

International Scientific Radio Union

U. R. S. I.

INFORMATION BULLETIN

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Xth GENERAL ASSEMBLY

Documents

*Hereunder copy of a letter from the President of U. R. S. I.
to the Presidents of National Committees*

My dear President,

As you will well understand, the duplication of documents for our next General Assembly is likely to give rise to many difficulties and the Secretary is having to work out a special plan in which, by cooperation between Australia and his own office, type-script material will be available, as usual, for participants in the General Assembly in Sydney.

I am sure that it would help in this connection if you could ensure that papers submitted for duplication are as brief as possible. I think you will agree with me that it is unsuitable to send long documents, possibly drafted with the idea of publication elsewhere, which put a heavy burden on our Brussels office just at a time when their commitments are heavy anyway. We can leave the restriction as to the number of words to you, but I would hope that you would encourage the submission of summary papers rather than papers *in extenso*. These remarks, of course, apply to original papers submitted by individuals, and not to Progress Reports we expect from all countries.

With all good wishes

Yours sincerely,
(Sgd.) E. V. APPLETON.

Commission I

We publish hereunder a letter sent by Dr. J. H. Dellinger, President of Commission I to the Members of the Commission, on December, 14, 1951.

Dear Sir,

As announced in the March-April issue of the *U.R.S.I. Information Bulletin* (N° 68, p. 3), the next General Assembly of the U.R.S.I. will take place in Australia on Aug. 11 to 21, 1952. I invite you to take action to insure suitable participation by your country in Commission I's part of that meeting.

One of the valuable features of such meetings is the summary of the status of work in progress. This usually consists principally of a report from each country. It may be a part of the general report of the National Committee, may be appended to it, or may be entirely separate. A good procedure, which is becoming the more common practice, is to have the National Committee report be a brief one on general matters, with appended reports for each Commission. Whatever the form, it is desirable that you take whatever steps are necessary to bring about the preparation of the summary of progress on radio measurement methods and standards. It is desirable that it emphasize outstanding fundamental developments and work on which international joint action or parallel thinking is important. It need not be confined narrowly to work of your own country, especially where you are in an area not otherwise represented in U.R.S.I.

It is also desirable that you be active in securing papers for presentation at the General Assembly. The emphasis should be on quality rather than quantity. We had too many papers at the Zurich meeting; it was not possible to present or even consider many of them. The papers most desired are those presenting basic or fundamental advances or these having a particular international interest.

In addition to the foregoing, I propose to have part of the Commission I sessions at the General Assembly consist of symposiums, i. e., meetings in which the state of knowledge of a topic is discussed informally by persons who give thought to it in

advance but do not present written papers. The topics might be : (1) Frequency measurement ; (2) Power measurement ; (3) Impedance measurement ; (4) Radio receiver and special measurement techniques. I would appreciate receiving from you the names of persons who can be prepared to participate in any of these (subject, of course, to their being able to attend). Have you any other topics to propose for symposiums, or other ideas as to our program of work at the Plenary Assembly.

Also please let me know if you think of any subjects on which we should adopt Resolutions. (The Resolutions of 1946, 1948, and 1950 are given on pages 52-55, 76-77, and 54-55, respectively, of the Proceedings of the General Assemblies of those years...).

Have you any other ideas or proposals on the field of work of Commission I ? I shall welcome any suggestions either on work we can do by correspondence or on the planning and operation of our sessions at the General Assembly.

It is suggested that, in respect to the foregoing and also in planning research programs, you read and take account of the conclusions of the C.C.I.R. in its 1951 Plenary Assembly at Geneva which bear upon the work of this Commission. These are Question 54 (Standard frequency transmissions and time signals), and Study Program 19 and Report 4 (Methods of measuring field strength). It is desirable that U.R.S.I. be as helpful to the C.C.I.R. as possible.

I hope I shall have the pleasure of seeing you at the General Assembly.

Very truly yours,
J. HOWARD DELLINGER,
Chairman, Commission I,
Radio Measurement Methods and Standards,
3900 Connecticut Ave.,
Washington 8, D. C., U. S. A.

NATIONAL COMMITTEES

Canada

MEMBERSHIP OF THE PROVISIONAL COMMITTEE

Chairman :

Dr. D. W. R. MCKINLEY, National Research Council, Ottawa.

Secretary :

Mr. J. C. W. SCOTT, Defence Research Board, Ottawa.

Members :

Mr. F. T. DAVIES, Defence Research Board, Ottawa.

Dr. J. T. HENDERSON, National Research Council, Ottawa.

Mr. W. B. SMITH, Department of Transport, Ottawa.

Prof. G. A. WOONTON, McGill University, Montreal, P. Q.

Prof. R. C. DEARLE, University of Western Ontario, London, Ontario.

Dr. B. W. CURRIE, University of Saskatchewan, Saskatoon, Saskatchewan.

Dr. Pierre BRICOUT, Laval University, Quebec, P. Q.

Mr. J. E. HAYES, Candian Broadcasting Corporation, Montreal, P. Q.

Dr. G. SINCLAIR, University of Toronto, Toronto, Ontario.

Japan

REPORT OF THE JAPANESE NATIONAL COMMITTEE FOR U.R.S.I.

by Y. HAGIHARA, Chairman

In order to promote the activity of the National Committee the members were re-elected in May 1951 with seven sub-committees

according to the seven commissions of the U.R.S.I. The National Committee consists of 30 members with additional 34 associated members belonging to each sub-committees. The chairmen were elected.

Chairman of the National Committee : Y. HAGIHARA.

Secretaries : T. SAKAMOTO, T. NAGATA, T. HATANAKA.

Chairmen of sub-committees :

1. Measurement and standardization : I. KOGA,
2. Troposphere and propagation : H. HATAKEYAMA,
3. Ionosphere and propagation : K. MAEDA,
4. Atmospherics : A. KIMPARA,
5. Radio astronomy : Y. HAGIHARA,
6. Waves and circuits : K. MORITA,
7. Electronics : T. SEKI.

The general meeting of the all members was held on May 26, 1951, and the general procedure for promoting the activity in accordance with the U.R.S.I. programs was discussed. Later each sub-committee held meetings several times and discussion was made how and to what extent to conform with the resolutions made at the General Assembly of the U.R.S.I. at Zurich, and how to select papers to be sent to the Union.

Further the following sub-committees were organized for the activity of the Committee :

Sub-committee for Ursigrams. Chairman : H. UEDA,

Sub-committee for the World-Wide Network on Solar Radio-Emission.

Chairman : Y. HAGIHARA,

Sub-committee for the U.R.S.I. Information Bulletin. Chairman :

Y. HAGIHARA.

The Committee sent H. Hatakeyama to the Joint Commission meeting for Radio-Meteorology held at Brussels, and asked K. Owaki to communicate our greetings to the Semi-Centennial Anniversary of the Bureau of Standards at Washington.

REPORT OF THE SUB-COMMITTEE III

by K. MAEDA, chairman

I. — SCIENTIFIC AND ADMINISTRATIVE ACTIVITIES.

The activity of the Sub-Committee III of the Japanese National Committee for U.R.S.I. has been in a close coordination with that of the Ionosphere Research Committee, Science Council of Japan.

Actually the latter Committee is acting throughly as the former. So that the scientific and administrative activities of the latter Committee are presented here. General meetings of the Society of Terrestrial Magnetism and Electricity of Japan (M. Hasegawa, President) were held in May 1950 at Tokyo, in October 1950 at Sendai and in May 1951 at Tokyo. The quarterly publication «*Journal of Geomagnetism and Geoelectricity*» is issued since March, 1949.

1. *Ionosphere Research Committee, Science Council of Japan* (chairman, Y. HAGIHARA). — The assemblies of the Ionosphere Research Committee were held every month in Tokyo. As the continuation of three kinds of reports in Japanese with English abstracts, «*Report of Ionosphere Research in Japan*», vol. IV, 1950, was issued in English text. This publication will be carried on in future. Collecting the data of participating observatories of ionosphere, geomagnetism, field intensity of radio wave, cosmic rays, solar phenomena and other related phenomena, the «*Catalogue of Disturbances*» is issued since August 1949 with regard to disturbances which occur during the simultaneous cooperative observations of fixed 4 terms in the year or of special disturbance intervals. They are sent widely to observatories and institutes of the world with the hope to exchange observing materials. Warning before disturbances in radio communications and broadcasting of Ursigrams are being planned.

The scientific activity of this Committee is described herewith.

2. *Movement of ionospheric condilions*. — After several reports concerning the movements of ionospheric conditions, a few more results on the similar phenomena were reported by the following scientists.

S. Matsushita made a detailed study on sporadic-E ionization and found that Es ionic clouds had a tendency to move south and northward with the speed of about 370 km/hr and to change the direction semidiurnally. Y. Aono followed this result and obtained the speed of 250 km/hr. The horizontal shifting of the bright night sky light was recognized by M. Huruwata, mostly north to south with the speed of about 1000 km/hr.

The semi-diurnal lunar tide of F2 layer was shown by S. Matsushita to have the amplitude 2-4 km and the phase difference by about 180° from the earth surface, using the data of maximum ionization height of F2 layer at Kokubunji for 13 months. He also obtained from $foF2$ the amplitude 0.052 Mc/s and the phase about 12 hr in lunar hours after transit at which maximum occurs. On the basis of these results, he discussed the L-field of the terrestrial magnetism.

S. Matsushita constructed a solar convectional circulation and solar tidal motion in the upper atmosphere, which were in harmony with the results of studies of his own and others on the movement of ionosphere as above described, and showed that the geomagnetic S-field might be dynamo-theoretically interpreted with the electric conductivity of ionosphere of order of 10^{-8} e. m. u.

3. *Physical properties of the ionosphere.* — T. Yonezawa showed that the nocturnal variation of electron density in F2 layer could be best interpreted with the terms of attachment and temperature change. Y. Inoue made a theoretical study of the ionosphere and discussed on the transfer of radiation, temperature-gradient and recombination-process in the ionosphere.

K. Maeda discussed the conductivity of the ionosphere under consideration of the recent theoretical and experimental studies on the ionospheric mechanism, such as recombination, attachment, detachment and photo-absorption processes. His numerical results were largely influenced by the photo-detachment coefficients according to Yamanouchi's theory.

4. *Observations during the solar eclipses.* — A solar eclipse occurred twice in the last three years (1948-1950) in Japan, one was the annular solar eclipse on May 9, 1948, and the other was the partial one on September 12, 1950. In both cases, geomagnetic

and ionospheric cooperative observations were administered by the Committee of Solar Eclipse with participation of domestic organizations concerned. In addition to the routine observatories, several temporary stations were distributed. Since the eclipse in 1950 took place around the noon time on a magnetically calm day, the existence of eclipse effect on geomagnetic field was confirmed. The result of observation well agrees with a theoretical expectation.

5. *The electric conductivity of the ionosphere viewed from the characteristics of geomagnetic variations.* — Assuming that the dynamo-action of the ionosphere is responsible for geomagnetic daily variation, the magnetic daily variation, the magnitude and the mode of change of the electric conductivity of the ionosphere were evaluated purely from geomagnetic data. The daily variation of the conductivity of the ionosphere over the low latitude zone was determined by M. Hasegawa to be in the form of $K(1 + 1.1 \cos t + 0.3 \cos 2t)$ for the north direction and of $K(1 + 0.7 \cos t + 0.3 \cos 2t)$ for the east direction. On the other hand, the absolute value of the ionospheric conductivity was estimated by T. Nagata from the result of statistical examination of the transient characteristics of solar-flare type variations in geomagnetic field. The result showed that the conductivity is 7×10^{-8} e. m. u.

The Hall effect of the ionosphere being taken into consideration, an abnormally high conductivity of the ionosphere over the magnetic equator was numerically illustrated by M. Hirono.

6. *Magnetic disturbances.* — The progressive characteristics of geomagnetic disturbances such as magnetic storms, and bay-disturbances were studied in detail by N. Fukushima with respect to a number of examples. The result showed that even in the early initial phase of magnetic storms the so-called SD-field, for which the ionosphere is responsible, appears frequently.

By examining the record of $\partial H/\partial t$, Y. Kato suggested that magnetic storms are to be caused by two kinds of radiant rays of different velocity.

7. *Solar phenomena and related problems.* — A 12 cm coronagraph designed by M. Notuki is now under examination at the Corona Station of the Tokyo Astronomical Observatory at Mt. Norikura

(2900 m high). A test observation of the intensity distribution of the coronal bright line $\lambda 5303$ was made with an improved coronagraph since October in 1950. The photometers for standardizing the observation are also under examination and construction by M. Notuki and S. Nagasawa. Percentage of days of observations is about 30 during November 1949-October 1950.

T. Hatanaka and Z. Suemoto of the Tokyo Astronomical Observatory studied the correlation between the area of K_{2-3} flocculi and total electron number of F2 layer. K. Osawa, also of the Tokyo Astronomical Observatory, found a negative correlation between the intensity of $\lambda 5303$ and the daytime electron density of F2 layer.

Z. Suemoto measured photometrically the contours of H_{ϵ} , H and K lines in eruptions and flocculi at the tower telescope of the Tokyo Astronomical Observatory and found that they may be accounted for by assigning the electron temperature of the order of $70\,000^{\circ}$ to the active layer.

II. — PROCEDURES TAKEN ON RESOLUTIONS IN ZURICH

The resolutions of 1950 Assembly of U.R.S.I. concerning the ionosphere and HF radio wave propagation were introduced to all members. Half of the resolutions has already been undertaken in Japan. The wind in the ionospheric layers was studied extensively by the members as reported in the preceding paragraph. The program for Ursigram broadcast has made some progress as is reported by the Sub-Committee for Ursigrams.

III. — LIST OF LABORATORIES AND OBSERVATORIES

Reported in *Information Bulletin*, n° 67, Jan.-Feb. 1951, p. 19.

IV. — LIST OF PUBLISHED PAPERS

ABBREVIATIONS :

RIRJ : Report of Ionosphere Research in Japan.

GN : Geophysical Notes, Tokyo University.

JGG : Journal of Geomagnetism.

SRTU : Scientific Report of Tohoku University.

1) *Ionosphere*

1. AONO, Y. and MINAGUCHI, T. — On the movement of the sporadic E-region. RIRJ, vol. 4, n° 2 (1950) 103.
2. FUKUSHIMA, N. — Propagation of ionospheric disturbance in F2-layer. RIRJ, vol. 4, n° 1 (1950) 47.
3. FURUTSU, K. — The modes of electro-magnetic field of the earth and their Green functions, with the transient phenomena and shielding effects of the ionosphere for each mode. RIRJ, vol. 4, n° 2 (1950) 108-109.
4. HATANAKA, T. — Correlation between the solar activities and the ionospheric ionization. RIRJ, vol. 4, n° 1 (1950) 51-52.
5. HOJO, H. — On a statistics of the ionospheric disturbance. RIRJ, vol. 4, n° 2 (1950) 112-113.
6. HURUHATA, M. — Shift of the night sky light. RIRJ, vol. 4, n° 1 (1950) 48.
7. HURUHATA, M. — Photoelectric studies of the night sky light (II). RIRJ, vol. 4, n° 3 (1950) 137-146.
8. INOUE, Y. — On the structure of the ionosphere. RIRJ, vol. 4, n° 3 (1950) 179-180.
9. INOUE, Y. — Radio range beacon wave and magnetic storm. RIRJ, vol. 4, n° 2 (1950) 117-118.
10. INOUE, Y. — On the disturbances of radio range beacon waves in the 19th co-operative observation (1st report). RIRJ, vol. 4, n° 2 (1950) 122-123.
11. INOUE, Y. — On the disturbances of radio range beacon waves in the 19th co-operative observation (2nd report). RIRJ, vol. 4, n° 2 (1950) 123-124.
12. INOUE, Y. — The irregular propagation of long waves. RIRJ, vol. 4, n° 4, (1950).
13. ISHIKAWA, G. — On the longitude effect of a corpuscular stream from the sun. JGG, vol. 2, n° 3 (1950) 74-76.
14. ISHIKAWA, G. — The total conductivity of the ionosphere. RIRJ, vol. 4, n° 4 (1950).
15. KMAMIYAMA, H. — Correlation between the sunspot number and the minimum frequency in $h'f$ curve for the E-region. RIRJ, vol. 4, n° 3 (1950) 175-176.
16. KAMIYAMA, H. — A statistical study on the minimum frequency in $h'f$ curve. RIRJ, vol. 5, n° 1 (1950).
17. KATO, Y and UTASHIRO, S. — Relation between ionospheric storm and regular micropulsation of the geomagnetic field accompanying magnetic storm. RIRJ, vol. 4, n° 3 (1950) 187.

18. KONO, T. — Experimental study on scattered echoes (n° 1) and (n° 2). RIRJ, vol. 4, n° 3 (1950) 127-135; vol. 4, n° 4 (1950) 189-199.
19. KOSHIKAWA, Y. — Relation between the mean value variations of geomagnetic field and those of ionospheric data. RIRJ, vol. 4, n° 2 (1950) 119.
20. MAEDA, K., AONO, Y. and KOBAYASHI, T. — A tentative method of calculation of HF radio sky wave field intensity by use of transmission curve. RIRJ, vol. 4, n° 2 (1950) 61-70.
21. MAEDA, K. — On the electrical conductivity of the upper atmosphere. JGR, vol. 2, n° 2 (1950).
22. MASHIKO, H. and NAKAMURA, S. — The correlation between the solar phenomena and the disturbance of short wave propagation during the 14th co-operative observation period in spring 1948. RIRJ, vol. 4, n° 1 (1950) 52-53.
23. MATSUSHITA, S. — Report on the investigation of the records of the 17th co-operative observation (Southward shifting of Es and semi-diurnal lunar tide in F2 layer). RIRJ, vol. 4, n° 1 (1950) 57-58.
24. MATSUSHITA, S. — Motions in the ionospheric atmosphere and the relation to the terrestrial magnetism. RIRJ, vol. 4, n° 2 (1950) 11-112.
25. MATSUSHITA, S. — Circulatory motions in the ionospheric atmosphere and their relation to the S field of the terrestrial magnetism, III. JGG, vol. 2, n° 1 (1950) 9-19.
26. MIYA, K. — On the effect of southward moving of ionospheric disturbance in wireless communication during geomagnetic storm. RIRJ, vol. 4, n° 1 (1950) 46.
27. MIYA, K. — Observational results of obliquely incident impulse wave sent from Chungking. RIRJ, vol. 4, n° 1 (1950) 43-44.
28. MIYA, K. — Relation between field intensity, relative numbers of sunspots and other effects on the 18th co-operative observation. RIRJ, vol. 4, n° 2 (1950) 120.
29. MIYA, K. — Some revision of the calculation method of field intensity for high frequency radio wave. RIRJ, vol. 4, n° 3 (1950) 182-183.
30. MIYA, K., MURATA, T. and WADA, H. — Study of propagation characteristics of obliquely incident impulse wave in time of the solar eclipse. RIRJ, vol. 4, n° 1 (1950) 1-20.
31. MIYA, K., OUCHIKI, S. and KANAYA, S. — On the study of attenuation characteristics for HF and MF and its application to calculation of field intensity. RIRJ, vol. 5, n° 1 (1951).
32. MIYADI, M. — Some note on transit time of wireless signal. RIRJ, vol. 4, n° 2 (1950) 109-110.
33. MORIYAMA, F. — Correlation between the ionosphere and the coronal radiation. RIRJ, vol. 4, n° 2 (1950) 121.

34. NAKATA, Y. — Effects on the F-regions of the ionosphere of the solar eclipse of May 9, 1948. RIRJ, vol. 4, n° 1 (1950) 21-30.
35. NAKATA, Y. and ARAKI, K. — A rapid change in the F-region. RIRJ, vol. 4, n° 4 (1950).
36. RIKITAKE, T. — The increase in the electronic conductivity of the ionosphere at the time of Dellinger-effect. RIRJ, vol. 4, n° 2 (1950) 110.
37. SUEMOTO, Z. — Report of the 17th co-operative observation. RIRJ, vol. 4, n° 1 (1950) 56-57.
38. SUMI, M. — Penetration of neutral particles into the upper atmosphere. RIRJ, vol. 4, n° 3 (1950) 147-153.
39. UYEDA, H., KUDO, H., SHIMIZU, T. and SATO, R. — The $h'f_oF_2$ -measurement of ionosphere at the time of the annular eclipse of May 9, 1948 at Wakkanai, Hokkaido in Japan. RIRJ, vol. 4, n° 2 (1950) 75-77.
40. UYEDA, H. and OBAYASHI, T. — Field intensity for long distance transmission deduced from the long time measurement. RIRJ, vol. 4, n° 2 (1950) 71-73.
41. YONEZAWA, T. — On some relations between the night sky light and the ionosphere. RIRJ, vol. 4, n° 1 (1950) 55.
42. YONEZAWA, T. — The recombination coefficient and the temperature variation in the upper atmosphere at night. RIRJ, vol. 4, n° 2 (1950) 79-85.
43. YONEZAWA, T. — On the possible relations between intense sporadic E-layer ionization and other geophysical phenomena. RIRJ, vol. 4, n° 3 (1950).
44. YONEZAWA, T. — On the variation in the F₂-layer thickness after sunset. RIRJ, vol. 4, n° 4 (1950).
45. YONEZAWA, T. — An analysis of electron density variation of the F₂-layer after sunset. RIRJ, vol. 5, n° 1 (1951).

2) *Geomagnetism*

1. FUKUSHIMA, N. — Some examples of the special condition of wireless communication during the 20th co-operative observation. RIRJ, vol. 4, n° 3 (1950) 181.
2. FUKUSHIMA, N. — Progressive change in the current system of the bay disturbance. GN 3, (1950) n° 22.
3. FUKUSHIMA, N. — Current system SD-field and the bay disturbance. JGG, vol. 2, n° 4 (1950) 103.
4. FUKUSHIMA, N. — Some characteristics of magnetic storm (1). (The magnetic storm on August 3, 1949). RIRJ, vol. 5, n° 2 (1951) 85.

5. HIRAYAMA, M. and ARAKI, T. — Magnetic field in the eclipse in Reibun island on May 9, 1948. RIRJ, vol. 5, n° 2 (1951) 106.
6. HIRAYAMA, M. — Some kind of magnetic disturbances and their effects on radio waves (Report of the 24th co-operative observation). RIRJ, vol. 5, n° 2 (1951) 109.
7. HIRONO, M. — On the influence of the Hall current on the electrical conductivity of the ionosphere. JGG, vol. 2, n° 1 (1950).
8. HIRONO, M. — On the influence of the Hall current on the electrical conductivity of the ionosphere. II, JGG, vol. 2, n° 4 (1950).
9. IMAMITI, S. — World-wide distribution of geomagnetic K-index and conditions of radio communication. RIRJ, vol. 4, n° 1 (1950) 51.
10. ISHIKAWA, G. — On the magnetic shielding effect of the ionosphere. J. of Meteorological Research, vol. 1, n° 8, 240.
11. ISHIKAWA, G. — On the initial phase of geomagnetic storm. Papers in Meteorology and geophysics, vol. 1, n° 2.
12. ISHIKAWA, G. — On the longitude effect of a corpuscular stream from the Sun. JGG, vol. 2, n° 3 (1950) 74.
13. KATO, Y. and UTASHIRO, S. — Investigation of the sudden commencement of the magnetic storm by induction magnetograph. SRTU, vol. 2, n° 1 (1950).
14. KATO, Y. and UTASHIRO, S. — The sudden commencement of the magnetic storm by induction magnetograph. RIRJ, vol. 4, n° 2 (1950) 118.
15. KATO, Y. and UTASHIRO, S. — Investigation of the magnetic storm by the induction magnetograph. JGG, vol. 2, n° 3 (1950) 71.
16. KATO, Y. — Further notes on a new theory of magnetic storm. RIRJ, vol. 5, n° 2 (1951) 75.
17. KOSHIKAWA, Y. — Relation between the geomagnetic variations and those of sporadic E-region (Report of the 25th co-operative observation). RIRJ, vol. 5, n° 2 (1951) 111.
18. NAGATA, T. — The solar flare type variation of geomagnetic field and the integrated conductivity of the ionosphere. RIRJ, vol. 4 (1950) 155.
19. NAGATA, T. and SUZUKI, T. — The solar flare type variation in geomagnetic field and the integrated electrical conductivity of the ionosphere II. Effect of F-Layer. RIRJ, 4 (1950) 201.
20. NAGATA, T., FUKUSHIMA, N. and SUGIURA, M. — Electro-dynamical behaviour of the ionosphere region viewed from geomagnetic variations. JGG, 2 (1950) 35.
21. OTA, M. — Geomagnetic activity characterized by the K indices. JGG, vol 2, n° 3 (1950) 86.
22. SUGIURA, M. — The shielding effect of the ionosphere (second report). RIRJ, vol. 4, n° 1 (1950) 31.

23. YONEZAWA, T. — A relation between the intense sporadic E-layer ionization and the terrestrial magnetism (Report of the 25th cooperative observation). RIRJ, vol. 5, n° 1 (1951) 53.
24. YOKOYAMA, I. and RIKITAKE, T. — The effect of a solar eclipse on the earth's magnetic field. RIRJ, vol. 5, n° 2 (1951) 100.
25. YOSHIMATSU, T. — Diurnal and seasonal frequencies of occurrence of « sudden commencement », SC in geomagnetism. JGG, vol. 2, n° 2 (1950) 54.

3) *Solar phenomena*

1. NOTUKI, M. and NAGASAWA, S. — Tokyo Astro. Bull., vol. 2, n° 35, 1951.
2. HATANAKA, T. and SUEMOTO, Z. — RIRJ, vol. 4 (1950) 51-56.
3. OSAWA, K. — RIRJ, vol. 4 (1950) 125.
4. SUEMOTO, Z. — Publ. Astr. Soc. Japan, vol. 2, n° 3, In press.

REPORT OF SUB-COMMITTEE IV

by A. KIMPARA, Chairman

I. — SCIENTIFIC AND ADMINISTRATIVE ACTIVITIES

(1) The meetings were held on the following days : April 21, May 26, June 27, August 4, and September 19, 1951.

(2) The scientific activities of Sub-Committee IV are as follows :

In accordance with the observation of atmospherics since 1928 as well as the physical consideration of the formation of atmospherics, A. Kimpara, Res. Inst. of Atmospherics in Nagoya Univ., proposed a general law that the main origins of atmospherics are the symbol indicating the degree of disturbances in the conditional instability region of every kind. He also studied the construction of the typhoon from the view-point of atmospherics and found that the origins of atmospherics concerning to the typhoon are distributed most frequently in the most disturbed area. A. Iwai, Res. Inst. of Atmospherics in Nagoya Univ., devised recently an unidirectional type of CRDF. The idea is to add a sense amplifier, with a small vertical antenna, to conventional twin channel amplifiers with brilliance modulation device. It keeps high accuracy in direction-finding together with the unidirectional characteristics. S. Kitagawa, Central Meteorological

Observatory, made directional observation of atmospherics with CRDF from May, 1950 to Jan., 1951 at three distant stations in Japan. He found that in summer 60 % of the observed origins of atmospherics are distributed in the tropical zone and in winter 80 %, while in the frigid zone further north than 60° N there are none.

H. Seki, Radio Regulatory Agency, proposed a new method of measuring atmospherics based on the recent information theory. He chose a rectangular wave as a simplest form of information which will become irregular by noise disturbances. He introduced also a new method of measurement which consists of pulsed signal generator and two gate circuits in addition to the ordinary field intensity meter. F. Minozuma, Radio Regulatory Agency, concluded theoretically that they can easily deal the noise problems with a ratio of quasipeak to mean value and a mean repetition frequency of noise impulse. He made an extensive observation of atmospherics and manmade noise all over Japan and published a daily variation of these noises in HF and VHF regions. T. Fujita, Radio Broadcasting Corporation, explained the difference of the nature of atmospherics in the day-time and at night in MF band, and further he reported the disturbances of atmospherics due to snow storms on VHF and UHF relay services.

II. — PROCEDURES STAKEN ON RESOLUTIONS AT ZURICH

(1) Resolutions 1, 2, and 3 are too difficult to be resolved in short time, and we intend to study them theoretically as well as experimentally in intimate collaboration of laboratories and administrative organizations of radio communications.

(2) Resolution 4 : Observation of the wave form of atmospherics will be continued at the Research Institute of Atmospherics, Nagoya University, and the results will be investigated from the stand-point of wave propagation as well as from the view-point of mechanism of electrical discharge phenomena in the atmosphere.

(3) Resolutions 5 and 6 : At present there are no collaborators in the Far East, and we shall be glad to cooperate in the observation of wave form, if India and Australia will join us.

(4) Resolution 7 : In Japan it is very easy at present to keep fairly accurate synchronization of observation by using the standard wave radiated regularly from the station of Radio Regulatory Agency.

(5) Resolution 8 : At present we have no facilities to concern with the problem.

III. — LIST OF LABORATORIES AND OBSERVATORIES

1. The Research Institute of Atmospheric, Nagoya University, Toyokawa-City, Aichi-Pref., Japan (34°50' N, 137°22' E).

2. The Observatory of Atmospheric, Nagoya University, Furō-Chō, Chikusa-Ku, Nagoya, Japan (35°09' N, 136°58' E).

3. Meteorological Research Institute, Mabashi, Suginami-ku, Tokyo, Japan (139°39' E, 35°42' N).

4. High Tension Laboratory, Institute of Physics, Faculty of Science Tokyo University, Hongō-ku, Tokyo, Japan.

5. Laboratory of the Radio Broadcasting Corporation of Japan, Kamata-cho, Setagaya-ku, Tokyo, Japan.

6. The Observatory of Waves, Radio Regulatory Agency, Ohira-Mura, Sanbugun, Chiba-Pref., Japan (35°36' N, 140°28' E) (temporary).

7. Shionomisaki Meteorological Observatory, Shionomisaki-mura Wakayama-Pref., Japan (33°27' N, 135°46' E).

8. Yonago Meteorological Observatory, Yonago-city, Shimane-Pref., Japan (35°26' N, 133°21' E).

9. Weather Communication Station, Kiyose-mura, Kitatama-gun, Tokyo, Japan (35°46' N, 139°32' E).

10. Three small stations belonging to the Central Meteorological Observatory.

11. Eighteen small stations belonging to Radio Regulatory Agency.

IV. — LIST OF PAPERS PUBLISHED DURING APRIL 1950-SEPTEMBER 1951

1. A. KIMPARA. — The Typhoon Kezia and Atmospheric. *Proc. Japan Academy*, vol. 27, n° 7, 1951.

2. A. KIMPARA. — The Typhoon Kezia and Atmospheric. *Memoirs Fac. Eng. Nagoya Univ.*, vol. 3, n° 1, 1951.
3. A. IWAI. — On a Portable Cathode Ray Direction Finder of Atmospherics. *Bull. Res. Inst. Atmospherics*, vol. 2, n° 1, 1951 (in Japanese).
4. T. AMISHIMA and F. MINOZUMA. — Consideration on the Radio Noise Measurement. Document for IXth Plenary Assembly of C.C.I.R., 1951.

(To be continued).

COMMISSIONS

Commission III

IONOSPHERIC SOUNDING STATIONS (3)

See *Information Bulletin*, n° 67, p. 8-12, n° 68, p. 19-21.

Austria

GRAZ STATION UNDER THE CONTROL OF THE METEOROLOGY
AND GEOPHYSICS INSTITUTE OF THE UNIVERSITY OF GRAZ

Geographic location : Latitude, 47° 4.8' N,
Longitude, 15° 27.3' E.

Automatic recording.

Frequency range : 2.5-12 Mc/s.

Pulse peak power : 1 kW.

Recurrence frequency : 50 per second.

Sweeping : 120 seconds.

Measurement : normally once every hour.

Time used : 15° E.

France

STATIONS UNDER THE CONTROL OF THE
BUREAU IONOSPHERIQUE FRANÇAIS
Bagneux (Seine), 196, rue de Paris

I. — Domont

Location : Latitude, 49°01' N,

Longitude, 2°19' E Greenwich.

Three frequency ranges : 1.5 to 4; 4 to 8 and 8 to 16 Mc/s.

Automatic recording of a total duration of 90 seconds.

Peak power : 12 kW.
Number of pulses per second : 50.
Length of the pulse : 100 micros.
Recording periodicity : 30 per day (every hour and eventually every $\frac{1}{2}$ hour).
Vertical recording scalling : about 100 km.
Maximum recording limit : 800 km.
Aerials : three aerials, travelling waves folded dipoles.
Working since March 10, 1950.

II. — *Poitiers*

Location : Latitude, 46°34' N,
 Longitude, 0°20' E Greenwich.
Two frequency ranges : 3.1 to 5.4; 5.4 to 11.8 Mc/s.
Automatic recording of a total duration of 75 sec.
Peak power : 0.5 kW.
Number of pulses per second : 100.
Pulse length 150 to 300 microsec.
Recording periodicity : every hour and eventually every $\frac{1}{2}$ hour.
Vertical recording scalling : per 50 km of virtual heighth.
Maximum recording limit : 1200 km.
Aerials : one folded dipole for each frequency band.
Hour and date are written on each record.
Accuracy of data : 5 km for virtual heighths,
 0.1 Mc/s (from 5.4 to 11.8 Mc/s),
 0.04 Mc/s (from 3.1 to 5.4 Mc/s).
Working since July 1, 1948.

This equipment will be replaced in September 1951 by an automatic sounder having three frequency ranges : 1.5 to 3.5 Mc/s, 3.5 to 8.5 Mc/s, 8.5 to 16.5 Mc/s; 1.5 kW power. The recording characteristics will be the same.

III. — *Casablanca*

Location : Latitude, 33°35' N,
 Longitude, 7°38' W Greenwich.

Three frequency bands : 1.5 to 3.6 ; 3.6 to 8.7 and 8.7 to 16.5 Mc/s.

Automatic recording of a total duration of 60 seconds.

Peak power : 1.5 kW.

Number of pulses per second : 75.

Length of pulse : 100 to 300 micros.

Recording periodicity : every hour (possibility of recording every 15 minutes or continually).

Vertical recording scalling : per 50 km of virtual heighth.

Maximum recording heighth : 1500 km.

Aerials : one folded antenna for each frequency band.

On work from October 1st, 1951.

Note. — Stations will shortly be working in Bangui (French Equatorial Africa), and in Tamanrasset (Sahara).

PERMANENT STATIONS UNDER THE CONTROL OF THE
SERVICE DE PRÉVISION IONOSPHERIQUE MILITAIRE
(S. P. I. M.)

I. — *Friburg*

Location : Latitude, 48° 1' N.

Longitude, 7° 8' E.

Automatic radiosounder sweeping continuously the frequency range 1.25-20 Mc/s accordingly to a logarithmic law ; frequency range swept once every hour.

Peak power : about 1 kW.

Number of pulses per second : 50.

Pulse duration : 150 micros.

Aerials : two vertical rhombic antennas.

II. — *Dakar*

Location : Latitude, 14° 6' N,

Longitude, 17° 4' W.

Same equipment as in Friburg.

III. — *Nha-Trang*

Location : Latitude, 12° 5' N,

Longitude, 109° E.

Same equipment as in Friburg.

IV. — *Djibouti*

Location : Latitude, 12° N,
 Longitude, 44° E.

Same equipment as in Friburg.

The service considers to set up permanent stations in Ivato
(Madagascar) and in Bizerte (Tunisy).

C. C. I. R.

U.R.S.I. - C.C.I.R. Cooperation

Members of Commission I are informed that we received the following documents sent to the Members of Study Group VII of the C.C.I.R. :

Form A. — Deviations and adjustments of standard frequencies and time signals as broadcast by Nationale Bureau of Standards Station WWV, Washington, D. C., and WWVH, Maui, T. H. for the quarter ending June 30, 1951.

Form B. — Summary of information on service areas.

Form D. — Summary of information on interfering stations.

A few copies of these documents are available at the General Secretariat.

UNESCO

Unesco Coupon Scheme

Information Circular N° 8

Gift Coupons. — The Unesco Gift Coupon Plan, which is already in operation in the U. S. A. and in the United Kingdom will be launched in France during October.

Specimens of the three denominations of Gift Coupons (\$ 10, £ 1 sterling and 1000 French francs) may be obtained from the Unesco Coupon Office. Editors of journals may wish to obtain specimen coupons for reproduction.

All denominations of Gift Coupons, whether labelled in U. S. dollars, pounds sterling or French francs, may be accepted by suppliers in all participating countries. Unesco will always redeem the coupons in the currency of the supplier's country.

For example : A supplier in the U. S. A. will receive in exchange for a £ 1 coupon \$ 2.80 and for a 1000 French francs coupon \$ 2.85.

Scientific material. — Orders for scientific material payable in coupons may now be sent to the *United Kingdom* as well as to the supplier countries already listed in the explanatory leaflet.

Orders to the U. K. should be addressed to :

The Scientific Instrument Manufacturers'
Association of Great Britain Ltd.,

20, Queen Anne Street,

London W. 1

Radio parts and accessories and electronic equipment :

Enquiries for sources of supply of specific items may be addressed to the :

National Appliance and Radio Dealers Association,
Merchandise Mart,
Chicago 54, Illinois, U. S. A.

who will nominate a suitable dealer.

Orders payable in coupons may be addressed to the following dealers :

Mr. Mort FARR,
President of the National Appliance and Radio Dealers Association
119 S. 69th Street,
Upper Darby, Pa., U. S. A.

Mr. H. B. PRICE, Jr.,
Vice-President of the National Appliance
and Radio Dealers Association.

Price's Inc.,
133 W. Charlotte Street,
Norfolk 10, Va., U. S. A.

Export Licences for Scientific Material from U. S. A. — Regulations governing Export Licences to be obtained from the U. S. Government Authorities on a great part of the instruments and supplies which can be purchased with the aid of Unesco Coupons have recently changed. It is now necessary for the suppliers to submit, with their applications for Export Licences, a statement from the ultimate consignee setting forth the following facts :

(i) The ultimate destination of the commodity or commodities involved.

(ii) The end-use of such commodity or commodities which must be a detailed description of the specific use to which the commodity or commodities will be put in the country of ultimate destination.

(iii) A description of the export transaction sufficient to identify it as the same transaction described in the application.

(iv) That the ultimate consignee will promptly send a supplemental statement to the United States exporter of any change of

facts or intentions set forth in this statement which occur after the statement is made.

Some enquiries have reached us from users of coupons on how to fill in the information required under (iii). We should like to point out that this question need not be answered in great detail. It will be sufficient to mention the name and address of the firm with which the order has been placed and to indicate the order number and any other reference number shown on the order, as well as a summary list of the items ordered.

New Unesco Labels. — The attention of suppliers is drawn to the new Unesco labels which may be affixed to parcels of all materials purchased with Unesco Coupons, whether books, films or scientific material. We have found that these labels assist people in many countries to obtain customs clearance on material bought with coupons, particularly in those countries where special customs exemption has been granted for purchases made with coupons. The new labels have been sent to the main suppliers under the Scheme. If more are needed, Unesco will be glad to send additional labels to suppliers upon request to the Unesco Coupon Office.

Redemption of Coupons. — Booksellers and all other suppliers accepting Unesco Coupons are particularly requested to send the coupons *direct to Unesco* for redemption and not to present them through a bank. In this way they will avoid delays, unnecessary correspondence and the payment of bank charges. Unesco will redeem the coupons in the supplier's currency with the least possible delay, either by cheque or by transfer.

Booksellers and all other suppliers are requested to attach copies of their invoices to the coupons which they submit to Unesco for redemption.

New Leaflet on Unesco Book Coupons. — A new version of the explanatory leaflet on Unesco Book Coupons is now available and can be obtained from national distributing bodies and from the Unesco Coupon Office.

Countries participating in Unesco Coupon Scheme

Country	Book Coupons	Film Coupons	Scientific material coupons
Austria	×	—	—
Belgium	×	×	×
Burma	×	—	—
Cambodia	×	—	—
Canada	—	×	—
Ceylon	×	×	×
Czechoslovakia	×	—	—
Egypt	×	×	×
France	×	×	×
Germany	×	—	—
Hungary	×	—	—
India	×	×	×
Indonesia	×	×	×
Israel	×	—	—
Italy	×	—	—
Netherlands	×	—	—
Pakistan	×	×	×
Persia	×	—	—
Switzerland	×	×	×
Syria	×	—	—
Thailand	×	×	×
Union of South Africa	×	×	×
United Kingdom	×	×	×
United States of America	×	×	×
Yugoslavia	×	—	—
Unesco Science Co-operation Offices	×	×	×

INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS

Third Meeting of the Executive Board

The Executive Board of I.C.S.U. met in the rooms of the National Academy of Sciences in Washington, on the invitation of the President, Dr. Detlev W. Bronk. U.R.S.I. was represented by Dr. Dellinger, Vice-President.

ADMISSION OF NEW UNIONS

1. *International Union of Biochemistry.* — It was agreed to defer a decision on whether to press for the admission to I.C.S.U. of Biochemistry as a separate and independent Union until after the Biochemistry Congress in Paris, July 1952, on which occasion there would be an opportunity for all concerned to review the whole question afresh in the light of the new I.U.P.A.C. organization.

2. *International Union of Scientific Psychology.* — It was decided to hold over a definite decision until after the formal admission of physiology to I.C.S.U.

MEETING OF UNION SECRETARIES

It was agreed to hold a meeting of the Secretaries of all the Unions in Paris on 31 January and 1 February 1952. They would have the opportunity to meet key members of the Unesco Secretariat, to discuss questions of the relations of I.C.S.U. and the Unions with Unesco, and to talk over problems of general interest to all Unions federated in I.C.S.U.

CREATION OF AN INTERNATIONAL ABSTRACTING
SERVICE (I.A.S.)

Notice was taken of a resolution of the Joint Commission on Physics Abstracting recommending to the Council that the Commission should be dissolved, and that an International Abstracting Service, not necessarily confined to Physics, be set up by the Council, under a Board consisting of (1) a neutral chairman; (2) at least two members nominated by I.C.S.U. from among its office-bearers; (3) a Secretary; (4) nominees of the Member Journals admitted by the Board to the I.A.S. This was agreed to, and Professor G. A. Boutry, Conservatoire National des Arts et Métiers, Paris, was nominated Secretary. The Service will function in the first instance under contract with Unesco.

POLAR YEAR 1957-58

It was agreed to form a Special Committee of the Council, under art. V, 18 of the Statutes, to co-ordinate special ionospheric operations in the polar regions, to be planned by the Joint Commission on the Ionosphere, and electric, magnetic, and meteorological measurements in the equatorial belt. The interested Unions (I.A.U., I.G.U., I.U.G.G. and U.R.S.I.) have been approached, with a request to nominate one member each, plus an alternate, to the special committee. These nominations will be submitted by the Bureau to the Executive Board at Amsterdam in September 1952 for its approval.

NEW DRAFT AGREEMENT BETWEEN I.C.S.U. AND UNESCO

The text of the draft agreement, as submitted by the External Relations Service of Unesco, was approved. The new agreement will come into force on 1 January 1952.

TRAVEL GRANTS TO YOUNG SCIENTISTS

The unsatisfactory situation in regard to travel grants for young scientists which, since the date of the Fifth General Conference

of Unesco at Florence, May 1950, have found a place neither in the categories of Unesco subvention to non-gouvernemental organizations, nor in the programme of the Exchange of Persons Service, was reviewed. The President was authorized to write to the Director-General of Unesco, pressing for a firm decision.

ALLOCATION OF 1952 SUBVENTION

The following breakdown into categories of the block grant of \$ 180 000 was approved by the Executive Board of Unesco at its Twenty-Eighth Session :

	\$
Categorie 1. Organizational expenses	1 800
Categorie 2. Publications	40 200
Categorie 3. Meetings of Committees	50 000
Categorie 4. Symposia and Conferences (including attendance of Young Scientists)	25 000
Categorie 5. Permanent Services	33 000
Categorie 6. International Laboratories	14 000
Categorie 7. Administrative Expenses	16 000
	180 000

Within this framework, the following breakdown between I.C.S.U. and the Unions was made by the Executive Board of I.C.S.U. :

I.C.S.U.	69 625
International Astronomical Union	14 300
International Union of Biological Sciences	20 100
International Union of Pure and Applied Chemistry	7 925
International Union of Crystallography	6 000
International Union of Geophysics and Geodesy	17 100
International Geographical Union	11 000
International Union on History of Science	4 000
International Union of Theoretical and Applied Meca- nics	7 500
International Union of Pure and Applied Physics ..	9 550
U.R.S.I.	12 900

The grant allocated to U.R.S.I. is divided as follows :

Categorie 1	900
Categorie 2	3 000
Categorie 3	9 000

(The grants allocated to U.R.S.I. in 1951 amounted to \$ 4000).

Note. — All figures are in U. S. dollars.

KALINGA PRICE FOR SCIENCE WRITING

In 1950, Sir B. Patnaik of Tulsipur, India, offered through Unesco a prize of £ 1000 annually for a body of work disseminating knowledge of science. Unesco requested the assistance of I.C.S.U. in selecting the prizewinner each year. The Bureau of I.C.S.U. drew up in consultation with Unesco a provisional set of regulations governing the award, which were approved by the Executive Board on the second day of Washington meeting.

In the outline, the agreed scheme is as follows :

1. I.C.S.U. invites the national adhering organizations to nominate a candidate for the prize ;
2. Unesco selects one candidate ;
3. A jury of three, of which two are nominees of I.C.S.U., one of Unesco, considers the work of the candidates put forward under 1 and 2 and names the winner ;
4. The presentation of the prize takes place under arrangements made between Sir B. Patnaik and Unesco.

International Union of Crystallography

At the Second General Assembly held in Stockholm from June 27 to July 3, 1951, Officers were elected as follows :

President : J. M. BIJVOET (Netherlands).

Vice-Presidents : G. Hagg (Sweden),
J. WYART (France).

General Secretary : R. C. EVANS (U. K.).

Editor : P. P. EWALD (U. S. A.).

Ordinary members of the Executive Committee : J. D. BERNAL (U. K.);
Sir K. S. KRISHNAN (India); E. ONORATO (Italy); A. L.
PATTERSON (U. S. A.).

It was agreed that the third General Assembly should be held in 1954 in some country on the continent of Europe.

International Union of Geodesy and Geophysics

At the Ninth General Assembly held in Brussels from August 21 to September 1, the following were elected as Officers of the Union for the ensuing 3-year period :

President : Prof. S. CHAPMAN (U. K.).

Vice-Presidents : Prof. J. BJERKNES (U. S. A.);
Prof. G. CASSINIS (Italy).

General Secretary : Col. G. LACLAVERE (France).

International Astronomical Union

A full meeting of the Executive Committee of I.A.U. was held in Paris, September 4-6, 1951.

Agreement was come to on the question of the postponement of the General Assembly scheduled for Leningrad August 1951, and it was agreed to accept the invitation of the Italian Research Council, and to hold the postponed meeting in Rome in September 1952.

International Union of Pure and Applied Chemistry

New-York and Washington, 8-16 September 1951.

The following information has come to hand concerning the election of new Officers to the Executive Committee for the period 1951-54 :

President : Arno TISELIUS (Sweden).

Vice-Presidents at large : Roger ADAMS (U. S. A.);
Endre BERNER (Norway);
Arthur STOLL (Switzerland).

Vice-Presidents and Section Chairmen :

E. W. R. STEACIE (Canada), Physical Chemistry ;
Pierre JOLIBOIS (France), Inorganic Chemistry ;
Paul KARRER (Switzerland), Organic Chemistry ;
C. J. VAN NIEUWENBURG (Holland) Analytical Chemistry ;
Leslie H. LAMPITT (Great Britain), Applied Chemistry ;
E. C. DODDS (Great Britain), Biochemistry.

Secretary General : Raymond DELABY (France).

CALENDER

1951

December 17, Unesco, Paris : Meeting of Governmental Representatives for the Establishment of the European Nuclear Physics Laboratory.

1952

March 4-6, I.U.B.S., London : Meeting of Executive Committee.

March 6-8, I.M.U., Rome : First General Assembly, International Mathematical Union.

April 1, I.C.S.U., Naples : First Meeting, International Advisory Committee, Zoological Station Naples.

June 10-13, Stockholm : Conference and Exhibition of « Instruments and Measurements ».

July 1-2, I.U.H.S., Paris : Council, International Union History of Sciences.

August 8-9, U.S.R.I., Sydney : Executive Committee, International Scientific Radio Union.

August 11-23, U.R.S.I., Sydney : Xth. General Assembly, International Scientific Radio Union.

August 25-27, I.C.S.U., Canberra : Third Meeting, Joint Commission on the Ionosphere.

August 8-15, I.G.U., Washington : XVIIth. International Geographical Congress General Assembly, International Geographical Union.

Summer, I.C.S.U., Colorado (U. S. A.) : Joint Commission on High Altitude Research Stations.

August. 15 to Sept. 15, Istanbul : VIIIth. International Congress of Applied Mechanics.

August. 25 to Sept. 2, I.U.T.A.M., Istanbul : Second General Assembly, International Union of Theoretical and Applied Mechanics.

September : I.A.U., Rome : VIIIth. General Assembly, International Astronomical Union.

September : I.C.S.U., Rome : Joint Commission on Solar and Terrestrial Relationships.

September : I.C.S.U., Monaco : Joint Commission on Oceanography.

September : I.C.S.U., Stockholm : Joint Commission on Radiobiology.

September : I.C.S.U., Columbus, Ohio (U. S. A.) : Joint Commission on Spectroscopy.

29 Sept. to Oct. 3, I.C.S.U., Amsterdam : VIIth. General Assembly, International Council of Scientific Unions.

November, U.N.E.S.C.O., Paris : Seventh Session, General Conference.

1953

August, I.U.H.S., Jerusalem : VIIth. International Congress of History of Sciences. Third General Assembly, International Union of History of Sciences.
