

International Scientific Radio Union

U. R. S. I.

INFORMATION BULLETIN

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Xth GENERAL ASSEMBLY

The Australian National Committee appointed the following Organising Sub-Committee to make arrangements for our next General Assembly :

Sir John MADSEN (*Chairman*),
Dr. E. G. BOWEN,
Dr. D. F. MARTYN,
Dr. G. H. MUNRO,
Dr. J. L. PAWSEY,
Dr. F. W. G. WHITE,
Dr. R. v. d. R. WOOLLEY,
Wing-Commander J. W. RODDROP,
Mr. E. P. WRIGHT,
Mr. A. J. HIGGS (*Secretary*).

The Sub-Committee met on 19th February, it proposed that the Assembly should open formally in Sydney on Monday August 11th 1952 and that the Executive Committee and Presidents of Commissions should assemble in Sydney on August 8th. The Assembly should close formally on Thursday, August 21st.

NATIONAL COMMITTEES

French National Committee

The Officers of the French National Committee are as follows :

Chairman : Mr. B. F. DAVID, Chef du Laboratoire Radio-Radar de la Marine.

General Secretary : Mr. B. DECAUX, Ingénieur en Chef, Laboratoire National de Radio-électricité.

Treasurer : Mr. P. ABADIE, Ingénieur en Chef, Laboratoire National de Radio-électricité.

Japanese National Committee

Membership (Supplement to the list published in Bulletin n° 62, p. 15).

Commission I

Shogo AMARI, chief of Radio Wave Section, Radio Regulatory Administrative Office.

Dr. Gennosuke HARA, chief of the Super-High-Frequency Section, Technical Laboratories of the Broadcasting Corporation of Japan.

Dr. Issac KOGA, professor of electrical engineering, University of Tokyo.

Hiroshi SEIMIYA, chief of the Equipment-Parts-Development Division, Electrical Communication Laboratory.

Commission II

Dr. Hisanao HATAKEYAMA, director of the Meteorological Research Institute.

Tetsuo KONO, chief of the Tropospheric Propagation Section,
Central Radio Wave Observatory.

Saburo MATSUO, chief of the Radio Propagation Section, Electrical
Communication Laboratory.

Yoshio TAKASHIMA, chief of the Fourth Section, Technical Labo-
ratory of the Broadcasting Corporation of Japan.

Commission III

Yuichiro AONO, chief of the Ionospheric Propagation Section,
Central Radio Wave Observatory.

Dr. Mankichi HASEGAWA, professor of geophysics, University of
Kyoto.

Dr. Ken-ichi MAEDA, chief of the Research Division, Electrical
Communication Laboratory.

Dr. Takeshi NAGATA, assistant professor of geophysics, University
of Tokyo.

Dr. Masao NOTUKI, chief of the Solar Phenomena Section, Tokyo
Astronomical Observatory.

Commission IV

Dr. Kanshi HONDA, professor of applied electricity, Physics
Department, University of Tokyo.

Dr. Atsushi KIMPARA, professor of electrical engineering, Nagoya
University, director of the Research Institute of Atmospherics.

Hiroshi SHINKAWA, assistant chief of the Engineering and Moni-
toring Division, Radio Regulatory Administrative Office.

Tadao TOSABAYASHI, chief of the Forecasting Division, Central
Meteorological Observatory.

Commission V

Dr. Yusuke HAGIHARA, professor of astronomy, University of
Tokyo, director of the Tokyo Astronomical Observatory.

Dr. Takeo HATANAKA, assistant professor of astrophysics, Univer-
sity of Tokyo, chief of spectroscopic Section of the Tokyo
Astronomical Observatory.

Dr. Hideo SEKI, assistant chief of the Radio Wave Section, Radio Regulatory Administrative Office.

Dr. Hiroyuko UYEDA, director of the Central Radio Wave Observatory.

Commission VI

Dr. Hideo IWAKATA, professor of electrical engineering, Waseda University, Tokyo.

Dr. Kiyoshi MORITA, professor of electrical engineering, Tokyo Institute of Technology.

Dr. Toshifusa SAKAMOTO, professor of electrical engineering, University of Tokyo.

Hidetosi TAKAHASHI, assistant professor of physics, University of Tokyo.

Commission VII

Dr. Yoshihiro ASAMI, professor of electrical engineering in the Hokkaido University, director of the Research Institute of Applied electricity.

Dr. Masao KOTANI, professor of physics, University of Tokyo.

Takeo SEKI, chief of Radio Research Section, Electrical Communication Laboratory.

Dr. Shintaro UDA, professor of electrical engineering, Tohoku University at Sendai.

Dr. Yasushi WATANABE, professor of electrical engineering, Tohoku University at Sendai.

U.S. National Committee

LIST OF OFFICERS FOR 1951-1953

Chairman : Prof. Charles R. BURROWS, Head of Department of Electrical Engineering, Cornell University, Ithaca, New York.

Vice-Chairman : Dr. NEWBURN SMITH, Director, Central Radio Propagation Laboratory, National Bureau of Standards, Washington, D. C.

Secretary-Treasurer : Prof. A. H. WAYNICK, Head, Department of Ionospheric Physics, School of Engineering, The Pennsylvania State College, State College, Pennsylvania.

Junior Past Chairman : Mr. Lloyd V. BERKNER, President, Associated Universities, Inc., 350, Fifth Avenue, New York 1, New York.

MEETING

The U. S. A. National Committee held a most successful spring meeting at the National Bureau of Standards, Washington D. C., April 16 to 18. The meeting was attended by about 300 American radioscientists and engineers and the scientific sessions were devoted to consideration of papers in the field of interest of Commissions II, III and IV. The following papers were submitted, abstracts are available at our General Secretariat.

Commission I

Impedance Measurements in the 50 to 1000 Megacycle Range, F. J. GAFFNEY, Polytechnic Research & Development Co, Inc., Brooklyn, N.Y.

Commission II

Recent Mathematical Developments in the Theory of Tropospheric Propagation. Bernard FRIEDMAN, New York University.

Air-to-Air Tropospheric Radio Propagation, G. B. FANNING and F. P. MILLER, A.M.C., Eng. Div., Aircraft Radiation Lab., Wright-Patterson Air Force Base, Dayton, Ohio.

The effect on Propagation on an Elevated Atmospheric Layer of Non-Standard Refractive Index, L. H. DOHERTY, Cornell University, Ithaca, N.Y.

Experimental Discrimination of the Factors in V.H.F. Radio Wave Propagation, A. W. STRAITON and C. W. TOLBERT, University of Texas, Austin, Texas.

Some Characteristics of 92.9 Mc/s Propagation observed at a Distance of 127 Miles, R. J. WAGNER Jr., R.C.A. Laboratories Division, Riverhead, N.Y.

Validity and Limitations of the Van Vleck-Weisskopf Equation for Atmospheric Microwave Absorption, T. F. ROGERS, Air Force Cambridge Research Laboratories.

Wave Propagation over Rough Surfaces, W. S. AMENT, Naval Research Laboratory, Washington, D.C.

Simultaneous Mobile Measurement of the Field Strengths of two V.H.F. Radio Stations over Irregular Terrain, Robert S. KIRBY, Central Radio Propagation Laboratory, National Bureau of Standards, Washington.

Suppression of Waves by Zonal Screens, Howard E. BUSSEY, Central Radio Propagation Laboratory, National Bureau of Standards, Washington, D.C.

The Effect of Low-Level Atmospheric Conditions on Overwater Interference Patterns at Microwave Frequencies, V. R. WIDERQUIST and J. E. BOYD, Georgia Institute of Technology, Atlanta, Ga.

V.H.F. Tropospheric Recording Measurements of Plane and Circular Polarized Waves in the Great Lakes Area, James S. HILL, United Broadcasting Co, Cleveland, Ohio and G. V. WALDO, Technical Research Division, Federal Communications Commission.

Commission III

Martyn's Theory of Magnetic Storms and Auroras, Dr H. G. BOOKER, Cornell University, Ithaca, New York.

On the Definition of Virtual Height, Jerry SHMOYS, New York University.

Dispersion of F2-Layer Critical Frequencies, M. LINDEMAN PHILLIPS and H. S. MOORE, Central Radio Propagation Lab., National Bureau of Standards, Washington, D.C.

Fluctuations of F2 Region between Stations separated by 100 to 150 Miles, H. W. WELLS, Dept. of Terrestrial Magnetism, Carnegie Institution of Washington.

Angle of Arrival and Polarization at Fort Chimo, J. E. HOGARTH, Radio Propagation Laboratory, Canadian Defence Research Board, Ottawa, Ontario.

Use of Long Distance Backscatter to Determine Skip Distance and Maximum Usable Frequency, William ABEL, Raytheon Mfg., Waltham, Mass.

Application of Punch-Cards to the Analysis of Multi-Path Ionospheric Pulse Propagation Records, W. CULLEN MOORE, Upper Atmosphere Research Laboratory, Boston University.

The Experimental and Theoretical Study of Ionospheric Absorption at 150 kc/s, A. H. BENNER, Pennsylvania State College (now with R.C.A. Laboratories, Camden, N.J.)

The Measurements of the Polarization of Ionospheric Reflections at low Frequencies, R. A. HELLIWELL, A. J. MALLINCKRODT, D. A. CAMPBELL, W. SNYDER, Dept. of Electrical Engineering, Stanford University, Calif.

Theoretical and Experimental Investigation of the Polarization of Long-Waves Reflected from the Ionosphere, J. M. KELSO and H. J. NEARHOOF, Ionosphere Research Laboratory, The Pennsylvania State College.

Polarization Measurements of Low Frequency Echoes, E. L. KILPATRICK, Central Radio Propagation Laboratory, National Bureau of Standards, Washington, D.C.

Wave Propagation in an Anisotropic Inhomogeneous Medium, J. FEINSTEIN, Central Radio Propagation Laboratory, National Bureau of Standards, Washington, D.C.

A Method for Obtaining the Wave Solutions of Ionospherically Reflected Long Radio Waves Including all Variables and their Height Variation, J. J. GIBBONS and R. J. NERTNEY, Pennsylvania State College.

Commissions II-III

Very High Frequency Propagation in the Equatorial Region, Oliver P. FERRELL, Radio Magazine, Inc., Philadelphia, Pa.

Southern Extent of Aurora Borealis in North America, C. W. GARTLEIN and R. K. MOORE, Cornell University, Ithaca, New York.

A V.H.F. Propagation Phenomenon associated with the Aurora, R. K. MOORE, Cornell University, Ithaca, New York.

Phase Velocity of Vertically Polarized Electromagnetic Waves in the Diffraction Region at the Surface of a Sphere, Henry LISMAN, Signal Corps Engineering Laboratories, Fort Monmouth, New Jersey.

Magneto-Ionic Multiple Splitting determined with the Method of Phase Integration, Wolfgang PFISTER, Geophysical Research Directorate, Air Force Cambridge Research Laboratories.

Electromagnetic Energy Density and Flux, C. O. HINES, Radio Propagation Laboratory, Canadian Defence Research Board, Ottawa, Ontario.

Commission IV

Recent Developments in the Study of Terrestrial Radio Noise, Wm. Q. CRICHLow, Central Radio Propagation Laboratory, National Bureau of Standards, Washington, D.C.

Atmospherics and the Propagation of Very-Low Frequency Waves, J. A. RATCLIFFE, Cavendish Laboratory, Cambridge University, Cambridge, England.

Atmospheric Noise Levels in the Range 10-500 kc/s as observed at the University of Florida, A. W. SULLIVAN and H. M. VAN VALKENBERG, Engineering and Industrial Experiment Station, University of Florida, Gainesville, Florida.

Some Characteristics of Atmospheric Waveforms, W. F. ZETROUER II and W. J. KESSLER, Dept. of Electrical Engineering, University of Florida, Gainesville, Florida.

The Tornado Season of 1950, Dr Herbert L. JONES, School of Electrical Engineering and Div. of Engineering Research and Experimental Station, Oklahoma A. and M. College, Stillwater, Oklahoma.

Some Interesting Applications of Radio Interference Suppression Techniques at the Aviation Medical Acceleration Laboratory, Naval Air Development Center, Johnsville, P. A., Albert R. KALL, Consulting Engineer, Electrosearch, Philadelphia 40, Pa.

Objective Noise studied by Teletype Evaluation, J. M. GOTTSCHALK, Research Assistant, Moore School of Electrical Engineering, University of Pennsylvania.

Commission VI

Low Frequency Antennas, P. S. CARTER, R.C.A. Laboratories Div., Rocky Point, N.Y.

Antenna Systems for Radio Direction Finding, E. C. JORDAN, Dept. of Elec. Eng. University of Illinois, Urbana, Ill.

Electrically Small Antennas and the Low-Frequency Airborne Antenna Problem, J. T. BOLLJAHN, Stanford Research Institute, Calif.

Antennas in Conducting Media, R. K. MOORE, School of Elec. Eng. Cornell University, Ithaca, New York.

On the Theory of Antenna Beam-Shaping, Allen S. DUNBAR, Stanford Research Institute, Stanford, California.

Beam Shaping in Doubly curved Reflector Systems employing Quasi-Point Sources, Arthur E. MARSTON, Naval Research Laboratory, Washington, D.C.

Lack of Uniqueness in Antenna Pattern Synthesis Methods and Related Energy Storage Considerations, T. T. TAYLOR, Hughes Aircraft Co, Culver City, California.

Feed Problems in Broad-Band Antenna Arrays, W. R. LEPAGE and R. F. GATES, Department of Electrical Engineering, Syracuse University.

Second-Order Beams of slotted Waveguide Arrays, H. GRUENBERG, Radio and Electrical Engineering Division, National Research Council, Ottawa, Canada.

Asymptotic Solution of Maxwell's Equations, Morris KLINE, New York University.

Current Distributions on Large Reflecting Cylinders, Henry J. RIBLET, Microwave Development Labs., Inc. Waltham, Mass.

Aperture Phase Errors in Microwave Optics, Kenneth S. KELLEHER, Naval Research Laboratory.

Review of Spherical Reflector Research at A.F.C.R.L., John E. WALSH, Air Force Cambridge Research Laboratories.

Review of Recent Metal Lens Research at A.F.C.R.L., John RUZE, Air Force Cambridge Research Laboratories.

APPOINTMENT

We have been informed that Dr. L. V. Berkner has been appointed as President of Associated Universities ; he will continue his cooperation to the Carnegie Institution of Washington as a Research Associate of this Institute.

COMMISSIONS

List of Official Members appointed by National Committees (1)

COMMISSION I

Australia : F. J. LEHANY, Division of Electrotechnology (C.S.I.R.O.)
National Standards Laboratory, University Grounds, Chip-
pendale, N.S.W.

France : Mr. P. ABADIE, Ingénieur en Chef au Laboratoire National
de Radio électricité, 196, rue de Paris, Bagneux (Seine).

Great-Britain : Mr. C. W. OATLEY, University Lecturer, 89, Gilbert
Road, Cambridge.

Japan : Dr. Issac KOGA, Professor, Electrical Engineering Depart-
ment, Faculty of Engineering, University of Tokyo, Bunkyo-ku
Tokyo.

South-Africa : Mr. F. J. HEWITT, Officer-in-charge, Telecommuni-
cations Research Laboratory of the C.S.I.R., c/o Department
of Electrical Engineering, University of the Witwatersrand,
Johannesburg, T.V.L.

Sweden : Lt Colonel H. BJORKLUND, Army Ordnance Engineers
Corps, Director of Army Signal Laboratory, Stockholm, 61.

U. S. A. : Mr. F. J. GAFFNEY, General Manager, Polytechnic
Research and Development Cy, 202, Tillory Street, Brook-
lyn I, N.Y.

COMMISSION II

Australia : A. H. CANNON, P.M.G. Research Laboratories, 59,
Little Collins Street, Melbourne, Victoria.

France : Mr. VOGÉ, J., Ingénieur au Département Tube et Hyper-
fréquences du C.N.E.T., 149, boulevard Bineau, Neuilly
s/Seine (Seine).

- Great-Britain* : Dr. R. L. SMITH-ROSE, Director of Radio Research, National Physical Laboratory, Teddington (Middlesex).
- Japan* : Dr. Hisanao HATAKEYAMA, Director, Meteorological Research Institute, Mabashi, Suginami-ku, Tokyo.
- Morocco* : Mr. G. BIDAULT, Géophysicien à l'Institut Scientifique Chérifien, 2, rue de Foucauld, Casablanca.
- South-Africa* : Mr. F. J. HEWITT.
- Sweden* : Dr. Mauritz Vos, Chief Engineer, L. M. Ericsson Co., Stockholm 32.
- U. S. A.* : Dr. A. W. STRAITON, Professor of Electrical Engineering, University of Texas, Austin (Texas).

COMMISSION III

- Australia* : Dr. D. F. MARTYN, Radio Research Board, Canberra Section, c/o Commonwealth Observatory, Mount Stromlo, Canberra, A.C.T.
- France* : R. P. LEJAY, Directeur du Bureau Ionosphérique Français, Laboratoire National de Radioélectricité, 196, rue de Paris, Bagneux (Seine).
- Great-Britain* : Mr. J. A. RATCLIFFE, Cavendish Laboratory, Cambridge.
- Japan* : Dr. Ken-ichi MAEDA, Chief of the Research Division, Electrical Communication Laboratory, Kichijoji, Musashino City, Tokyo Prefecture.
- Morocco* : Dr. A. HAUBERT, Immeuble du Parc, Fedala.
- South-Africa* : Mr. F. J. HEWITT.
- Sweden* : Mr. Sven GEJER, Bureau Director, Royal Board of Swedish Telegraphs, Stockholm 16.
- U. S. A.* : Dr. H. G. BOOKER, School of Electrical Engineering, Cornell University, Ithaca, N.Y.

COMMISSION IV

- Australia* : Dr. A. L. GREEN, Officer-in-Charge, Ionospheric Prediction Service, 16, Wylde Street, Potts Point, N.S.W.

France : Mr. R. RIVAULT, Faculté des Sciences, 2, rue de l'Université, Poitiers (Vienne).

Great-Britain : Mr. F. HORNER, Engineer, National Physical Laboratory, Teddington (Middlesex).

Japan : Dr. Atsushi KIMPARA, Professor in the Nagoya University, Director of the Research Institute of Atmospheric belonging to the Nagoya University. Ichida-cho, Toyokawa City, Aichi Prefecture.

Morocco : Mr. TILLOLOY, Ingénieur des travaux météorologiques, Météorologie Nationale, Camp Cazes, Casablanca.

South-Africa : Dr. B. J. SCHONLAND, Director, Bernard Price Institute for Geophysical Research, University of the Witwatersrand, Johannesburg, T.V.L.

Sweden : Prof. Harold NORINDER, Institute of High Tension Research, Uppsala.

U. S. A. : Mr. H. E. DINGER, c/o Dr. Newbern Smith, Central Radio Propagation Laboratory, National Bureau of Standards, Washington, 25, D.C.

COMMISSION V

Australia : Dr. J. L. PAWSEY, Radiophysics Laboratory, University Grounds, Chippendale, N.S.W.

France : Mr. M. LAFFINEUR, Institut d'Astrophysique, 98, boulevard Arago, Paris, 14^e.

Great-Britain : Dr. A. C. B. LOVELL, Scientist, The Quinta, Swetenham near Congleton (Cheshire).

Japan : Dr. Yusuke HAGIHARA, Professor of the University of Tokyo, Director of the Tokyo Astronomical Observatory, Mitaka near Tokyo.

Morocco : Mr. le Professeur E. VASSY, Faculté des Sciences, 1, rue Victor Cousin, Paris (V^e).

South-Africa : Mr. F. J. HEWITT.

Sweden : Prof. Olof RYDBECK, Chalmers University of Technology, Göteborg.

U. S. A. : Mr. A. H. SHAPLEY, Central Radio Propagation Laboratory, National Bureau of Standards, Washington, 25, D.C.

COMMISSION VI

Australia : Dr. J. C. JAEGER, Physics Department, University of Tasmania, Hobart (Tasmania).

France : Mr. J. LOEB, Chef de la Division Télécommande du C.N.E.T., 1, avenue de la République, Issy-les-Moulineaux (Seine).

Great-Britain : Mr. W. Proctor WILSON, Research Engineer, The British Broadcasting Corporation, Kingswood Warren (Surrey).

Japan : Dr. Kiyoshi MORITA, Professor, Tokyo Institute of Technology, O-okayama, Meguro-ku, Tokyo.

South-Africa : Mr. F. J. HEWITT.

Sweden : Prof. Erik HALLÉN, Royal Institute of Technology, Stockholm 26.

U. S. A. : Dr. Samuel SILVER, Associate Professor of Electrical Engineering, University of California, Berkeley (California).

COMMISSION VII

Australie : R. E. AITCHESON, Electrical Engineering Department, University of Sydney, N.S.W.

France : Mr. G. LEHMANN, Ingénieur au Laboratoire Central des Télécommunications, 46, avenue de Breteuil, Paris, 7^e.

Great-Britain : Prof. Dr. G. SAYERS, The University, Edgbaston, Birmingham 15.

Japan : Dr. Masao KOTANI, Professor, Faculty of Science, University of Tokyo, Bunkyo-ku, Tokyo.

South-Africa : Mr. F. J. HEWITT.

Sweden : Prof. Erik LÖFGREN, Royal Institute of Technology, Stockholm 26.

Morocco

Mr. G. Bidault, Secretary of the National Committee sent us for members of Commissions II, III and V results of observations he made during the fading of February 19, 1951.

Casablanca, February 19, 1951

Fading : from 1326 to 1525

Observations on Malta (TBJ) 11 535 kc/s (RN 3/5)	Observations on New-York WSY 23 211 kc/s (RN 4/5)	Observations on New-York 12 395 kc/s (RN 3/5)	Observations on Paris HXX 218 163 kc/s (RN 4/5)
1326. Reception power going down, no more audible at 1339 Not heart till :	1332. R 1/5 non readable 1340. Faded 1444. Received R 0 to 1/5	1333. Received 2/5 1338. Transmission fades out slowly and disappears at 1408	1335. Not heart 1420. Received 1 to 2/5 1530. Normally received
1506. Received 0 to 1/5	1446. Received R 1/5	1446. Not heart	
1510. Received 1 to 2/5	1500. Received R 1 to 2/5	1500. Not heart	
1517. Received 2/5	1506. Non heart	1506. Not heart	
1526. Received as usual	1520. Non heart	1520. Not heart	
	<i>Note</i> : Had to stop the transmission	<i>Note</i> : Had to stop the transmission	

Note. — Usual Phenomena : whisling-strong and near stations are heart (C.N.O. military stations).

Receiving attempts on very short waves

OBSERVATION

1510. — Noise similar to damped waves transmissions heard on :

44 000 kc/s R 3/5

44 400 kc/s R 1 to 2/5

45 500 kc/s R 3/5

45 400 kc/s R 1 to 2/5.

1515. — Transmission on 45 400 kc/s disappears ; another one appears on 43 500 kc/s R 2/5.

1525. — Same noise on 46 500 kc/s R 3/5.

1550. — Heard only on 43 500, 44 000 and 46 500 kc/s.

1620. — Heard only on 44 000 and 46 500.

I noted that those noises are spread and that they disappear suddenly when I increase the kc/s, they spread out when the kc/s are decreasing (approximative variations 100 to 150 kc/s).

Commission III and Joint Commission on the Ionosphere

IONOSPHERIC MEASUREMENTS

The Swiss P.T.T. Administration in Berne issues a monthly publication of Ionosphere Measurements taken near the transmitting center at Schwarzenburg.

The tables and charts of this ionospheric characteristics obtained at the above station will be available for the radio-propagation calculations to users in exchange of their own material.

Please send your request for this material, which will be sent free of charge, to the : Swiss Post, Telegraph and Telephone Administration, Radio and Telegraph Service, Speichergasse 6, Bern, Switzerland.

IONOSPHERIC SOUNDING STATIONS (2)

Australia

Station	Fre- quency range	Time for each sweep	Inter- val between sweeps	Peak power approx.	Dates of operation
	Mc/s	Min. sec.	Min.	kW	
<i>Brisbane</i> 27.5° S 153.0° E	2.2-12.5 1.0-16.0	2 30 1 55	10	1	June 1943 July 1947
<i>Canberra</i> 35.3° S 149.0° E	1.6-10.0 2.2-13.0 1.6-12.5 1.0-16.0	5 2 2 1 55	10	1	March 1947 August 1941 December 1946
<i>Hobart</i> 42.8° S 153.0° E	1.0-13.0	1 55	60	1	December 1945
<i>Macquarie Island</i> 54.5° S 159.0° E	1.0-13.0	1 55		1	July 1950
<i>Townsville</i> 19.4° S 146.5° E	1.0-13.0 1.0-16.0	1 55 1 55	10 10	1 1	June 1946 ⁽¹⁾
<i>Watheroo</i> 30.3° S 115.9° E	0.5-16.0 1.0-16.0	15 1 55	10	1	July 1935 April 1950

Note. — Positions are approximate, geographic. Some of these may be changed slightly within the next few years.

Details of data recorded are shown in Ionospheric Prediction Service Publication Series D.

⁽¹⁾ Closed down after a few months. Approximate date of reopening July, 1951.

All equipment now in use is automatic and records for the full 24 hours of the day.

New-Zealand

Stations operated by the Geophysical Laboratory of Christchurch under the control of the New Zealand Department of Scientific and Industrial Research.

Station	Christchurch		Campbell Island	Rarotonga
	Lincoln	Godley Head		
Latitude.....	43.6° S	43.6° S	52.5° S	21.3° S
Longitude.....	172.7° E	172.8° E	169.2° E	159.8° W
M.M.T.	172.5° E	172.5° E	165° E	157.5° W
Type of Recorder.....	Automatic		Manual	
Sweep Time.....	2 minutes		10 minutes	
Frequency Range.....	1-13 Mc/s	1-13 Mc/s	1.5-15.5 Mc/s	1.5-20 Mc/s
Approx. Peak Power Output.....	2 kW	2 kW	500 W	2 kW
Pulse Repetition Rate ..	48 p. p. s.	50 p. p. s.	45 p. p. s.	50 p. p. s.
Pulse Length.....	140 μ sec	80 μ sec	100 μ sec	100 μ sec
Aerial Type.....	Berkner Cage	Cox Delta	Cox Delta	Cox Delta
Recording Schedule.....	half hourly		0500, 0700, 1900, 2100 and 2300	Hourly

Heights are read to the nearest 10 km except for E region, below 200 km, where an attempt to read to 5 km is made. Accuracy of calibration is maintained to better than 0,1 %.

Frequencies are read to the nearest 0.1 Mc/s but in plotting records 0.01 Mc/s is aimed at frequencies below 5 Mc/s. Receivers are calibrated to this accuracy.

Godley Head station with Australian built J28 automatic recorder commenced operation on February 24th. 1951.

All stations interpret from their records.

f_o : E1, E2, F1, F2,

h' : Es, E2, F1, F2.

f_bEs , fEs , M3000F2, $hpF2$.

Rarotonga and Campbell Island read $h'E1$ which is omitted at Christchurch due to doubt caused by fixed echoes from mountain ranges at a distance of about 80 km.

As from January 1st. 1951 Christchurch scales $fE2s$ this will be introduced at Rarotonga on April 1st. and at Campbell Island on May 1st.

Sweden

Add to the list published in *Bulletin* n° 67.

Portable station sponsored by the Research Institute for National Defence.

Switzerland

Station of Schwarzenburg (Lat. $46^{\circ}49.6' N$, Long. $7^{\circ}20.6' E$) sponsored by the Swiss P.T.T. Administration; Ionosphere Recorder C.R.P.L. Model C-2.

C. C. I. R.

Plenary Assembly

U.R.S.I. will be represented at this Assembly by a delegation under the Chairmanship of Dr. J. H. Dellinger, Vice-President of the Union. This delegation will meet at Geneva in order to study better cooperation between C.C.I.R. and U.R.S.I.

Officers and Presidents of Commissions of U.R.S.I., and officers of National Committees attending the Plenary Assembly are kindly requested to attend the meetings of the delegation; we are asking them to send us their names.

DOCUMENTATION

The following document has been distributed to the National Committees.

Experimental designs balanced for pairs of residual effects, by
E. J. WILLIAMS. Reprinted from the *Austr. Jour. Sc. Res. A*,
vol. 3, n° 3, p. 351-363, 1950.
