme deal with the measurement of magnetic field gradient, the accurate calibration of instruments and the accurate time calibration of magnetograms.

Many proposals and offers to establish new stations were received and approved by C.S.A.G.I. These include proposals for new stations on certain Pacific Isles, in Africa (on the magnetic equator), Belgian Congo, Abyssinia, Khartoum, Hong-Kong, Hollandia, Spanish Guinea, Canary Isles, Tatuoca (Brazil), Kerguelen Isles and in Iceland.

IX. — Cosmic Rays

C.S.A.G.I. has outlined a skeleton programme for Cosmic Ray observations and states that the programme should cover :

« A study of the relationship of Cosmic Ray intensity to solar activity and to geomagnetism. This would also involve an examination of the correlation with associated phenomena such as ionospheric changes, solar radio noise, aurorae and ozone in the atmosphere. »

X. — Publications

Whilst it is considered too early to formulate definite proposals concerning the publication of A.G.I. results, C.S.A.G.I. feels that it is desirable to give preliminary consideration to this important aspect of the work. The following summarises the statement approved by C.S.A.G.I. on this subject :

(*a*) The responsibility for establishing the results obtained during the A.G.I. rests with the National Committees of the participating countries.

(*b*) The Unions and W.M.O. are invited to consider whether it is possible to recommend a uniform presentation for the results obtained in the different scientific domains covered during the A.G.I. and to forward their suggestions on this subject as soon as possible to C.S.A.G.I.

(*c*) C.S.A.G.I. will examine the possibility of giving financial assistance to certain publications.

(*d*) In order to realise points (*b*) and (*c*) the different domains are allocated between the Unions and W.M.O. as follows.
Meteorology : W.M.O.
Magnetism, Aurorae, Cosmic Rays : U.G.G.I.
Ionosphere : U.R.S.I. and M.C.I.
Solar Activity : I.A.U.
Latitude and Longitude : I.A.U. and U.G.G.I.

(*e*) C.S.A.G.I. will prepare and publish a Final Report coordinating conclusions based on results obtained during the A.G.I.

(*f*) C.S.A.G.I. will establish a bibliography covering all papers dealing with work during the A.G.I., grouped according to subject and according to region or country. Every paper listed will be

followed by a short abstract. This bibliography will be published each year from the end of 1958 and will terminate if possible within a period of five years.

(*g*) National Committees are asked to endeavour to ensure that papers published in a language other than English or French should be accompanied by a resume in English or French.

XI. — Rocket Research

A number of the reports of C.S.A.G.I. working parties refer to the value of rocket experiments in upper atmospheric research and the launching of rockets is given as one of the occasions on which Special World Days may be designated during the A.G.I. The following statement on rocket research has been formulated by C.S.A.G.I. « A number of firings of rockets should take place in New Mexico and Australia, and arrangements should be made for firings from ships which go into the polar regions. Information regarding temperature and density, as well as other atmospheric properties, obtained in this way at specific times and places would have to be collated with other less direct observations that are more widely available in space and time. »

W. J. G. Beynon,
Secretary, Mixed Commission on the Ionosphere.

August, 1953.

C.C.I.R.

VIIth Plenary Assembly of London

Report of Meeting of the U.R.S.I. Delegation

Place : Church House, London, England.

Time and date : 1345, 7 September 1953.

Presiding : Dr. J. H. DELLINGER, Chairman of U.R.S.I. Delegation.

Dr. Dellinger called the meeting to order and read the names of the U.R.S.I. representatives to the current Plenary Assembly (Seventh) of the C.C.I.R. as listed in Annex I. They had been named by the U.R.S.I. National Committees and Chairmen of Commissions. As explained by the Chairman, they are representatives for this meeting only, the permanent U.R.S.I. representatives in C.C.I.R. being those named by the Australia, 1952, General Assembly who are Messrs. H. Bremmer (S.G. IV), R. L. Smith-Rose (S. G. V), H. W. Wells (S. G. VI), and B. Decaux (S. G. VII).

The Chairman then named Mr. H. E. Dinger and Mr. Lepechinsky as reporters for the meeting.

Documents 252, 251, 249, and 183 contain the Resolutions of the 1952 U.R.S.I. General Assembly in Sydney, of interest to C.C.I.R. A discussion ensued on the use of these in the appropriate Study Groups.

Drs. Dellinger and van der Pol discussed the individual roles of U.R.S.I. and C.C.I.R. and the desirability of continued close cooperation between them. The policy of U.R.S.I. studying the more basic and research phases of questions, with the C.C.I.R. handling the practical applications, is increasingly recognized as valid and fruitful.

Dr. Smith-Rose pointed out that only about half the member countries of the C.C.I.R. are members of the U.R.S.I. and brought up the question of encouraging additional representation. It

was mentioned that some pre-war participants were no longer represented. It was agreed that additional representation would be most welcome, and should be encouraged through individual contacts. Dr. Dellinger agreed also to bring this to the attention of the President and Secretary of U.R.S.I. He outlined the procedure necessary for countries to join the U.R.S.I.

Mr. Dinger read an excerpt from a letter received by him from Mr. J. A. Ratcliffe, International Chairman of Commission IV, calling attention to the desire for papers on the question, « What are the most easily measured characteristics of terrestrial radio noise from which the interference to different types of communication systems can be determined ». At the Chairman's request, a copy of Mr. Ratcliffe's statement is attached to this report as Annex II. Dr. van der Pol endorsed Mr. Ratcliffe's statement and commented on the origin of the question. A discussion followed on the action to be taken and it was decided that the question should be submitted to C.C.I.R. Study Group II. Drs. van der Pol and Dellinger called attention again to the practical aspects of C.C.I.R. and the scientific aspects of U.R.S.I. Dr. van der Pol, in commenting on Ratcliffe's letter, pointed out that U.R.S.I. desires a precise statement by C.C.I.R. as to the characteristics of radio noise that are important in communication problems. Dr. Dellinger suggested that the same policy of framing specific statements from C.C.I.R. point of view applies also to other questions.

Dr. Dellinger read a letter from Father Lejay, President of U.R.S.I., concerning some French Delegation documents to be submitted on Questions 50 and 52 of interest to the U.R.S.I.

The Chairman next brought up the subject of the 1957-58 International Geophysical Year and outlined the background and current plans. He explained that a Special Committee appointed by the International Council of Scientific Unions had prepared basic plans for world-wide work. One of its Resolutions concerned radio transmission of worl-wide time signals for longitude determination. President Lejay, Secretary Herbays and Dr. Decaux had all requested that the U.R.S.I. delegation bring this to the attention of the C.C.I.R. The delegation considered that this should be taken up in Study Group VII and Dr. Decaux agreed that this would be done.

There was discussion concerning the action to be taken, if any, with U.R.S.I. resolutions concerning the reservation of frequencies for radio noise measurement. It was pointed out that U.R.S.I. is not concerned with frequency allocations, but could suggest proper principles underlying allocations.

The meeting was adjourned at 1450.

H. E. DINGER
(English Reporter)

M. LEPECHINSKY
(French Reporter).

Annex I

U.R.S.I. Representatives

Chairman of U.R.S.I Delegation : Dr. J. H. DELLINGER.

At Large : Dr. VAN DER POL.

France :
M. ANGOT.
Dr. B. DECAUX.
Dr. P. DAIRD.
M. LEPECHINSKY.

Germany :
Dr. W. DIEMINGER.

Italy :
Prof. BOELLA.
Dr. EGIDI.
Prof. GORI.
Dr. GORIO.
Prof. MARINO.
Prof. SABBATINI.
Prof. SACCO.

Netherlands :
Dr. H. BREMMER.

New Zealand :
Dr. E. MARSDEN.

Sweden :
Dr. H. STERKY.
E. ESPING.

S. GEJER.
P. ÅKERLIND.
B. JOSEPHSON.
Dr. M. VOS.
Dr. C. G. AURELL.

United Kingdom :

Dr. R. L. SMITH-ROSE.
Capt. P. WILSON.
F. HORNER.

United States of America :

Dr. J. H. DELLINGER.
E. W. ALLEN.
H. E. DINGER.

Annex II

(*Excerpt from letter dated* 1 *September* 1953 *to Mr. H. E. Dinger from Mr. J. A. Ratcliffe*) :

... « The British Committee has started some serious work on the question posed at Commission IV of U.R.S.I. in Sydney, What are the most easily measured characteristics of terrestrial radio noise from which the interference to different types of communication systems can be determined, and we hope to be presenting a paper on the subject at the next meeting of U.R.S.I. »

« I hope you have been able to get some similar action in the States, and that you will be able to arrange for papers to be presented and for the authors to be present to discuss them, at the next U.R.S.I. meeting. What I should like is that papers could be sent round *even before the meeting*, a few copies to each chairman of a National Committee, so that others could think about them, and that actual writers of the papers could be present for detailed discussions at U.R.S.I. »

« As I cannot be at C.C.I.R. myself, I wonder if you would be good enough to show this letter to any other National Committee chairmen of Commission IV, or failing that, to other National Representatives, who may be present. »...

Hereunder copy of a letter to the members of U.R.S.I. delegation :

October 2, 1953.

There has been no occasion to require another meeting of the delegation. I want to thank all of you for yor good work in applying here the principles we discussed in our meeting of September 7. I feel that we have successfully promoted useful relations between the U.R.S.I. and the C.C.I.R.

The matter of specifying the characteristics of radio noise important in communication was considered by Study Group II, as we requested in our September 7 meeting, and will be studied further by them.

Please write me, by November 1, of any points that occur to you that should be mentioned in a rapport to the President of U.R.S.I.

(*sgd*) J. H. DELLINGER,
Chairman U.R.S.I. Delegation
VIIth. Plenary Assembly, C.C.I.R.

INTERNATIONAL GEOPHYSICAL YEAR

First Plenary Meeting

DOCUMENTS SUBMITTED TO THE COMMITTEE (II)

See *Inf. Bull.*, nº 80, p. 18.

Nº 18. — CZECKOSLOVAKIA

At the meeting on April 27-30, 1953, at the J. E. Purkins Home for Scientific Workers, about fifty Czeckoslovakian astronomers, geophysicists, meteorologists and physicists were present. They discussed the possibilities of the Czeckoslovakian cooperation to the I.G.Y. 1957-1958. Six organizations and one group will participate to the programme.

1. — Ondrejov Astrophysical Observatory

Continuous solar observations in cooperation with the net of stations in Czeckoslovakia. Systematical studies of the upper atmosphere by electric and visual techniques. Meteoric Year : Systematical meteor photography by seven stations in order to obtain the trails and the upper atmosphere structure. Warning service for other Czeckoslovakian stations for solar and ionospheric disturbances.

2. — Skalnaté Pleso Astronomical Observatory

Systematical observations of sunspots (Relative number). Systematical observations of aurorae and nightglow.

7. — World Wide Longitude Determinations

It is suggested if the World wide Longitude Determination be adopted, to repeat the 1932 longitude measurements at Ondrejow with various instruments.

The Director of the mentionned organizations constituted a National Committee for the I.G.Y.

The next meeting of the National Committee will be called for by F. Link in September, after the meeting of the C.S.A.G.I. to be held in July and when the results of this meeting will be available.

Nº 19. — REPORT OF THE BELGIAN NATIONAL COMMITTEE

I. — Suggested Observations for the I.G.Y.

1. — Photometric and spectroscopic observations of atmospheric noise

The world wide study of atmospheric noise should be carried out using observations from the pole to the equator in order to consider auroral night-sky and twilight phenomena as a function of geographic and geomagnetic latitude.

The analysis of the observations, particularly in the vicinity of the equator, might perhaps give information on the effects of the distribution differences at the magnetic and geographic equators. Simultaneous crepuscular and nocturnal spectrum observations should be made on atomic oxygen radiations, sodium and on OH and O_2 molecular bands, using photoelectric and spectroscopic techniques in equatorial regions.

2. — Solar observations

2.1. *Visual Observations.* — Continuous observation of chromospheric phenomena using H monochromatic light should be added to routine observations on sunspots. Besides, it would be very useful to made quantitative observations on coronal and chromospheric phenomena.

2.2. *Radio Observations.* — Continuous observations should be made on a frequency band sufficiently wide to cover the whole chromospheric and coronal field. Besides it would be very useful to have a world wide distribution of stations in order to have 24 hour observations.

3. — Meteorological Observations

It is recommended investigations of the troposphere structure (pressure, temperature, humidity, wind electrical potential gradient) to be made up to 30-35 km using very accurate sounders, radars or theodolites.

It is also recommended that sounding made during the I.G.Y. should involve many potential gradient measurements by the Koenigsfeld-Piraux technique.

4. — Third Longitude Determination

The recommendations sent by Sir H. Spencer Jones to Prof. Nørlund should be adopted.

Further recommendations are submitted to the Special Committee :

1. Observatories concerned with the determination should exchange information on their respective observation and reduction methodes and on the techniques used to record time signals and to measure recording delays. This would permit accurate suggestions to be drafted for the observatories cooperating in the determination.

5. In order to improve the accuracy of secondary stations having no quartz clock, it should be desirable to increase the number of permanent transmissions of the WWV type in order that such signals be available at any time of the day, in any region of the earth.

6. As regard to measurement methods of time signal recording delays, the use should be generalized of a low power heterodyne oscillator having the same design for all the observatories.

7. According to I.A.U. Commission 31 recommendation at the General Assembly of Rome, September 1952, the organization of a high accuracy Time Signal Service in the equator should be considered.

II. — Belgian Possibilities

A) Should travelling expenses and subsistance allowances be paid, Belgium could carry out study of aurorae in polar regions (Alaska or Norway).

C. In the Belgian Congo night-sky observation could be carried out.

2. Visual observations of solar activity will be made : 1° by determinating the Wolf number and by drawing or photography of sunspots, 2° by means of continuous recording of chromosphere phenomena.

Radio observations could be made in Belgium and in the Belgian Congo on 169 Mc/s. As it is useful to use higher frequencies for chromosphere observation, one or two frequencies could easely be added.

3. As regard Terrestrial Magnetism, Belgium will be able to co-operate to the study of disturbance morphology by means : 1° of the recording of the magnetic stations at Dourbes and Manhay using LaCour equipments, these stations are about 100 km apart, 2° of recording of multifrequency ionospheric sounder (NBS) which will operate at Dourbes in 1954, 3° of earth's current recording at Dourbes from 1954.

A Lugeon-Nobile narrow beam radiograph will be set up at Dourbes.

As regards study and recording of very short period fluctuations of the earth's magnetic field, steps will be taken to set up in Dourbes a cathode ray radiogoniometer in order to cooperate to the investigation of electromagnetic waves from storm centers.

In the Belgian Congo magnetic field recordings are carried out in Elisabethville and Leopoldville.

4. In the ionospheric field, routine observations are made in Leopoldville and Lwiro-Bukavu Belgian Congo, by means of multi-frequency ionospheric sounders. A similar equipment will be operated in Dourbes in 1954.

Ionospheric observations of the perturbance dynamics and morphology are not made either in Belgium or in Belgian Congo. Should the cooperation to a international programme be necessary, efforts would be made to set up such an cooperation. However, any activity depends from obtaining staff and grant.

6. As regards the longitude determinations, the Time Service of Uccle is considering to have for 1957 another 3 « quartz » group. The cooperation will be based on observations made at the Askania

meridian circle and at the Bamberg equipment. Besides during the determination, observations could be made with another Bamberg equipment operated by Italian Astronomers and by means of a first rate Tate T IV theodolite.

Steps are being taken to set up a time service at Lwiro, Belgian Congo.

N° 22. — AUSTRALIAN NATIONAL COMMITTEE

1. — Geomagnetism

It is hoped to maintain magnetic observatories at (i) Macquarie Island ; (ii) Heard Island ; (iii) The Antarctic Mainland (at a site between meridians 55° E and 85° E) ; (iv) Watheroo (W. Australia) ; (v) Toolangi (Victoria) and (vi) Port Moresby (New Guinea).

At the sites it is proposed to measure H, Z, and D, and also $\partial^2 Z/\partial r \partial t$ and $\partial^2 X/\partial y . \partial t$.

2. — Ionosphere

Routine ionospheric measurements will be made at the existing Australian observatories, Watheroo, Hobart, Canberra, Brisbane and Townsville, and it is hoped at Macquarie Island, Heard Island, the Antarctic Mainland (between 55° and 85° E), and Port Moresby.

3. — Cosmic Rays

It is intended to set up :

(i) Vertical telescopes with a narrow angle of reception and high counting-rate.

(ii) Neutron recorders.

(iii) Equipment to study N-S and E-W inequalities.

(iv) Photographic plate equipment at :

(*a*) The Antarctic Mainland : sea-level (i), (ii), (iii?), (iv), high altitude (i), (ii), (iv) ;

(*b*) Macquarie Island (i), (ii) ;

(*c*) Hobart or Melbourne (i), (ii) ;

(*d*) Brisbane (i), (ii) ;

(*e*) Rabaul (i), (ii), (iii?).

4. — Aurorae

It is proposed to set up :

(i) Visual observations and frequent wide-angle photographs.

(ii) Accurate position determinations using phototheodolites.

(iii) Spectrographs.

(iv) Radio equipment to obtain direct echoes.

(v) Radio equipment for the study of radio storm scintillations.

at :

(*a*) Antarctic Mainland (i), (ii?), (iii?) ;

(*b*) Macquarie Island (i), (ii), (iii), (v) ;

(*c*) Heard Island (i) ;

(*d*) Hobart (i), (iv).

5. — Meteorology

(i) 3-hourly surface observations.

(ii) radiosonde observations.

(iii) rawind observations.

It is hoped that it will be possible to carry out some of these studies at a high-altitude inland station on the Antarctic Continent, as well as at the Heard and Macquarie Island stations.

N° 23. — FRENCH NATIONAL COMMITTEE

Section on Longitudes

The French Committee thinks that the observation programme must not only yeld to improve the world wide longitude net. It seems more desirable to increase our understanding on 1. the pole displacements and the local fluctuations of the vertical ; 2. the pattern of radio signal propagation. It is obvious that to day the study of longitude variation has to be carried out simultaneously with the study of latitude variations. On the other hand, due to the insufficient knowledge of propagation conditions, comparison of remote clocks is not accurate. Should both these studies not been undertaken, the determination would give the same results as in 1933, during the last world wide determination, nevertheless the development of time equipment.

Research on signal propagation is hindered due to the decreasing use of bilateral communications which were regularly used at the time of the two previous world-wide determinations. Duplex communications should be restablished during all the planed determination, otherwise one cannot see how the accuracy reached in 1933 could be increased. An effort in that way is as needed as the improvement of time determination and maintenance methods.

N° 25. — FINNISH NATIONAL COMMITTEE

Terrestrial Magnetism and Electricity

(Proposals by Dr. E. SUCKSDORFF)

GEOMAGNETISM

The observatories of Sodankylä and Nurmijärvi, equipped with normal, quick-run, and slow-running storm recorders, will be in continuous operation. According to a proposal made by Prof. S. Chapman, it is considered to establish two auxiliary magnetic stations in the vicinity of the Sodankylä observatory, operating during the Geophysical Year. Field observations will be carried out at a number of stations, selected for the study of the secular variation.

In spite on the fact that up to now very little has been made in studying the quick-run magnetograms from the Second Polar Year, it is recommended that all the LaCour quick-run recorders now available should be put in operation during the Geophysical Year and distributed in a suitable manner over the Globe, especially for accurate determinations of times for various geomagnetic occurrences, in connection with ionospheric observations.

For the general geomagnetic research work it is very desirable that the Greenlandish observatories of Godthaab and Julianehaab should be reoccupied during the Geophysical Year.

EARTH CURRENTS

The variations of the earth currents, which also give a very clear measure of the changes of the electromagnetic activity, are still but little known. Therefore it is proposed that earth cur-

rent recording stations should be set up around the Globe on several places free from artificial disturbing factors and with homogeneous structure of the soil.

In Finland it is being considered to re-establish the earth current recording station in Sodankylä, demolished during the war.

Observations of auroral forms

A systematic study of the auroral displays near the Auroral Zone during many years show, according to the experiences obtained in Sodankylä, that the Aurora appears chiefly in three various and distinct forms, namely as :

1. homogeneous quiet arcs,
2. moving forms (with rays, occasionally with corona), and
3. the flaming.

Probably the arcs are more common in the vicinity of the Auroral Zone ; the moving forms appear occasionally also nearer to the Equator. Evidently these various features must depend on different ways in which the Aurora arises ; therefore a systematic investigation of auroral forms seems to be necessary.

According to these facts the following proposals are suggested :

It should be investigated :

(*a*) whether the above mentioned classification of the auroral forms corresponds to the actual circumstances, and

(*b*) whether a quiet auroral arc can appear also during wholly quiet magnetic conditions.

Further should be studied :

(*c*) the diurnal variation of the occurrences of the different auroral forms, and

(*d*) the direction of the flaming and its changes with the time of the day and of the year.

(*e*) when spectral or radiotechnical investigations of the aurorae are carried out, account must be taken on the different types of the aurorae in question, because their origin can be different.

Ionospheric Investigations

(By the Finnish National Committe, U.R.S.I.)

We are considering possibilities of participation in an international program. Much depends, however, on how quickly we can obtain the necessary instruments from abroad and how soon the observing stations can be erected. One of our ionospheric stations will stay north of the Arctic Circle. Also investigations of ionospheric winds by radioastronomical methods are considered.

N° 26. — REPORT FROM THE INDIAN NATIONAL COMMITTEE

I. *Organisation of the Indian National Committee.* — The present National Committee in India consists of Dr. K. S. Krishnan, Dr. K. R. Ramanathan, Prof. S. K. Mitra, the Director, Solar Physics Observatory and a Specialist in Cosmic Rays.

The Committee will be expanded to include one representative from each of the following organisations : Central Board of Geophysics, India Meteorological Department, and Survey of India.

II. — India will be able to cooperate in the General Programme of the International Geophysical Year in the following main fields :

1. Longitude survey.
2. Solar Observations.
3. Ionospheric Studies including ionospheric winds.

The Committee wishes to suggest the following :

(i) A programme of high power pulse transmissions in the short wave band from some of the broadcasting centres in the participating countries. (Observations in such pulses at the ionospheric stations will add greatly to our knowledge of the oblique modes of transmissions, and also of ionospheric characteristics.)

(ii) Studies on scattering of very high frequency radio waves with special reference to propagation.

(iii) Study of the upper part of the F region with the help of galactic radiation.

(iv) Collection of data on sporadic E echoes, which will be available from the routine records of ionospheric stations.

(v) Study of ionospheric absorption.

4. Spectroscopic study of air-glow.

5. Magnetic observations.

6. Cosmic ray studies.

(A detailed note was appended.)

7. High level winds, temperatures and humidities.

8. Radio astronomy for which facilities are expected to be available shortly.

III. — A high altitude station in the Himalayas is likely to be established before the Geophysical year.

IV. *New cooperation required.* — The study of the effects of solar flares and magnetic storms on the intensity of cosmic rays is included in the preliminary recommendations for the International Geophysical Year. During the past year new evidence has been presented which demonstrates a continuous emission of cosmic ray from the sun. Changes in its mean energy and composition can be inferred by a study at different points of the earth of the diurnal variation of meson intensity as well as the changes of neutron intensity. Cosmic ray studies therefore can be valuable in establishing solar and terrestrial relationships. Data furnished through this medium, when correlated with ionospheric, geomagnetic, auroral and solar radio noise studies would give valuable information about solar activity in particle and wave radiation, and its changes.

Cosmic ray variation studies carried out in an intensive coordinated way in different parts of the world are also capable of giving a clue to the galactic origin of the radiation.

The Indian National Committee therefore suggests the creation of a new cooperation for this field.

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