N°64

April - May - June 1950

INFORMATIONS

Secretariat

IXth. GENERAL ASSEMBLY

Copies of the programme of the Meeting have been forwarded to the National Committees. Members wanting to receive copies may apply to their Committee.

SUBSCRIPTION

We remind the National Committees that the subscription for 1950 was fixed by the 1948 General Assembly at the rate of 450 gold francs per statutary unit.

ITALY

We are informed of the constitution at the Napoli University of the « Centro Studi sulla Radiopropagazione e Radionavigazione » (Study Center for Radiopropagation and Radionavigation).

One of the activities of the Center consists in organizing lectures for engineers on the following topics :

Spatial and terrestrial propagation ;
Ionospheric propagation ;
Radionavigation methods ;
Radionavigation equipments ;
Pulse circuits, etc.

EUROPEAN BROADCASTING UNION

For the personal informations of our readers it seems useful to publish the introduction of the first « Documentation and Information Bulletin » of the European Broadcasting Union.

« Today is published the first issue of the Bulletin of the European » Broadcasting Union. Founded in February 1950 at Torquay, » the Union has rapidly become an organised and effective » international body, and the present publication bears witness » to the fact.

» The Administrative Office has been established in Geneva, » and the Technical Centre of the Union has a most active » existence at Brussels. The coming into force of the Copenhagen » Plan on March 15th. provided very early in its carier a test for » the Technical Centre, and gave it the chance to demonstrate its » effectiveness. Everything points to the conclusion that the » European Broadcasting Union has a useful future before it, » and that it is ready to play its part in furthering collaboration » among Broadcasting Organisations in the European Area and » throughout the world.

» As the first President of the Union I have great pleasure » in introducing our Bulletin to its readers, and in wishing it » every success. I feel confident that our Members will support » the Union by every means in their power, and will help it to be » useful in all matters of interest to broadcasting. There are » many international bodies in existence nowadays, but few which » have to work in a field where friendly collaboration is more » necessary if development is to proceed unchecked. I have no » hesitation in affirming that this friendly collaboration will be » the hall-mark of the European Broadcasting Union not only in » its domestic affairs but in its relations with other bodies. »

« Ian JACOB. »

INTERNATIONAL UNION OF PURE AND APPLIED PHYSICS

Papers submitted to the colloquium on Cosmic Rays

Côme, 11-16 September 1949

E. FERMI (Chicago) : Ipotesi sull' origine dei raggi cosmici.

H. ALVEN (Stockholm) : On the origin of Cosmic Rays.

E. BAGGE (Hamburg) : Die Sonne und die Fixsterne als Quellen kosmischer Strahlung.

F. Bopp (München) : Der Spin der Elementarteilchen als Folge von Emissions-Reabsorption prozessen.

J. Clay (Amsterdam) : Solar flares and excesses of cosmic radiation.

J. H. Davies, W. O. Lock and H. Muirhead (Bristol) : Energy of particles from the decay of mesons.

Miss Dilworth (Bruxelles) and Miss Page (Manchester) Electrons accompanying the decay and capture of mesons.

C. Franzinetti (Bristol), S. Rosenblum (Paris) : On the Spectrum of Light Particles produced in Cosmic Ray Disintegrations.

J. Clay (Amsterdam): The complex of radiation of extensive showers.

E. Amaldi, C. Castagnoli, A. Gigli, S. Sciuti (Roma) : Contributo allo studio degli sciami estesi dell' aria.

A. Borsellino (Milano) : Sullo sparpagliamento angolare e laterale degli elettroni in uno sciame.

J. Daudin (Observatoire du Pic du Midi, Pyrénées) : Clichés Wilson, composante électronique et gerbes nucléaires.

A. L. Hodson et A. Loria (Manchester) : Control of a Wilson cloud chamber by means of an internal counter.

R. Maze (Paris) : Sur le pouvoir pénétrant des gerbes de l'air.

C. Milone, S. Tamburino, G. Villari (Catania) : Sulla distribuzione delle particelle penetranti negli sciami estesi dei raggi cosmici.

G. Moliere (Hechingen-Hohenzollern) : Merfache und vielfache Coulomb-Streuung.

C. F. Powell (Bristol) : Nuclear transmutation produced by cosmic ray particles of great energy.

L. Leprince-Ringuet (Paris) : Phénomènes nucléaires de très grande énergie dans le rayonnement cosmique.

M. G. E. Cosyns (Bruxelles) : Stars with Showers of relativistic Particles.

B. Ferretti (Roma) : Sulla componente della radiazone penetrante generatrice di stelle.

M. Morand (Paris) : Etude de la dissymétrie Est-Ouest mise en évidence sur les traces isolées produites dans les émulsions nucléaires par les rayons cosmiques.

a) Recherches et données préliminaires.

b) (in co-operation with L. Winand, C. Beets, H. Moucharafyeh, M. Jannot, L. van Rossum, M^me^ Alleno) : Résultats expérimentaux.

c) (in co-operation with L. VAN ROSSUM, C. BEETS et M. JANNOT) : Essai de détermination des masses des particules sur lesquelles a été observée la dissymétrie Est-Ouest.

L. VAN ROSSUM, P. CUER, M. MORAND (Paris) : Etude comparative des évaporations nucléaires, produites dans les émulsions sensibles, par particules, deutérons, neutrons, mésons et rayons cosmiques.

G. OCCHIALINI (Bruxelles) : One Year of Electron Sensitive Plates : Problems and Results.

M. M. ADDARIO et S. TAMBURINO (Catania) : I. Nuclei pesanti della radiazione cosmica primaria osservati in lastre fotografiche esposte fino a 29000 m di altezza.

II. Disintegrazioni nucleari prodotte dalla radiazione cosmica a 29000 m di altezza.

G. BERNARDINI, G. CORTINI, A. MANFREDINI (Roma) : Sulle stelle di nucleoni provocate dai raggi cosmici.

Miss DILWORTH (Bruxelles), Miss VERMAESEN (Ghent) : Processing of Nuclear Research Plates of great thickness and their applications to Cosmic Rays.

V. GOLDSCHMIDT (Bruxelles), M. MERLINO (Padova) : Sandwich di lastre fotografiche in campo magnetico.

J. KADLECIK, J. PERNEGR and V. PETRZILKA (Praha) : Measurements of relative intensity of « stars » in emulsions of nuclear Photographic Plates.

Miss N. PAGE and G. D. ROCHESTER (Manchester) : Some observations on the nuclear disintegrations caused by Cosmic Rays in Photographic Emulsions.

D. H. PERKINS (London) : Nature of particles emitted in nuclear explosions at high energies.

M. SCHEIN (Chicago) : On the production of Nucleons and Mesons in the Cosmic Radiations.

P. M. S. BLACKETT (Manchester) : Cloud chamber studies of penetrating showers.

R. B. BRODE (Berkeley) : The Multiplicity of Production and Mass Spectrum of Cosmic Ray Mesons.

A. BORSELLINO, G. SALVINI (Milano) : Sulla struttura degli sciami estesi dell' aria.

M. Conversi (Chicago) : Altitude and Latitude Dependence of Penetrating Particles slowed down after traversing 15 cm of Lead.

J. Daudin (Paris) : Deux montages de compteurs pour l'étude des gerbes nucléaires.

M. Degallier (Lausanne) : Apparatus for the Study of the Production and Scattering of Ionizing Penetrating Particles Generated by the Non-ionizing Radiation.

A. Lovati, A. Mura, G. Salvini and G. Tagliaferri (Milano) : Esplosioni nucleari in Piombo e in Carbonio, osservate in camera di Wilson.

L. Mezzetti and R. Querzoli (Roma) : Sulla produzione e sulla molteplicità degli sciami penetranti in materiali di diverso numero atomico.

W. Heisenberg (Göttingen) : Die Entestehung von Mesonen in Vielfachprozessen.

P. Bassi, E. Clementel, I. Filosofo, G. Puppi (Padova) : Sull' eccesso positivo dei mesoni al livello del mare.

P. Caldirola (Pavia) : Sulla generazione e sull' eccesso positivo della componente mesonica.

B. d'Espagnat (Paris) : Sur la production des mésons aux hautes énergies.

G. M. Garelli (Torino) : Sullo spettro dei mesoni in funzione della profondita atmosferica.

W. Heitler and L. Janossy (Dublin) : Absorption of meson producing nucleons.

J. G. Wilson (Manchester) : The relative numbers of positive and negative mesons at sea level.

L. Janossy (Dublin) : Penetrating particles in air showers.

A. Freon-Tsai-Chu (Paris) : Sur la loi empirique de répartition angulaire de la composante pénétrante dans la basse atmosphère.

E. P. George (London) : Some nuclear interactions of cosmic ray particles.

W. Heitler and L. Janossy (Dublin) : The multiplicities of meson showers.

G. Wataghi (Torino) : Sciami penetranti locali ed estesi.

B. Bernardini (Roma) : Relazione conclusiva dei lavori.

Those papers will be published in a special issue of *Nuovo Cimento*.

NATIONAL COMMITTEES

Dutch National Committee

MEMBERSHIP

The Dutch National Committee of the U.R.S.I. is constituted as follows :

President : Prof. Ir. B. D. H. TELLEGEN, Tongelresestraat, 193, Eindhoven.

Secretary : Ir. M. L. TOPPINGA, Vlakte van Waalsdorp, The Hague.

Treasurer : Ir. J. J. VORMER, Joh. Bildersstraat, 52, The Hague.

Members : Ir. J. W. ALEXANDER, Loosdrachtseweg, 146, Hilversum.
Ir. J. BLOEMSMA, Mient 551, The Hague.
Dr. C. J. BOUWKAMP, Goorstraat, 10, Eidhoven.
Dr. H. BREMMER, Markt, 35, Eindhoven.
Ir. B. VAN DIJL, Prins Willem van Oranjelaan, 25, Naarden.
Dr. H. J. GROENEWOLD, Utrechtseweg, 324, de Bilt.
Drs. A. HAUER, Biltsestraatweg, 57, de Bilt.
Dr. Ir. J. L. H. JONKER, Broerelaan, 12, Eindhoven.
Prof. Dr. M. G. J. MINNAERT, Zonnenburg, 2, Utrecht.
Prof. Dr. J. H. OORT, Sterrewacht, 5, Leiden.
Ir. J. PIKET, Jongeneelstraat, 11, Scheveningen.
Prof. Dr. B. VAN DER POL, Chemin Krieg, 22, Geneva (Switzerland).
Dr. J. F. SCHOUTEN Fazantlaan, 11, Eindhoven.
Prof. Dr. Ir. J. P. SCHOUTEN, Roelofsstraat, 4, The Hague.
Ir. A. H. DE VOOGT, Scheveningseweg, 6, The Hague.
Jhr. Dr. Ir. C. Th. F. VAN DER WIJCK, van Stolkweg, 1*a*, The Hague.

U. S. A. National Committee

CONSTITUTION OF THE COMMITTEE

As amended by the Committee on May 2, 1949, and approved by the Executive Board of the National Research Council on May, 24, 1949.

1. The U.S.A. National Committee shall consist of the Chairman of the Division of Mathematical and Physical Sciences of the National Research Council (ex officio); one representative each of the U.S. Department of Commerce, the Federal Communications Commission, and the Institute of Radio Engineers; two representatives of the U. S. Department of the Army, one of whom shall be the Chief Signal Officer (ex officio); two representatives of the U. S. Department of the Navy, one of whom shall be te Chief, Naval Communications (ex officio); two representatives of the U. S. Department of the Air Force, one of whom shall be the Director of Communications (ex officio); officers and Commission chairmen of the International Scientific Radio Union resident in the United States (ex officio); the chairman of the National Commissions (ex officio); officers until expiration of their terms of office; the junior past chairman; and members-at-large.

2. The representatives (other than ex officio representatives) of the several organizations shall be nominated by those organizations, and the members-at-large shall be nominated by the U.S.A. National Committee. The nominations shall be acted upon, and the appointments made, by the National Research Council.

3. The officers of the U.S.A. National Committee shall be a chairman, a vice-chairman, a secretary, and a treasurer. These officers, and honorary members and subcommittees and other auxiliary bodies, shall be elected by the Committee.

4. Officers shall serve for terms from the spring meeting after each General Assembly of the Union to the spring meeting after the next General Assembly. Members-at-large shall serve for terms of four years. Officers and members-at-large shall not be eligible for immediate reelection.

5. The duties of the U.S.A. National Committee shall be : (*a*) to promote the objectives of the Union; (*b*) in consultation with the chairman of the Division of International Relations of the National Research Council, to nominate a representative of the National Committee in that Division; (*c*) to nominate delegates to the meetings of the Union; (*d*) to arrange for meetings in the U. S. A. in consonance with the objectives of the Union; (*e*) to deal with scientific radio questions in general involving the participation of the United States.

COMMISSIONS

Commission III

ON IONOSPHERE AND WAVE PROPAGATION

Report from Ionosphere Research Committee (Science Council of Japan) for 1946-1948

by Y. HAGIHARA, Chairman

(EXTRACTS)

PART II

RESULTS OBTAINED IN 1948. — The reports and the discussions made at the committee meetings held each month were published in Numbers 3, 4 and 5 of the « Reports of the Synthetic Study of the Co-operative Observations ». The abstracts of the lectures and the research results reported at the colloquia held each month are published in Numbers 1 and 2 of the « Proceedings of Colloquia ». When the results of research are reported in their final form, they are published in « Essays on Ionosphere Research ».

The main results contained in such publications during 1948, concern :

1. *Improvement and Extension of Observations.*

1.1. Photographic Observations of Solar Phenomena.

1.2. Geomagnetic Observations : During the solar eclipse, observations were carried out at several temporary stations. The observed elements of the variability of magnetic field were increased,

1.3. Ionospheric Observations : A precise measurement was made with a special apparatus during the eclipse.

1.4. Record of Electric Field Intensity : Electric field intensity measurement of radio-waves from England was transferred from Ohira to Hiraiso.

1.5. Preparation for the Measurement of Solar Noises : Equipments are now in preparation for measuring solar noises at the Oi Laboratory of the Ministry of Communication and the Tokyo Astronomical Observatory.

1.6. Cosmic Ray Observation : The observation by the Nagoya University has begun.

1.7. Night Light Observation.

2. *Development of Research and New Discoveries.*

2.1. Detailed Study of Solar Phenomena.

2.2 Provisional Study with Coronagraph.

2.3. Spectroscopic Study of the Sun.

2.4. Variation of Ionosphere accompanied with Geomagnetic Variation.

2.5. Electromagnetic Induction in Ionosphere : Effects on the geomagnetic field of the induction current produced in ionosphere due to the variation of external magnetic field (Nagata, Sugiura).

2.6. Composition and Development of Geomagnetic Storms.

2.7. Ionospheric Storms : Statistical study on the ionospheric storms were made and their characteristics are now in search for (Nagata, Fukushima).

2.8. Analysis of Diurnal Variation of Geomagnetic Field : The fact that the vertical component of diurnal variation is bigger in the external geomagnetic field was pointed out (Rikitake).

2.9. Discussion of Diurnal Variation in the Polar Region : That the electric conductivity of the upper atmosphere has a special distribution in the region was studied (Hasegawa).

2.10. Activity of the Geomagnetic Sq Field.

2.11. Relation between Telecommunication and the world-wide Distribution of Geomagnetic Disturbances : By comparing the world-wide distribution of K-index in the radio fade-out for short wave radio communications the circumstance that the communication condition is generally worse when K-index is larger world-wide (Imamichi).

2.12. Absorption of Radio-Waves in Ionosphere : By computing the collision cross-section of neutral oxygen atoms for slow electrons it was known that this collision cross-section is not much different from the ordinary cross-section so far as the absorption of radio-waves is concerned (Yonezawa).

2.13. Increase of the Thickness of F2 layer at Night : This phenomenon was explained by considering the diffusion of electrons and the cooling of the atmosphere (Yonezawa).

2.14. Oscillation of Ionosphere : It was found that there exists a period of four hours in the variation of the height of F2 layer (Matsushita).

2.15. Lunar Semi-Diurnal Tide of F2 layer : The M_2 of the Z_m of F2 layer was shown to have the amplitude 2-4 km and the phase different by about 180° from the earth surface (Matsushita).

2.16. Southward Movement of Es : It was shown that the Es has a tendency to move southward when it is strong and its speed is about 360 km per hour (Matsushita).

2.17. World-wide Distribution of F2 Layer : The condition of radio-wave propagation was analysed by obtaining the world-wive distribution of the constant and the variable terms for F2 layer (Ueda).

2.18. Effect of Solar Activity on Ionosphere : By discussing statistically the effect of solar activity on ionosphere, important data for the prediction of radio-wave propagation were obtained (Ueda and his collaborators).

2.19. Analysis of the Variation of Electric Field Intensity and the Associated Phenomena : The values of the variation of electric field intensity computed on the basis of the attenuation were shown to agree with the observed values, if plotted on the world map, except for the radio-waves passing through the polar region (Ueda, Obayashi).

2.20. Effect of Eclipse on E and F Layers : That the decrease of electron density of F layer at the time of eclipse is controlled by the solar activity and the local time and that of E layer has the same variation as the variation for morning and evening was known (Ueda).

2.21. Variation of Ionosphere during Eclipse : The appearance of a sub-layer in F region which has different mechanism for electron capture has been recognized (Nakata).

2.22. Diurnal Variation of Geomagnetic Field in F layer : It was shown that the diurnal variation of geomagnetic field in F layer has amplitude 10^2 times larger than on earth surface and that the phases of the diurnal and the semi-diurnal period variations are of opposite sense (Nakata).

2.23. Effect of Solar Eruptions on $f_{\min}$: The solar eruption are shown to be the cause of the increase of $f_{\min}$ (Aono).

2.24. Relation between the Telecommunication and the Solar Phenomena and the Geomagnetism : It has been discovered that at the time of magnetic storm the propagation due to the anomalous reflection for E layer and the disturbance phenomena of telecommunication moves southward with a speed of about 260 km per hour (Miya, Wada).

2.25. Relation between Electric Field Intensity and Magnetic Disturbance : It was shown that the electric field intensity decreases during about one hour in the case of violent magnetic storm and about 10-30 hours in the case of weak magnetic storm after the main phase of the storm takes place, and that the variation of the direction of the radio receiving is accompanied with and in preceding the radio-disturbance (Kono).

2.26. Observation of Radio-Wave Reflection by Meteors.

2.27. Analysis of Electric Field Intensity of GLX.

2.28. Analysis of Anomalous Phenomena of Tele-communication from America and from Europe : The relation between radio propagation anomalies and solar eruptions and solar radiation was discussed (Matsuo).

2.29. Diurnal Variation of Cosmic Rays and Solar Activity : From the fact that the diurnal variation of cosmic rays is in phase with the sunspot relative number and has its maximum in spring and in autumn, a close correlation is expected with geomagnetism (Sekido).

2.30. Diurnal Variation of Cosmic Rays and Magnetic Storms : It is shown that the diurnal variation of cosmic rays increases rapidly with the beginning of a magnetic storm and then decreases (Sekido).

2.31. Time-Relation between Cosmic Ray Variation and Geomagnetic Variation.

2.32. Variation of Night-sky Light Intensity and the Height of the Night-Sky Light Emitting Layer : The height of the emitting layer of night-sky light was shown to vary in accordance with the Z_m and to be higher or lower than Z_m according as $f'F2$ is larger or smaller than its median value.

2.33. Height and Intensity of Night-Sky Light : The intensity of the night-sky light is shown to have a tendency to increase, the higher is the latitude, and to have a closer correlation with electron density (Shimamura).

2.34. Theoretical Study on Night-sky Light :

PLAN FOR THE NEXT YEAR (1949). — (1) Fundamental Research for the Application to the Prediction of Radio Propagation Anomalies.

(2) Observation of Light-Intensity of Corona by a Coronagraph.

(3) Observation of Short-Wave Radio Noise from the Sun.

(4) Study on the geomagnetic variation and its relation to various phenomena concerning ionosphere.

(5) Direct Vision Magnetograph.

(6) Improvement of the Accuracy for Ionosphere Observations.

(7) Theoretical Study of Various Phenomena in the Ionosphere.

(8) Statistical Studies on Ionospheric Phenomena and their Relation to the Associated Phenomena.

(9) Continuous Self-Registering Record of the Field Intensity, Receiving Direction and Incident Angle of Radio-Waves and the Study of the Observational Results.

(10) Precise Measurement of Cosmic Rays.

(11) Precise and Simultaneous Observations of Night-Sky Light.

(12) Observation of Noises and Atmospheric Electricity.

(13) Compilation of Anomalous Variation of Ionospheric, Geomagnetic and Tele-communicational Phenomena.

(14) Publication of the Reports of Research Results.

Members of Commission III may be interested in the following letter we received from the Ionosphere Research Committee of Japan :

January, 15, 1950.

« Dear Sir,

» The Ionosphere Research Committee is attempting to publish Catalogues of Disturbances in Ionosphere and Other Related Phenomena and the present copy is the first number (1). The Committee, belonging now to the Science Council of Japan, was organized in 1946 in accordance to the requests from the technicians and the scientists engaged in related subjects. The members of the Committee are carrying on regular simultaneous co-operative observations continuously during one month in each season of the year. At the moment when an unexpected extraordinary solar phenomenon occurs, the Committee will start extra simultaneous observations for about ten days. The meeting of the Committee is held once a month, and the data obtained are studied and discussed and take up the necessary step for disclosing the nature of the phenomena. The results are published in the « Report of Ionosphere Research in Japan » for distribution. The factors observed simultaneously are as follows :

» 1. Cosmic Rays ;
» 2. Night Sky Light ;
» 3. Solar Phenomena ;
» 4. Geomagnetism ;
» 5. Earth current ;
» 6. Atmospheric electricity ;
» 7. Ionosphere ;
» 8. Field intensity of radio waves.

» The Catalogue of Disturbances, N° 1, contains the result of the extra observation made by our Committee during three days from August 2 to August 4, 1949, when a magnetic storm occured. We hope the Catalogue will be of any value to the collaborators in other countries. We should be glad if you would write any

(1) See p. 33.

criticism and advice on the Catalogue. We should be much obliged, if you would kindly send us a copy of the record of observations made at your laboratory during the same period as in the present Catalogue.

As the list in our hand of the addresses where to send this Catalogue is very incomplete, so it would be much appreciated, if you would let us know the addresses of the organizations in your country.

» Yours truly,

(*Sgd*) Dr. Yusuke HAGIHARA,
Chairman of
the Ionosphere Research Committee

Any comments may be sent either to our General Secretarial either to the following address :

Doctor Yusuke HAGIHARA
Ionosphere Research Committee
Science Council of Japan
Ueno Park, TOKYO, Japan

Commission V

ON EXTRA-TERRESTRIAL RADIO NOISE

Dr. F. D. MARTYN sent the following letter to the Members of the Commission :

Canberra, 9th. May, 1950.

« Dear Colleague,

» I would be glad if Members of Commission V would now communicate to me any suggestions they may have for major topics of discussion at the Zurich Assembly in September. These may be concerned either with problems of international cooperation or with a particular field in extra-terrestrial radio.

» In the first class of problem some success has already been achieved. Thus in cooperation with the Commission on Radio Astronomy of I.A.U. a scheme is now in operation for the regular publication of solar noise data in the Quarterly Bulletin of Solar Activity. Again, by the kind cooperation of the Radio Astronomy

Project at Cornell University arrangements have been made for the regular publication of up-to-date World Bibliographics of our subject. Attention is also being devoted to the nomenclature and units in use in our subject, a problem which should receive much attention at Zurich. You will soon receive some preliminary notes on this subject; these should be regarded as a basis for discussion and further thought before our Commission meets.

» One of our objects should be to keep a world-wide continuous watch on the sun for at least one radio-frequency. This would give valuable statistical and other information, as well as providing a valuable and necessary check on the calibration of equipments in various countries. There are now excellent measurements on 200 Mc/s being made at Cornell University, U.S.A. and at the Commonwealth Observatory, Canberra, Australia. The world chain would be much improved if similar observations were to be made continuously at a site in Europe. I specially invite the attention of Commission members from European countries to this matter.

» Very cordially yours. »

(*Sgd*) D. F. Martyn,
President, Commission V.

URSIGRAMS

France

MARCH 1950 (1)

Date		Text
1 =	PIDB	MERCREDI NIL =
	SOL	01112 161X1 151X1 278X1 =
	SOLER	10545 40000 =
	MAGME	DPCXX 30206 00315 =
	CORON	00100 =
2 =	PIDB	JEUDI NIL =
	SOL	02112 181X1 171X1 258X1 271X1 =
	SOLER	10545 50000 =
	MAGJE	CQBXX =
	CORON	00200 =
3 =	PIDB	VENDREDI NIL =
	SOL	03112 181X1 248X1 261X1 =
	SOLER	10545 60000 =
	MAGVE	CSBXX 30200 00250 10439 00442 =
	CORON	10311 GFGGG HHHHJ MOPQT PONLO RQNLL JHGFF EAAAA 01515 FEGIJ JHHKL MMKML NNRSU SQPMN MMMLJ IIJJH 01927 =

(1) Owing to the great usefulness of the condensed form of the « Ursigrams » for the speedy research of correlations between the various data (SOL MAG, PIDB, etc.), it has appeared necessary to give here all the phenomena observed during the month were they broadcasted or not. After checking and possible corrections, the published text gives a final summing up of the « Ursigrams » for each month.

4 = PIDB SAMEDI NIL =
SOL 04NIL =
SOLER 10545 70000 =
MAGSA BHCSB =
CORON 00400 =

5 = PIDB DIMANCHE NIL =
SOL 05221 15661 13331 22621 228X1 22121
241X1 278X1 277X4 =
SOLER 10545 IXXXX =
MAGDI BLCPB 12203 02212 =
CORON 00500 =

6 = PIDB LUNDI NIL =
SOL 06121 17671 14341 11632 118X1 221X1
258X1 267X4 =
SOLER 10545 20000 =
MAGLU CNDXX 11034 01042 11254 01303 21339
01348 11742 01750 32200 02252 =
CORON 00600 =

7 = PIDB MARDI NIL =
SOL 07131 17111 16351 12642 128X1 211X1
21311 248X1 247X4 263X1 287X2 57101
91429 61301 01440 =
SOLER 10545 30000 =
MAGMA DQCXX 21210 01218 =
CORON 10710 HHGHH HHIIK MOQTU QQORT
USQQO LJIII HHGGF 02207 AFGGI
JJMKK KLNPS SSPPP QQQQQ OONMK
IHIHH 02171 =
CORON 20714 ZAZAZ AZAZA FGHII GAAGH
JHAAZ AZAZA ZAZAZ 00181 ZAZAZ
AZZZZ ZAZAG HHFFH FAAAZ AZAZA
ZAZAZ 00094 =

8 = PIDB MERCREDI NIL =
SOL 08131 18121 17361 13652 138X1 121X1
11321 253X1 262X1 277X4 287X1 =
SOLER 10545 40000 =
MAGME BGCXX =

CORON 10809 GGGGG HIIJN MKNPQ NQMOO RONOK JIIHJ HHIEE 01586 EEGGI JIJJI JLLMO TQOOQ TNPNO NMLLJ IHHHG 01819 =

CORON 20814 ZAAAZ AZAZA ZAEFG FGEAA FIEAA AZAZA ZAZAZ 00101 ZAZAZ AZAZA ZAZEF GEEGF AAZAZ AZZZZ ZZZZZ 00062 =

CORON 30813 28004 HZZZZ =

9 = PIDB JEUDI NIL =

SOL 09131 15662 148X1 131X1 13331 243X2 252X1 257X4 267X2 =

SOLER 10545 50000 =

MAGJE CSBXX =

CORON 10909 GGFGH HIIKM KMMPN QSNQQ QPNML JIHIJ IIGFA 01650 EEFFH HHIIJ JIKKO QNPSQ QSUPN MMJJI HHHIG 01780 =

CORON 20914 ZAZAZ AZAZA ZAEGG HIFFE GLFFF EEEAA ZAZAZ 00204 ZAZAE FFFAA AAEFF JEAHG EGGFE EFFEF EGFFA 00248 =

CORON 30911 27603 KZZZZ =

10 = PIDB RENF VENDREDI 0940 0944 EVAN VENDREDI 0944 =

SOL 10NIL =

SOLER 10545 60000 =

MAGVE CRBXX 10527 00533 =

CORON 11010 GGGHI IILNK JKLQR VUQNO QONLI IIIII IIGAA 01794 FEFGH IIIHH HGJOO OMPTQ RVTOM OKIIH IHHHH 01799 =

CORON 21011 ZAEGF EAAAA AAHHH IGFEE GHEEA AEEEA ZAZAZ 00207 ZAZEE FFEAA EEFEF FFEEI EFGFE EEAAA ZAZAZ 00181 =

11 = PIDB SAMEDI NIL =

SOL 11NIL =

SOLER 10545 70000 =

MAGSA BXXXX =
CORON 11109 GGGHI HJLNI LMNRV SWSQL OLMMJ IIIII JJFEA 01944 EEFGH GHHHE FLNRS PPSSR TSRPM LJHHG GGGGG 01864 =
CORON 21114 FFGFF FFAAA AEIGK IIGEA AGFGA FGEAA AEEFA 00300 ADEEE FEFEE AAAEF EEFFH FEFEF FFEEE FFFFF 00241 =
CORON 31111 08107 GZZZZ =

12 = PIDB RENF DIMANCHE 1415 1430 EVAN DIMANCHE 1415 =
SOL 12NIL =
SOLER 10545 10001 14500 =
MAGDI BECRB 11346 01351 21403 01409 21450 01500 =
CORON 11209 HHHII IKMKL MORRU UWQPL LMLKJ HHIJJ JJEAA 01977 EEFGG GFFEE HMTTR PQTRS TQONO OLGII HGHHH 01995 =
CORON 21211 EEFEE EEEAA EFIIK JIIIF FEEEE EEEEA AAAAZ 00322 = ZAAAE EAEFA EFGHG JHLLL FFFFF GGGFF FFEDD 00413 =
CORON 31214 06905 07708 IFZZZ =

13 = PIDB LUNDI NIL =
SOL 13NIL =
SOLER 10545 20000 =
MAGLU BJCWB 10512 00518 10942 00951 31848 02000 =
CORON 11310 HHIII ILKKM LPSVS TSOML NNMKI GIIII JJHEA 01887 AEEFE FFFEE JPUSR PSUUS RTSPR OJFFG GHHHI 02239 =
CORON 21312 EFAFF GEEFA AHGGH JIHGE AAAFE EAAAA AAAAA 00242 EEAEE AAAAE EEKFE GGJJF FGHGI JGFFE EEEAA 00356 =
CORON 31308 06510 07308 30305 GHGZZ =

14 = PIDB MARDI NIL =
SOL 14533 133X2 132X1 127X4 117X1 242X1 262X4 272X1 53201 91005 =
SOLER 10545 30300 =
MAGMA CGDWC 21452 01459 =
CORON 01400 =

15 = PIDB MERCREDI NIL =
SOL 15133 153X1 147X4 137X1 222X1 252X4 262X1 =
SOLER 10545 40000 =
MAGME EFDPB 30230 00500 =
CORON 01500 =

16 = PIDB JEUDI NIL =
SOL 16133 163X1 157X4 147X1 212X1 232X4 252X1 =
SOLER 10545 50000 =
MAGJE BFCMB =
CORON 01600 =

17 = PIDB VENDREDI NIL =
SOL 17NIL =
SOLER 10545 60000 =
MAGVE CPBWC 10624 00630 11054 01103 22105 =
CORON 01700 =

18 = PIDB SAMEDI NIL =
SOL 18233 187X4 177X1 132X1 12211 212X4 223X1 =
SOLER 10545 70201 14241 =
MAGSA CPBUC =
CORON 01800 =

19 = PIDB DIMANCHE NIL =
SOL 19133 187X1 142X1 13221 122X4 213X1 282X4 =
SOLER 10545 IXXXX =
MAGDI BFFWC 80545 =
CORON 01900 =

20 = PIDB LUNDI NIL =
SOL 20NIL =

SOLER 10545 20000 =
MAGLU CSDWC 31900 01930 =
CORON 02000 =

21 = PIDB MARDI NIL =
SOL 21NIL =
SOLER 10545 30001 08370 =
MAGMA CEDPE 31500 01536 32000 02100 =
CORON 02100 =

22 = PIDB MERCREDI NIL =
SOL 22323 162X4 143X1 241X4 257X1 =
SOLER 10545 40500 =
MAGME DOCSD 10338 00350 =
CORON 02200 =
NOTE : PERTURBATION POSSIBLE DE PROPAGATION.

23 = PIDB JEUDI NIL =
SOL 23NIL =
SOLER 10545 50000 =
MAGJE CRBYD =
CORON 02300 =

24 = PIDB VENDREDI NIL =
SOL 24223 173X1 211X4 227X1 267X1 =
SOLER 10545 60000 =
MAGVE CCDIC 30200 00315 10546 00550 10653 00659 =
CORON 12413 HIIII IJKJL MQRSQ OONMS TQLII HGGFF HHGAA 01720 EFGIJ JHIKJ KOPPN MRSTV USOPO NOMKK IHHGG 02242 =

25 = PIDB SAMEDI NIL =
SOL 25123 12611 111X4 217X1 23311 257X1 =
SOLER 10545 7XXXX =
MAGSA CDDIC 20754 00806 =
CORON 12511 HIIHH IIJHM ORRSR POMOT PLLLI EAAAE FFGAA 01620 DGHHI JJKJH MOMLL OQRTW VTPQM LLLKJ IIHGG 02183 =

26 = PIDB DIMANCHE NIL =
SOL 26123 14621 121X4 127X1 22321 237X1 283X4 =
SOLER 10545 10000 =
MAGDI CWDXX 62125 42330 =
CORON 12609 IIHII IJIMN PQPOO MMZZZ ZZZZZ ZZZZZ ZZZZZ 00893 ZZZZZ ZZZZZ ZZZZZ ZZZZZ ZURNL LKKKK IIIHH 00733 =

27 = PIDB LUNDI NIL =
SOL 27122 15631 141X4 21331 227X1 263X4 286X4 31413 =
SOLER 10545 20000 =
MAGLU EEDPE 40137 00149 =
CORON 02700 =

28 = PIDB MARDI NIL =
SOL 28122 16641 151X4 12341 253X4 276X4 =
SOLER 10545 30000 =
MAGMA CQBXX 40725 00945 =
CORON 02800 =

29 = PIDB MERCREDI NIL =
SOL 29122 18651 161X4 13351 233X4 256X4 282X1 283X4 =
SOLER 10545 40000 =
MAGME CHDOC 70721 41040 01540 =
CORON 02900 =

30 = PIDB JEUDI NIL =
SOL 30NIL =
SOLER 10545 50000 =
MAGJE CQBXX 10323 00328 40715 01150 =
CORON 03000 =

31 = PIDB VENDREDI NIL =
SOL 31232 213X4 236X4 256X1 252X1 263X4 65601 90830 =
SOLER 10545 60000 =
MAGVE BGDSC 10958 01003 11200 01216 =
CORON 03100 =

Mois d'avril 1950

1 = PIDB SAMEDI NIL =
SOL 01NIL =
SOLER 10545 70000 =
MAGSA DFCUD 11148 01155 40800 02100 =
CORON 00100 =

2 = PIDB DIMANCHE NIL =
SOL 02232 133X4 116X4 22821 226X1 222X1 233X4 =
SOLER 10545 10000 =
MAGDI DDCRD =
CORON 00200 =

3 = PIDB LUNDI NIL =
SOL 03132 143X4 126X4 21831 216X1 212X1 223X4 =
SOLER 10545 20000 =
MAGLU CUDZC 32045 02145 41525 01630 =
CORON 00300 =

4 = PIDB MARDI NIL =
SOL 04NIL =
SOLER 10545 30000 =
MAGMA CRDUC =
CORON 00400 =

5 = PIDB MERCREDI NIL =
SOL 05233 163X4 156X4 13852 136X1 132X1 12141 123X4 22221 267X4 =
SOLER 10545 40000 =
MAGME DGCND =
CORON 10514 GGHHI IJMNO NMMNO LMOMN NMKKJ IHHHG FEHGF 01380 EFFAG GHIHH HHGJL MOMOP NOONL KKJJI IIIHG 01243 =

6 = PIDB JEUDI NIL =
SOL 06133 166X4 14762 146X1 142X1 14151 133X4 21231 257X4 =
SOLER 10545 5XXXX =

MAGJE DDCUD 11317 01324 40945 01010 41145 01335 =
CORON 10611 AGGGH IMOQN MKMOS QQQOM MMLJJ JIIHH HHHFA 01635 FFFAG IHHII HGHJP PMLOM OQQQM KJJJJ IIHHG 01381 =

7 = PIDB RENF VENDREDI 1455 1502 EVAN VENDREDI NIL =
SOL 07133 186X4 16772 152X1 15161 153X4 12241 247X4 282X1 =
SOLER 10545 60000 =
MAGVE DICWB 10850 00857 =
CORON 00700 =

8 = PIDB RENF SAMEDI 0927 0929 EVAN SAMEDI NIL =
SOL 08133 17782 16171 163X4 13251 227X4 272X2 =
SOLER 10545 70000 =
MAGSA ABCPB 11335 01342 =
CORON 10810 IIIIK LLMLL MNTWW VTRMM KIJJJ JKJHJ HKJHA 02205 GHGHH IIAAG LKOPT SRTRS SQSQM OMLNL KJJHH 02208 =

9 = PIDB RENF DIMANCHE 0700 0710 DIMANCHE 1015 1020 EVAN DIMANCHE NIL =
SOL 09132 18792 18181 173X4 14261 217X4 262X2 =
SOLER 10545 IXXXX =
MAGDI BGCSB =
CORON 10910 HHHII KKLKL LQQUT TROMN KIJJH KKHAA 01816 AGGGH AFAFG OPTVS TVVTU TSPRP NNKKJ HIHHH 02647 =

10 = PIDB RENF LUNDI 1139 1143 LUNDI 1308 1314 EVAN LUNDI 1139 =
SOL 10NIL =
SOLER 10545 2XXXX =

MAGLU OQBVC 32236 02330 =
CORON 11013 HHHJJ JIMJL ORSQR RPKKJ IJJII IJLKL KLJHA 01688 AFAAA AAGGI NTVVT WWWVV TPRPQ OMLJH GHHGG 02953 =

11 = PIDB RENF MARDI 1545 1548 EVAN MARDI NIL =
SOL 11222 17281 137X4 242X3 =
SOLER 10545 30000 =
MAGMA ADBPC =
CORON 01100 =

12 = PIDB RENF MERCREDI 1015 1016 MERCREDI 1228 1231 MERCREDI 1329 1338 MERCREDI 1445 1505 EVAN MERCREDI 1457 =
SOL 12122 147X4 222X3 62201 01455 82204 01450 =
SOLER 10545 40000 =
MAGME DMCXX 20416 11454 01455 =
CORON 01200 =

13 = PIDB JEUDI NIL =
SOL 13122 157X4 212X3 24121 =
SOLER 10545 50000 =
MAGJE DJCPB 30223 00300 40540 =
CORON 01300 =

14 = PIDB RENF VENDREDI 1240 1250 VENDREDI 1337 1343 VENDREDI 1650 1653 EVAN VENDREDI 1243 1313 VENDREDI 1338 1403 =
SOL 14132 177X4 122X3 23131 272X2 =
SOLER 10545 6XXXX =
MAGVE COAUC 11336 =
CORON 01400 =

15 = PIDB RENF SAMEDI 1250 1255 EVAN SAMEDI 1245 =
SOL 15132 187X4 132X3 21141 262X2 =
SOLER 10545 7XXXX =

MAGSA CDDNC 21155 01200 32240 02325 =
CORON 01500 =

16 = PIDB RENF DIMANCHE 1215 1226 EVAN
DIMANCHE 1220 =
SOL 16132 142X3 11151 242X2 256X4 =
SOLER 10545 IXXXX =
MAGDI CDBGC =
CORON 01600 =

17 = PIDB LUNDI NIL =
SOL 17122 152X2 12161 232X2 =
SOLER 10545 20000 =
MAGLU CIBLC =
CORON 01700 =

18 = PIDB MARDI NIL =
SOL 18NIL =
SOLER 10545 30000 =
MAGMA DJCOD =
CORON 01800 =

19 = PIDB MERCREDI NIL =
SOL 19222 182X2 15182 112X2 32321 =
SOLER 10545 40000 =
MAGME CNDWC 31912 02005 =
CORON 01900 =

20 = PIDB JEUDI NIL =
SOL 20122 17192 122X2 27721 =
SOLER 10545 50000 =
MAGJE DHCSD 30345 00427 10921 00929 12145
32218 02308 =
CORON 02000 =

21 = PIDB VENDREDI NIL =
SOL 21122 18102 132X2 26731 =
SOLER 10545 60000 =
MAGVE BNAXX =
CORON 02100 =

22 = PIDB SAMEDI NIL =
SOL 22122 142X1 25742 277X1 =
SOLER 10545 70000 =

MAGSA AJCRB 20910 00916 21054 01108 =
CORON 02200 =

23 = PIDB DIMANCHE NIL =
SOL 23NIL =
SOLER 10545 IXXXX =
MAGDI CFDRD 20548 =
CORON 02300 =

24 = PIDB LUNDI NIL =
SOL 24222 172X1 16121 22762 247X1 272X1 287X1 =
SOLER 10545 20000 =
MAGLU EIFJD 40735 00800 50800 00840 40857 31700 01800 =
CORON 02400 =

25 = PIDB MARDI NIL =
SOL 25122 17131 21772 237X2 262X1 266X1 278X1 =
SOLER 10545 30000 =
MAGMA CFDSB 40506 01615 =
CORON 12500 HHGHH HKMKL PRRRR UQOON NMNMK IJIZZ ZZZZZ 01761 ZZZII IJLGG IJJIG MLNRS TTSRM LKLKI HHGHH 01654 =

26 = PIDB MERCREDI NIL =
SOL 26NIL =
SOLER 10545 40000 =
MAGME BECJB 10321 00330 10512 00521 10648 00655 10741 00750 =
CORON 02600 =

27 = PIDB RENF JEUDI 1352 1356 JEUDI 1629 1637 EVAN JEUDI 1352 JEUDI 1630 =
SOL 27222 13792 117X3 23711 236X1 24711 258X1 273X7 =
SOLER 10545 5XXXX =
MAGJE BFCXX 11247 01251 32003 02100 =
CORON 02700 =

28 = PIDB VENDREDI NIL =
SOL 28NIL =
SOLER 10545 60000 =
MAGVE BECZD 10418 00426 21422 01426 32312 =
CORON 02800 =

29 = PIDB SAMEDI NIL =
SOL 29NIL =
SOLER 10545 70000 =
MAGSA CDBJD =
CORON 02900 =

30 = PIDB DIMANCHE NIL =
SOL 30322 17702 157X2 126X1 11641 218X1 233X7 252X1 262X1 =
SOLER 10545 10000 =
MAGDI DLCPD 30230 00348 21742 01743 =
CORON 13012 ZAZAZ AAHIL LOMNO OKJKM MPMLJ HHAAA ZAZAZ 01000 AGGHH HHHHI JJJKL LJHIJ MOOML JIHGG AAAAA 00915 =
CORON 23014 ZAZAZ AZAFF FGGGM HHGGH HHEEA AZAZA ZAZAZ 00252 ZAZAZ AZAZA ZAFGG FEAAF FEFEA AZAZA ZAZAZ 00089 =

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Monthly Report Aé 3/50, March 1950, 4/50, April 1950.
Monthly Report Ph 3/50, March 1950, 4/50, April 1950.

The Ph reports give the results of measurements made at Bruxelles by the C.C.R.M. on Marine and Aviation radiobeacon transmissions on medium frequencies.

H. F. Electricité, Courants faibles, Electronique, n° 5, 1950.

Abstract : M. NICOLET. — *Prédictions ionosphériques et radiocommunications* (Ionospheric Predictions and Radiocommunications).

The determination of the conditions of short wave propagation in the ionosphere is shown in a synthetic manner by questions raised by the application. These questions are illustrated by some precise examples.

A brief study of the ionospheric regions such as they are revealed by soundings introduce the principal factors of the problem : critical frequencies of the various layers, virtual heights, existence of ordinary and extraordinary rays, appearance of the sporadic E layer, existence of ionospheric storms.

The formulas for the passage from the critical frequency to the maximum « reflected » frequency under a certain incidence are then shown, the working hypothesis and the applicable domains of each approximation being explained. Finally, the methods employed in practice for the elaboration of ionospheric charts are indicated.

Ciel et Terre. Monthly Bulletin of the Société Belge d'Astronomie, de Météorologie et de Physique du Globe, LXVI[e] Year, n° 3-4, March-April 1950.

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Basic Radio Propagation Predictions, issued by the National Bureau of Standards, CRPL, Series D, nº 68, April 1950, for July 1950 ; nº 69, May 1950 for August 1950.

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International Union of Pure and Applied Physics. Report 1949.

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The Structure of Cosmic Ray Air Showers, by J. R. PRESCOTT and C. B. O. MOHR. Reprinted from *Austr. Journ. of Scient. Res.*, Series A, Physical Sc., vol. 2, nº 2, p. 184-197, 1949 (Copies habe been sent to the National Committees).

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Nº 1. *The theory of the traveling-wave tube*, by O.E.H. RYDBECK, Reprint from *Ericsson Technics*, nº 46, 1948.

Nº 2. *The experimental development of traveling-wave tubes.* (Preliminary notes), by J. SIGVARD and A. TOMNER.

Nº 3. *Pulser and water load for high power magnetrons*, by S. INGVAR SVENSSON.

Nº 4. *On the radiation of sound into a circular tube with an application to resonators*, by Uno INGARD.

Nº 5. *A study of impressive wave formation in the atmosphere*, by Dietrich Stranz.

Nº 6. *Ozonradiosonde*, by Dietrich STRANZ (in German).

Summary. — The daily weather service requests more and more air reports, thus radio sonds having been designed and completed for this purpose. Most recent investigations during the War suggested to develop an instrument for obtaining measurements of ozone content from the stratosphere up to about 25 km. In order to solve this task it has been tried to design an ozone radio sond which, while ascending and descending in the air, signals to the ground the amount of ultra-violet irradiation upon a photocell representing a measure for ozone content above the receive of radiation. The method of transforming solar radiation into radio signals received at ground and of evaluating the results as to ozone content in air is described in the paper.

The whole work could not be accomplished because of disruption of experiments in spring 1945.

Nº 7. *On the propagation of waves in an inhomogeneous medium*, by O.E.H. RYDBECK.

Nº 8. *Ionospheric effects of solar flares* 1948, by O.E.H. RYDBECK and D. STRANZ (Preliminary Report nr. 1).

Summary. — Regular recordings of ionospheric effects of solar flares with different kinds of apparatus were started at the Geophysical Obser-

vatory, Chalmers University of Technology, Gotenburg, early in 1948. The results of the first half year are presented and analysed in this preliminary communication. The statistical distribution of radiation sources of stronger and weaker fade-outs across the solar disk is shown. The magnitude and probability of the absorption of the ultraviolet fade-out radiation in the solar corpuscular beam is discussed.

N° 9. *On the forced electro-magnetic oscillations in spherical resonators*, by O.E.H. RYDBECK.

N° 10. *Experimental investigation of a long electron beam in an axial magnetic field*, by J. SIGVARD and A. TOMNER.

N° 11. *The ionospheric and radio wave propagation observatory at Kiruna*, by O.E.H. RYDBECK.

N° 12. *The panoramic ionosphere recorder*, by Rune LINDQUIST.

Summary. — This article gives a description of a new type of recorder for ionospheric sounding. The recorder covers the frequency spectrum 1 to 20 Mc/s in 30 seconds and is for that reason of great value for investigations in the polar regions, where ionospheric conditions are very fluctuating. The use of a wave band transmitter and receiver has made the short sweep time possible. Only one variable capacitor rotating at low speed is necessary. Automatic tracking between receiver and transmitter is secured through the use of a heterodyne system. Samples of records obtained at Kiruna since the beginning of observations in July 1948 are shown.

N° 13. *Ionospheric effects of solar flares*, by R. LINDQUIST (Preliminary Reports n° 2 and 3).