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U. R. S. I.

INFORMATION BULLETIN

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NATIONAL COMMITTEES

Canada

We are informed by the General Secretary of the National Research Council of Canada that this Council at a meeting held on 21 September 1951 took the following action :

1. An Associated Committee on Radio Science was established, on wich the various organizations in Canada directly concerned with work in the field of radio science have representation. The Chairman of this Committee is Dr. D. W. R. McKinley of the Division of Radio and Electrical Engineering, National Research Council, Ottawa, and the Secretary is Mr. J. C. W. Scott of the Defence Research Board, Ottawa, Ontario.

2. It was decided that Canada should join the International Union of Radio Science and that in this connection the Associate Committee described above the empowered to serve as the National Committee for Canada in be field of radio science.

U. S. A. National Committee

FALL 1951 MEETING

(In collaboration with the I.R.E. Professional Group on Antennas and Propagation)

In past years the twice yearly U.R.S.I.-I.R.E. meetings have always been held in Washington, D. C. At the Fall meeting of 1949 it was decided by the U. S. A. National Committee, in collaboration with the I.R.E. Professional Group on Antennas and Propagation, to hold a portion of these meetings in other geographical areas of the United States. The purpose behind this innovation was to periodically hold the meetings in other locations where work of interest to the groups was being conducted.

In view of the above, it was decided to hold future Fall meetings away from Washington, D. C. It was further decided to hold

these meetings, whenever possible, on some University campus where work of interest to the U.R.S.I.-I.R.E. was being done. Through the kindness of Dr. C. R. Burrows, Chairman of the U. S. A. National Committee of U.R.S.I. and Director of the School of Electrical Engineering at Cornell University the first of such meetings was held at the Cornell University Campus in Ithaca, New York on October 8-10, 1951.

A large group attended the meetings which were devoted to subjects of interest to Commissions I, II, III, V and VII. The following papers were presented. Abstracts are available at our General Secretariat.

Commission I

Validity of the Substitution Principle in Bolometer Power Measurements, Max Sucher and Herbert J. Carlin, Microwave Research Institute, New York, N. Y.

Use of Sampling Theorems in Meeting Antenna Specifications, W. L. Murdock, General Electric Co., Syracuse, N. Y.

Measurement and Development of High Frequency Resistors, C. Wellard and S. R. Parker, International Resistance Co., Philadelphia, Pa.

Microwave Bridge for Recording of a Time Varying Complex Propagation Constant, David L. Fye and Henry H. Grimm, Naval Research Laboratory, Washington, D. C.

A New Technique in Radar Receiver Performance Measurement, Joseph H. Vogelman, Rome Air Development Center, Griffiss Air Force Base, Rome, N. Y.

A Slope Method of Measuring Pulse Noise Spectra, J. R. Burnett, G. R. Cooper, and R. H. George, Purdue University, Lafayette, Ind.

Studies of Noise From Microwave Oscillators, Winston Gottschalk, Raytheon Mfg. Co., Waltham, Mass.

High-Q Measurements in the 1 000-Megacycle Range, A. Horvath, Federal Telecommunications Laboratories, Nutley, N. J.

On the Presentation of Microwave Circuits by Lumped Elements, Georg Goubau, Signal Corps Engineering Laboratories, Fort Monmouth, N. J.

Commission II

Some Characteristics of Tropospheric Scattering, A. H. LAGRONE, The University of Texas, Austin, Texas.

The Role of Partial Reflection in Tropospheric Propagation Beyond the Horizon, Joseph FEINSTEIN, Central Radio Propagation Laboratory, Washington, D. C.

Internal Reflection in the Troposphere and Propagation Beyond the Horizon, T. J. CARROLL, Central Radio Propagation Laboratory, Washington, D. C.

Field Strengths Recorded on Adjacent F-M Channels at 93 Megacycles over Distances from 40 to 150 Miles, G. S. WICKIZER and A. M. BRAATEN, Radio Corporation of America, Riverhead, N. Y.

The Effect of Uniform Layers on the Propagation of Radio Waves, L. J. ANDERSON and J. B. SMYTH, Navy Electronics Laboratory, San Diego, Calif.

Refraction of Radio Waves in Arbitrary Atmosphere-Ray-Tracing Picture, Ming S. WONG, Wright-Patterson Air Force Base, Dayton, Ohio.

The Dielectric Properties of Ice and Snow at 3.2 Centimetres as Related to the Reflection Coefficient of Snow-Covered Surfaces, W. A. CUMMING, National Research Council, Ottawa, Canada.

Commission III

On the Question of the Magnitude of the Lunar Variation in Radio Field Strength, T. N. GAUTIER, M. B. HARRINGTON and R. W. KNECHT, Central Radio Propagation, Washington, D. C.

Radio Wave Propagation Over Long Distances at 100 kc, R. H. WOODWARD and Oscar GOLDBERG, Rome Air Development Center, Griffiss Air Force Base, Rome, N. Y.

The Lower E and D Regions of the Ionosphere as Deduced from Long Wave Measurements, J. J. GIBBONS, H. J. NEARHOOF, R. J. NERTNEY and A. H. WAYNICK, The Pennsylvania State College, State College, Pa.

The Effect of Sporadic E on Television Reception, E. K. SMITH, Central Radio Propagation Laboratory, Washington, D. C.

Commissions III and V

The Effect of Laminar Flow on the Duration of Meteor Echoes, T. N. GAUTIER, Central Radio Propagation Laboratory, Washington, D. C.

The Polarization Characteristics of Meteoric Echoes, L. A. MANNING and M. E. VAN VALKENBERG, Stanford University, Stanford, Calif.

Meteoric Echo Measurement of Ionospheric Drift and Turbulence, L. A. MANNING and A. M. PETERSON, Stanford University, Stanford, Calif.

Systematic Ionospheric Winds, Reynold GREENSTONE, Central Radio Propagation Laboratory, Washington, D. C.

Experimental Determination of Rates of Decay of Meteoric Echoes as Functions of Wave Frequency and Height, V. C. PINEO, Central Radio Propagation Laboratory, Washington, D. C.

Techniques in Meteor Ionization Studies at 23 Megacycles, O. G. VILLARD, Jr. and A. M. PETERSON, Stanford University, Stanford, Calif.

Commission V

The World Chain of Solar Radio Observatories, A. H. SHAPLEY, Central Radio Propagation Laboratory, Washington, D. C.

The NRL Fifty-Foot Microwave Telescope, Fred T. HADDOCK, Naval Research Laboratory, Washington, D. C.

Radiation from Hyperfine Levels of Interstellar Hydrogen, H. I. EWEN and E. M. PURCELL, Harvard University, Cambridge, Mass.

Solar Bursts and Coherent Electron Motions, Ralph E. WILLIAMSON, David Dunlap Observatory, Richmond Hill, Ontario and Cornell University Radio Astronomy Project, Ithaca, N. Y.

Space Charge Wave Amplification in Plasmas of Non-Uniform Density, Hari K. SEN, Central Radio Propagation Laboratory, Washington, D. C.

Moving Prominences and Solar Noise, Hari K. SEN, Central Radio Propagation, Washington, D. C.

Solar Noise Storms and Plasma Oscillations, Hari K. SEN, Central Radio Propagation Laboratory, Washington, D. C.

The Role of Plasma Oscillations in Solar Radio Noise Bursts, J. FEINSTEIN, Central Radio Propagation Laboratory, Washington, D. C.

The February 1952 Eclipse of the Sun, J. P. HAGEN, Fred T. HADDOCK, Naval Research Laboratory, D. C., and Walter Orr ROBERTS, High Altitude Observatory, Climax, Colo.

Radio Measurements Planned for the Next Total Solar Eclipse, Fred T. HADDOCK and J. P. HAGEN, Naval Research Laboratory, Washington, D. C.

Radio Astronomy at Cornell University, C. R. BURROWS, Cornell University, Ithaca, New York.

Observation of Active Regions of the Sun by Radio Interferometer and Spectroheliograph, Helen W. DODSON, McMath-Hulbert Observatory, Ann Arbor, Mich., and Lief OWREN, Cornell University, Ithaca, N. Y.

An Application at 50 Mc of a Theory of Radio Frequency Radiation from the Quiet Sun, R. E. WILLIAMSON, David Dunlap Observatory, Richmond Hill, Ontario and E. E. REINHART, Cornell University, Ithaca, N. Y.

Solar Radiation at a Wavelength of 3.15 cm, Fred T. HADDOCK, Naval Research Laboratory, Washington, D. C.

Outbursts of Solar Radiation Observed at 8.5 mm Wavelengths, J. P. HAGEN and N. HEPBURN, Naval Research Laboratory, Washington, D. C.

Commission VII

Current Status of Research and Development on Travelling Wave Tubes, J. R. PIERCE, Bell Telephone Laboratories, Murray Hill, N. J.

Current Status of Transistor Research and Development. J. A. MORTON, Bell Telephone Laboratories, Murray Hill, N. J.

SOLAR ECLIPSE OF FEBRUARY 25, 1952

Professor Mario Cutolo informs us that the Centro Studi of the Istituto di Fisica Tecnica of the University of Naples (Via Mezzocannone 6, Naples, Italy), is going to participate to observations planed for the Eclipse of February 25, 1952.

The Centro Study will study the processus of the gyro-interaction for vertical incidence and will follow U.R.S.I. suggestions for the observations which will be started one month before and finished one month after the eclipse.

This organization would like to undertake some radiosounding but is lacking of an ionospheric equipment.

URSIGRAMS

Transmissions of Ursigrams by the « Arbeitsgemeinschaft Ionosphäre »

The « Arbeitsgemeinschaft Ionosphäre » is an association formed by scientific institutes, observatories and independent experts and represents a voluntary group. It has been established for the purpose of actual exchanging of certain scientific data within stipulated limits. All these institutes etc. remain independent, which is made evident by the fact that also foreign participators have joined this exchange. The informations are transmitted by the communication ways of the Deutsche Bundespost, which as well as the Arbeitsgemeinschaft Ionosphäre must not be considered as the representative of the institutes.

I. — TRANSMISSIONS OF THE « ARBEITSGEMEINSCHAFT IONOSPHÄRE » (Working Association « Ionosphere »)

PROGRAM

Since December 1st 1950 ionospheric data are transmitted by a sender of the Deutsche Bundespost (at present by Norddeich Radio) under the calling signal DEA 99. The messages are coded. An instruction for decoding is given in page 11. The time schedule of these transmissions is as follows :

From Monday to Saturday :	19.40 h. GMT	5 627.5 kc/s	A1
	20.45 h. GMT	4 400.0 kc/s	A3
	22.30 h. GMT	8 340.0 kc/s	A1
	22.30 h. GMT	13 100.0 kc/s	A1
	(addition for summer time).		
From Tuesday to Sunday :	07.40 h. GMT	17 100.0 kc/s	A1
	07.40 h. GMT	21 940.0 kc/s	A1

I. — Telegraphic transmissions

Speed. — The telegraphic transmissions are given with 16 words per minute and repeated with 20 wpm.

Calling signal. — Before the beginning of each transmission the signal CQ de DEA 99 is given for 1 minute, followed by the thrice repeated word IONOSPHERE.

Preamble. — The preamble consists of indications concerning the category of the telegram ION, the current number, the place of origin DARMSTADT, the total word number, date and time of dispatch (GMT).

Adress. — TO ALL GEOPHYSICAL INSTITUTES.

Text. — The text consists of a variable number of mixed groups (figures and letters). The text contains 4 different parts announced by the characteristic words SOL + 2 figures, ION + 2 figures, MAG + 1 figure + 1 letter, CR + 2 figures + 1 letter. These parts are separated by double-dashes. Foi failing values the letter « *x* » is used. Additional observations are given in ordinary language.

Signature. — The signature is IONOSPHERE DARMSTADT.

II. — Radiotelephone transmissions

Calling signals. — Before the beginning of each transmission the following call will be given in German and English for a minute :

« An alle ! hier ist DEA 99, ein sender der Deutschen Bundespost — CQ, this is DEA 99, a station of the Deutsche Bundespost », followed by the thrice repeated word « Ionosphere ».

Preamble, *Address*, *Text*, *Signature.* — The preamble, the address, the text and the signature are read in English. The letters are spelled according to the following international spelling table :

A = Amsterdam	E = Edison	I = Italia
B = Baltimore	F = Florida	J = Jerusalem
C = Casablanca	G = Gallipoli	K = Kilogramme
D = Danemark	H = Havana	L = Liverpool

M = Madagascar
N = New York
O = Oslo
P = Paris
Q = Quebec
R = Roma
S = Santiago
T = Tripoli
U = Upsala
V = Valencia
W = Washington
X = Xantippe
Y = Yokohama
Z = Zurich

II. — INSTRUCTION FOR DECODING THE TRANSMISSIONS

In the following table the letters are represented by B_1, B_2, etc. and the figures by Z_1, Z_2, etc. Generally not all groups are transmitted. For failing values the letter « *x* » is used.

Solar data

1) SOL Z_1Z_2 :

SOL = informations about solar activity.
Z_1Z_2 = date of the observation.

2) SPOTE. — Sunspots on the eastern hemisphere of the sun.

3) $Z_1B_1Z_2B_2Z_3$:

Z_1 = distance of the spot from the meridian, in multiples of 10 degrees.
B_1 = N or S, corresponding to the northern or southern hemisphere of the sun.
Z_2 = distance of the spot from the equator in multiples of 10 degrees.
B_2 = type of sunspots corresponding to the table of Brunner (table 1) A...I.
Z_3 = activity of the spot (1 = weak, 2 = mediocre, 3 = strong).

4) Groups of the same form in variable number.

5) SPOTW. — Sunspots on the western hemisphere of the sun.

6) $Z_1B_1Z_2B_2Z_3$ (Signification like group 3).

7) Group of the same kind in variable number.

8) FLAR B_1 :

FLAR = information about a chromospheric flare of the sun.

B_1 = place of observation (K = Kanzelhöhe, S = Schauinsland, W = Wendelstein).

9) $Z_1Z_2Z_3B_1Z_4$:

Z_1Z_2 = observation time in hours GMT and
Z_3 = multiples of 10 minutes.
B_1 = O : observation began as the effect was in course,
E : the beginning of the effect has been observed.
Z_4 = duration of the flare in multiples of 10 min.

10) $B_1Z_1B_2Z_2Z_3$:

B_1 = flare on the eastern (E) or western (W) hemisphere of the sun.
Z_1 = distance form the meridian in multiples of 10 degrees.
B_2 = N or S corresponding to the northern (N) or southern (S) hemisphere of the sun.
Z_2 = distance from the equator in multiples of 10 degrees.
Z_3 = intensity of the flare : breadth of the line H_α in Angström-Units.

11) RN $Z_1Z_2Z_3$:

RN = provisional reduced relative number of sunspots.
$Z_1Z_2Z_3$ = value of number.

12) FL $Z_1Z_2Z_3$:

FL = Calcium flares (Floculi).
$Z_1Z_2Z_3$ = total area of the floculi in square degrees.

13) CORON. — Informations about the coronal brightness of the sun.

14) $Z_1Z_2B_1Z_3Z_4$:

Z_1Z_2 = date of observation.
B_1 = observatory (K = Kanzelhöhe, W = Wendelstein).
Z_3Z_4 = time of observation in hours GMT.

15) $Z_1Z_2Z_3Z_4Z_5$. — This group concerns the Nord-East arc of the sun :

Z_1 = position of the maximum of brightness, given as angle from the equator of the sun. The figures must be multiplied by 5 to get the value in degrees. 9 = 40 deg. and more.

Z_2Z_3 = intensity in the maximum of brightness in a memorial scale of 50 parts, which is photometrically controlled. The dates are reduced to a scattering light of 50.10^{-6} of the total solar brightness.

Z_4 = breath of the half value of the maximum brightness.

Z_5 = observed line: 1 = red 6374 Angström Units, 3 = yellow 5694. 5 = green 5303 A. U.

16) $Z_1Z_2Z_3Z_4Z_5$. — The same data as for group 15 apply to the South-East arc of the sun.

17) $Z_1Z_2Z_3Z_4Z_5$. — The same data as for group 15 apply to the South-West arc of the sun.

18) $Z_1Z_2Z_3Z_4Z_5$. — The same data for the North-West arc of the sun.

Atmospherics

19) ATMO B_1 :

ATMO = information concerning atmospherics on very long waves.

B_1 = observatory : (H = Hamburg, D = Darmstadt, S = Schauinsland, W = Wendelstein).

20) $Z_1Z_2Z_3Z_4Z_5$:

Z_1Z_2 = beginning of a short-time increase of atmospherics in hours GMT and in

Z_3 = multiples of 10 minutes.

Z_4 = duration of the effect in multiples of 10 minutes.

Z_5 = estimated intensity from 1 (weak) to 3 (strong).

Ionospheric data

21) ION Z_1Z_2 :

ION = ionospheric informations.

Z_1Z_2 = date of observation.

22) $Z_1Z_2B_1Z_3Z_4$:

Z_1Z_2 = minimum critical frequency of F2 layer (*fo* F2) before sunrise in Mc/s and tenths of Mc/s.

B_1 = type of echoes : O = normal, F = spread echoes (the critical frequency cannot be exactly fixed), K = ionospheric storm in progress.

Z_3Z_4 = middle value of the critical frequency of the F2 layer (*fo* F2) between 10 and 14 h. local time, in Mc/s and tenths of Mc/s. Above 9.9 Mc/s the figure 1 of the tens will be omitted.
Generally the values have their origin at Lindau.

23) ABS Z_1Z_2 :

ABS = noon-absorption.

Z_1Z_2 = value of absorption in decibels. $(Mc/s)^2$ (middle value of 5 frequencies).

24) FES B_1B_2 :

FES = critical frequency of the sporadic E-layer.

B_1B_2 = observatory LI = Lindau.

25) $Z_1Z_2Z_3Z_4Z_5$:

Z_1Z_2 = time of observation in hours GMT and

Z_3 = multiples of 10 minutes.

Z_4Z_5 = critical frequency in Mc/s and tenths of Mc/s. Above 9.9 Mc/s the figure 1 of the tens will be omitted. Only values above 6 Mc/s will be reported.

26) BLA B_1B_2 :

BLA = blanketing frequency of sporadic E-layer (*f*A or *fb*E*s*).

B_1B_2 = observatory LI = Lindau.

27) $Z_1Z_2Z_3Z_4Z_5$:

Z_1Z_2 = time of blanketing in hours GMT and

Z_3 = multiples of 10 minutes.

Z_4Z_5 = blanketing frequency in Mc/s and tenths of Mc/s. Above 9.9 Mc/s the figure 1 of the tens will be omitted.
Only values above 5 Mc/s will be reported.

28) MD $Z_1Z_2B_1$:

MD = Mögel-Dellinger-Effect (fade out).

Z_1Z_2 = duration in minutes.

B_1 = place of observation. L = Lindau, P = Deutsche Bundespost.

29) $Z_1Z_2Z_3Z_4Z_5$:

$Z_1Z_2Z_3Z_4$ = time of in hours GMT and minutes.
Z_5 = intensity. (1 = weak, 2 = mean, 3 = strong).

Terrestrial Magnetism

30) MAG Z_1B_1 :

MAG = terrestrial magnetic informations.
Z_1 = international magnetic character figure C (0 = calm, 1 = moderate, 2 = stormy).
B_1 = observatory : F = Fürstenfeldbruck, W = Wingst, M = Mering (M gives the results of earth current observations).

31) $Z_1Z_2Z_3Z_4Z_5$:

Z_1Z_2 = date.
Z_3 = three-hour-range index K according to Bartels for the intervall 00-03 h. GMT.
Z_4 = dito for 03-06 GMT.
Z_5 = dito for 06-09.

32) $Z_1Z_2Z_3Z_4Z_5$:

Z_1 = dito for 09-12 h.
Z_2 = dito for 12-15 h.
Z_3 = dito for 15-18 h.
Z_4 = dito for 18-21 h.
Z_5 = dito for 21-24 h.

If further groups should be given, they concern the next three-hours-ranges.

The signification of the indices for terrestrial magnetism and current will be found in table 2.

33) SCOM B_1 :

SCOM = information about an observed sudden commencement of a magnetic storm.
B_1 = observatory (F = Fürstenfeldbruck, W = Wingst, M = Mering, L = Lindau).

34) $Z_1Z_2Z_3Z_4Z_5$:

$Z_1Z_2Z_3Z_4$ = time of the sudden commencement in hours and minutes GMT.

Z_5 = violence of the sudden commencement expressed by the increase of the index compared with the last three-hour-range index.

35) CR $Z_1Z_2B_1$:

CR = informations about variations of cosmic radiation.
Z_1Z_2 = date.
B_1 = observatory (B = Bargteheide, F = Freiburg, P = Predigtstuhl, R = Ravensburg-Weissenau, Z = Dr. Zirkler.

36) $Z_1Z_2Z_3Z_4Z_5$:

Z_1Z_2 = beginning of the effect in hours GMT.
Z_3 = duration of the effect in hours.
Z_4Z_5 = increase of the measured values in percent.
If the reported effect should refer to a decrease of value, this group is preceded by the word MINUS.

37) $B_1Z_1Z_2B_2B_3$:

B_1 = type of the slope of the curve before maximum or minimum of the measured values. A = abruptly, S = slowly.
Z_1Z_2 = time of the maximum effect in hours GMT.
B_2 = type of the slope of the curve after the maximum (or minimum). A = abruptly, S = slowly.
B_3 = type of the measuring units : G = Geiger-Müller counters in coincidence, S = great screaned ionisation chamber, U = great unscreaned ionisation chamber, L = little screaned ionisation chamber, M = little unscreaned ionisation chamber.

TABLE 1

Type A : small isolated spot or small group of small spots.

Type B : more extended group of small spots without penumbra, or bipolar group of small spots.

Type C : small or medium-sized spot with penumbra, accompanied by small spots or a bipolar group.

Type D : bipolare group with two or three spots, with penumbra, and several intermediate small spots.

Type E : large group with many spots with penumbra and many small spots.

Type F : very large group with very large and irregular spots, with penumbra, and numerous small spots.

Type G : first state of regression of the largest groups. Two large spots with penumbra, in bipolar position, and eventually several intermediate small spots. Large spot with penumbra and small spots in bipolar position.

Type H : large or medium-sized spot with penumbra with ephemeral neighbouring small spots or small group of medium-sized or small spots with penumbra, formed by scission of a larger spot.

Type I : small regular spot with penumbra, or small spot with penumbra in regression.

TABLE 2

Three-hour-range index	maximum total amplitude in a three hour interval in μ (1 $\mu = 10^{-5}$ Gauss) (terrestrial magnetisme)	maximum total ampiltude in a three hour interval in mV/km (earth current)
0	5	1.5
1	10	3
2	20	6
3	40	12
4	70	21
5	120	36
6	200	60
7	333	100
8	500	150
9	>500	>150

III. — CONTENTS OF THE TRANSMISSIONS

All data reported in the ION-telegrams represent only provisional characteristics. It is the aim of these telegrams to direct

the attention on special phenomena. If the code should not be sufficient, further information will be given in ordinary language.

The Arbeitsgemeinschaft Ionosphäre, Darmstadt-Germany, Rheinstr. 110 disposes of details of these data, which will be reported in writing or telegraphically if specially wanted. (Registered telegram address : « Ionosphäre Darmstadt »).

The reported informations have their origin in the following institutes :

1. — Solar Institutes

(*a*) Fraunhofer Institut, Freiburg (Breisgau). — Schauinsland. Director : Prof. Dr. K. O. Kiepenheuer, at present represented by Prof. Dr. Siedentopf.

Coordinates : 1240 m above sea-level, 47°54'51'' N, 7°54'21'' E.

Observations : Sunspots, chromospheric and Calcium flares, atmospherics on very long waves. Abbreviation in the messages « S ».

(*b*) Sonnenobservatorium Wendelstein der Universitätssternwarte München, Brannenburg (Oberbayern) (Solar Observatory of the Munich University). Director of the Observatory : Prof. Dr. Rolf Müller.

Coordinates : 1838 m above sea-level, 47°42'13'' N, 12°1'0'' E.

Observations : Sunspots, chromospheric and Calcium flares, corona of the sun, atmospherics on very long waves. Abbreviation in the messages : « W ».

Informations : Both institutes report sunspots (coordinates : heliographic latitude and distance from the central meridian, type of the spots according to the Brunner scale and activity in estimated grades from 1 to 3), chromospheric flares (coordinates, beginning, duration and intensity, expressed by the spectroscopic breadth of the line H in Angström units), the reduced provisional sunspot relative number, the total area of the Calcium floculi and the intensity of the corona at the sun and the positions of its maximal brightness in the four quadrants.

(*c*) Sonnenobservatorium auf der Kanzelhöhe, Sattendorf (Kärnten), Austria. Directors : Prof. Dr. Mathias, Dr. Bruzek.

Abbreviation in the messages : « K ».

Coordinates : 48°27' N, 13°48' E.

Observations : Sunspots, flares, corona.

At present it is not yet possible to give actual informations.

(*d*) Fernmeldetechnisches Zentralamt Darmstadt. Measurements : Dipl.-Ing. W. Menzel.

(*e*) Meteorologisches Amt für Nordwestdeutschland, Hamburg. Measurements : Prof. Dr. Schulze.

(*f*) Zentralamt für Wetterdienst in der US-Zone, Bad Kissingen. Measurements : Dr. Wüsthoff.

The institutions (*d*)-(*f*) report the short-time increase of atmospherics on very long waves (27 kc/s and 15 kc/s). It is well known that the field strength on very long waves will be much enlarged if the ionospheric D-layer accepts a more intense conductivity caused by chromospheric flares (fade out, Mögel-Dellinger-Effect). This phenomen is studied by the observation of atmospherics, where by an independence of radio transmitters is realized.

2. — Ionospheric Institutes

(*a*) Institut für Ionosphärenforschung in der Max-Planck-Gesellschaft, Lindau via Northeim (Hannover) (Institute of Ionospheric Research). Director : Dr. W. Dieminger.

Coordinates : 51°39′ N, 10°7.5′ E.

Observations : Critical frequencies of the E and F regions of the ionosphere, fade-outs. Abbreviation : LI or L.

The characteristics are received by means of an automatical pulse-transmitter and receiver on vertical rhombic aerials. The frequency range from 1 to 16 Mc/s is passed within 8 minutes. The pulse power is about 10 kW, the pulse frequency 40 c/s is derived from a crystal-oszillator-clock. The passages start on the minutes 00 and 30 of each hour (controlled by crystal-clock).

(*b*) Fade-outs are also reported by the Fernmeldetechnisches Zentralamt Darmstadt (abbreviation « P ») that evaluates the observations of the radio communication service. (Dr. Beckmann, Dipl.-Ing. Menzel).

3. — Terrestrial Magnetic Institutes

(*a*) Erdmagnetisches Observatorium Fürstenfeldbruck (Oberbayern) (Terrestrial Magnetic Observatory). Director : Dr. Burmeister.

Coordinates : 48°9.9′ N, 11°16.6′ E.

Abbreviation : F.

Observations : The elements of the terrestrial magnetic field. The observatory reports the three-hours-range indices according to Bartels, the beginning of magnetic storms and the international magnetic character figure.

(*b*) Erdmagnetisches Observatorium Wingst des Deutschen Hydrographischen Instituts, Hamburg, Seewartenstr. 9. Director : Prof. Dr. Errulat.

Coordinates : 53°44.6′ N, 9°4.4′ E.

Abbreviation : W.

Observations like (*a*).

(*c*) Geophysical Institut J. B. Ostermeier Mering (Oberbayern). Director : J. B. Ostermeier.

Coordinates : 48°16.5′ N, 10°59.5′ E.

Abbreviation : M.

Observations : Recording of the earth current in short circuits, the course of which corresponds to the variations of the ionospheric field.

The characteristics are given in three-hour-range indices, the signification of which as potential difference is given in II.

Particular phenomena are described in ordinary language.

4. — Cosmic Radiation Institutes

(*a*) Physikalisches Institut, Universität Freiburg (Breisgau), Katherinenstr. 25. Director : Prof. Dr. Gentner, Measurements : Dr. Sittkus.

Coordinates : 48°0.0′ N, 7°51.6′ E, 300 m above sea-level.

Abbreviation : F.

Measurements : Incidence of cosmic radiation by means of an ionisation chamber. The chamber has a volume of 500 litres and is filled with pure nitrogen under a pressure of 8.65 kg/cm². It is screaned at all sides with 10 cm iron plates. The influence of large air showers is eliminated. The caracteristics are reduced for normal air pressure. The exactness of the measurement of the hourly mean values is about 1.2 °/₀₀. The deviations from

the mean value which are greater than 1 % will be reported. As regards the dimension of the chamber and the screan the reported data may be taken for very secure.

(*b*) Forschungsstelle für Physik der Stratosphäre in der Max-Planck-Gesellschaft, Weissenau Kr. Ravensburg (Württemberg). Director : Prof. Dr. Regener and Dr. Ehmert.

Coordinates : 47°46.0′ N, 9°36.0′ E, 445 m above sea-level.

Abbreviation : R.

Measurements : Cosmic radiation, measured with Geiger-Müller counters in coincidence. 2 units work independently.

Deviations from the mean value that are greater than 3 % will be reported. The values are corrected to normal air pressure.

(*c*) Fernmeldetechnisches Zentralamt Darmstadt (Messstelle Bargteheide (Holstein). Measurements : Dr. H. Salow.

Coordinates : 53°44.8′ N, 10°19.2′ E, 30 m above sea-level.

Abbreviation : B.

Measurements : cosmic radiation, measured with two independent Geiger-Müller counters in coincidence.

Deviations from the mean value that are greater than 2 % are reported. The data are corrected to normal air pressure.

(*d*) Fernmeldetechnisches Zentralamt Darmstadt, (Messtelle Predigtstuhl b. Bad Reichenhall-Oberbayern). Measurements : O. Augustin.

Coordinates : 47°42.0′ N, 12°53.4′ E, 1608 m above sea-level.

Abbreviation : P.

Measurements : Cosmic radiation, measured with ionisation chambers and a Geiger-Müller counter in coincidence.

The observations are made by the following equipments : 2 ionisation chambers with a volume of 4 litres according to Kolhörster, (discharging method), which are filled with Xenon under 2 kg/cm². One of the chambers is screaned at all sides with 4 cm lead, the other is free on the top side. Another chamber of 25 litres filled with nitrogen and krypton under 8.7 kg/cm², is wholly screaned with 5 cm lead. Finally an unscreaned chamber of 50 litres is in function, filled with 11 kg/cm² nitrogen and krypton. Both the latter chambers work in the charging methode.

Effects of more than 2-4 % are reported.

(*e*) Dr. J. Zirkler, at present Wallgau (Oberbayern) in about 1200 m above sea-level.

Abbreviation : Z.

Measurement of cosmic radiation by means of an ionisation chamber of a volume of 4 litres, filled with xenon of 2 kg/cm², only with ground-screan.

Effects of more than 5 % are reported.

INTERNATIONAL COUNCIL OF SCIENTIFIC UNION

Mixed Commission on the Ionosphere

The following letter has been sent to all Members of the Commission.

Dear Colleague,

At the invitation of the Australian National Committee of U.R.S.I. and in accordance with the suggestion made at our 1950 Meeting in Brussels, it is proposed to hold the Third Meeting of our Commission at Canberra, Australia on August 25-27th, 1952. The Xth General Assembly of U.R.S.I. is being held at Sydney in the period August 8th-23rd, and it is expected that many of the delegates attending the Assembly will also attend the meetings of our Commission at Canberra.

The decisions to hold both the U.R.S.I. Assembly and the Mixed Commission Meetings in Australia were made, inter alia, as a gesture of appreciation of the extremely important advances in the field of radio and ionospheric research which have been made during the recent years by the Australian workers. Accordingly it is hoped that as many members as can possibly do so will attend these Meetings in Australia, and thus ensure the success to this tribute to our Australian colleagues. An application for a grant towards travelling expenses of members has been submitted to the Executive Board of Unesco and the result of this application is expected to be announced next month.

In view of the proposal that the Third International Polar Year be nominated for 1957-58, it is suggested that at the 1952 Meeting part of the discussion should be devoted to Polar Year problems. It is also suggested that a preliminary discussion of the ionospheric

results obtained during the 1952 Solar Eclipse might take place. Members are invited to make additional suggestion for the agenda of the meeting.

A further communication concerning this Meeting will be addressed to you in the near future.

Yours sincerely,

E. V. Appleton (*Chairman*),

W. J. G. Beynon (*Secrelary*).

INTERNATIONAL UNION FOR THEORETICAL AND APPLIED MECHANICS

International symposium of non-linear vibrations, Ile de Porquerolles, September 18-22, 1951, organized by the I. U. T. A. M. (International Union for Theoretical and Applied Mechanics)

Professor van den Dungen, acting as General Secretary of the I.U.T.A.M., asked Mr. Herbays, Secretary of the U.R.S.I., for a delegate of the U.R.S.I. to be present at the above mentioned symposium. By his letter of July 30th, 1951, Mr. Herbays invited me to represent the U.R.S.I. on this occasion.

The symposium was under the able Chairmanship of the French mathematician Prof. J. Pérès. It was attended by some 40 mathematicians and physicists from the following countries : Germany, Denmark, Spain, United States of America, France, Italy, Norway, Netherlands, Great Britain, Sweden and Switzerland.

In all some 20 papers were read and occasionally discussed in great detail.

At this symposium electrical and mechanical phenomena were treated which lead to non-linear differential equations. Systems with one, more, or even an infinite number of degrees of freedom were discussed, either oscillating autonomously or under impressed periodic forces. A part of the time was given to nvestigations of the equation :

$$v'' - \varepsilon (1 - v^2) v' + v = A \sin \omega t,$$

(van der Pol, 1920).

Solutions of this equation were considered for both $\varepsilon \ll 1$ and $\varepsilon \gg 1$ leading respectively to sinusoidal and relaxation oscillations. Apparently no solution of the latter equation, even of the homogeneous case $A = 0$ (and $\varepsilon \gg 1$) in a simple analytical form has so far been obtained, although considerable progress has been made in our knowledge of the form and the stability of these solutions, which cover the phenomenon of frequency demultiplication.

Also equations of one or more degree of freedom with non-linear spring were discussed. Extensive thought was also given to Poincaré's classical and topological researches on non-linear differential equations as applied by him also in his « Mécanique Céleste ».

A contribution by me bore the title : « Note on the properties of solutions of a differential equation which may be derived directly from the differential equation itself ».

The papers read, together with the discussions, will be published in France in the languages in which they were presented.

The symposium was on a high technical and scientific level. It showed, amongst others, the interest of those mainly engaged in mechanical researches in theoretical questions which were originally developed with electrical applications in view. It also proved again the great help which pure mathematics might give to the solution of applied problems.

Geneva, September 28, 1951.

(*s*) Prof. Dr. Balth. VAN DER POL.

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

VIth Plenary Assembly, Geneva, 1951

We publish hereafter the List of C.C.I.R. Study Groups, as approved by the VIth Plenary Assembly, together with the names and addresses of the Chairmen. This list is followed by the Allocation of Questions, Study Programmes, Reports and Resolutions to Study Groups, in which U.R.S.I. might be interested.

LIST OF STUDY GROUPS

(with names and addresses of Chairmen)

STUDY GROUP N° I : Radio transmitters.

Chairman : Dr. Ing. Ernst METZLER, Chef du Service de la Radio et du Télégraphe, Direction générale des P.T.T., Speichergasse, 6, Berne, Switzerland.

STUDY GROUP N° II : Radio receivers.

Chairman : M. Pierre DAVID, Ing. en chef du Ministère des Forces Armées (Marine), Laboratoire des Transmissions, Section marine du C.N.E.T., 8, Bld Victor, Paris XV^{e}, France.

STUDY GROUP N° III : Complete radio systems employed by the different services.

Chairman : Dr. H. C. A. VAN DUUREN, Chief Engineer, Storm van's-Gravesandeweg, 83, Wassenaar, Netherlands.

STUDY GROUP N° IV : Ground wave propagation.

Chairman : M. le Professeur Luigi SACCO, Lieut. gén. rés., Lungotevere Flaminio, 22, Roma, Italy.

STUDY GROUP N° V : Tropospheric propagation.

Chairman : Dr. R. L. SMITH-ROSE, Director of Radio Research, Dept. of Scientific and Industrial Research, Radio Research Station, Slough, England.

STUDY GROUP Nº VI : Ionospheric propagation.

Chairman : Dr. J. H. DELLINGER, R.C.A. Frequency Bureau, 1625 K Street, Washington 6, D. C., U. S. A.

STUDY GROUP Nº VII : Radio time signals and standard frequencies.

Chairman : M. B. DECAUX, Ing. en chef du Laboratoire Nat. de Radioélectricité, 196, Rue de Paris, Bagneux (Seine), France.

STUDY GROUP Nº VIII : Monitoring.

Chairman : Mr. A. H. CANNON, Sectional Engineer, Radio Sub-Section, P.M.G. Research Laboratories, Melbourne, Australia.

STUDY GROUP Nº IX : General technical questions.

Chairman : Capt. C. F. BOOTH, Engineer-in-Chief's Office, W. P. Branch Alder House, Aldersgate Street, London, E. C. 1, England.

STUDY GROUP Nº X : Broadcasting including questions relating to single sideband.

Chairman : Mr. Neal MCNAUGHTEN, Director of Engineering, National Assoc. of Radio and Television Broadcasters, 1771 N Street, Northwest, Washington 6, D. C., U. S. A.

STUDY GROUP Nº XI : Television including questions relating to single sideband.

Chairman : Mr. Erik ESPING, Royal Swedish Telegraph Board, Stockholm, Sweden.

STUDY GROUP Nº XII : Tropical broadcasting.

Chairman : Mr. S. S. MOORTHY RAO, Deputy Director General, Posts and Telegraphs, New Delhi, India.

STUDY GROUP Nº XIII : Operation questions depending principally on technical considerations.

Chairman : Ir. J. D. H. VAN DER TOORN, Director in Chief of Telecommunications, 12, Kortenaerkade, The Hague, Netherlands.

STUDY GROUP Nº XIV : Vocabulary.

Chairman : M. le Professeur Tullio GORIO, Directeur de l'Institut Supérieur des Postes et des Télécommunications, Ministère des Postes et des Télécommunic., Viale Trastevere, 189, Roma, Italy.

ALLOCATION OF QUESTIONS, STUDY PROGRAMMES

REPORTS AND RESOLUTIONS TO STUDY GROUPS

STUDY GROUP Nº III

Complete radio systems employed by the different services

Question Nº 11. — Presentation of the results of atmospheric radio noise measurements for the requirements of operational services.

Question Nº 48. — Directivity of antennas at great distances.

STUDY GROUP Nº IV

Ground wave propagation

Question Nº 6. — Ground wave propagation.

Question Nº 49. — Presentation of antenna radiation data.

Study Programme Nº 11. — Effects of tropospheric refraction on frequencies below 10 Mc/s.

Study Programme Nº 12. — Temporal variation of ground wave field strengths.

Study Programme Nº 13. — Ground wave propagation over mixed paths.

Study Programme Nº 14. — Effects of irregular terrain on ground wave propagation.

Study Programme Nº 15. — Phase variations in ground wave propagation.

Study Programme N° 16. — Revision of the 1937 C.C.I.R. propagation curves, and their possible extension to higher frequencies.

Report N° 2. — Ground wave propagation over irregular terrain.

Report N° 3. — Review of publications on propagation (ground wave).

Study Group N° V

Tropospheric propagation

Study Programme N° 17. — Tropospheric propagation curves for distance well beyond the horizon.

Study Programme N° 18. — Tropospheric wave propagation.

Study Programme N° 19. — Measurement of field strength of radio signals.

Report N° 3. — Review of publications on propagation (tropospheric).

Report N° 4. — Methods of measuring field strength.

Report N° 5. — Measurement of field strength (respective merits of the two main types of equipment now in use).

Report N° 6. — Measurement of field strength (merits of a standard noise generator as the source of the locally generated signal).

Study Group N° VI

Ionospheric propagation

Question N° 50. — Practical uses of radio propagation data.

Question N° 51. — Severity of fluctuations in field at reception.

Question N° 52. — Allowances for fading.

Question N° 53. — Choice of a basic index for ionospheric propagation.

Study Programme N° 20. — Non-linear effects in the ionosphere.

Study Programme N° 21. — Radio propagation at frequencies below 1500 kc/s.

Study Programme N° 22. — Ionospheric propagation of waves in the range of 30 to 300 Mc/s.

Study Programme N° 23. — Measurement of atmospheric radio noise.

Study Programme N° 24. — Study of fading.

Report N° 3. — Review of publications on propagation (Ionospheric).

Report N° 7. — Long distance propagation of waves of 30 to 300 Mc/s by way of ionization in the E and F regions of the ionosphere.

Report N° 8. — Atmospheric noise data.

Report N° 9. — Interference to radio reception at sea due to atmospheric causes.

Report N° 10. — Rapid exchange of information on propagation.

Study Group N° VII

Radio time signals and standard frequencies

Question N° 54. — Standard frequency transmissions and time signals.

Study Programme N° 25. — Standard frequency transmissions and time signals.

Study Group N° VIII

International monitoring

Question N° 55. — Accuracy of field strength measurement by monitoring stations.

Study Group N° IX

General technical questions

Question N° 60. — Preferred methods of specifying power supplied to an antenna by a radio transmitter.

Question N° 61. — Pulse transmission for radio direction finding.

Study Group Nº XIV

Vocabulary

Question Nº 72. — Decimal classification.

Question Nº 73. — Classification of the frequency and wavelength bands used in radiocommunication.

Resolution Nº 5. — Means of expression (definitions, vocabulary, graphical and letter symbols).

Resolution Nº 6. — Unit systems.