

U.R.S.I.

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CHARLES MANNEBACK
1894-1975

It is with a particularly keen sense of loss and regret that we have to record the death on 15 December 1975 of Professor Charles Manneback, Belgian physicist and mathematician, after a long association with URSI which began in 1928 and continued in one form or another until his death. Professor Manneback followed in the footsteps of other Belgian radio scientists who have, over a period of more than 60 years, played leading rôles in URSI. The Union was founded in 1919 on the proposal of the Belgian Delegation to the First General Assembly of the International Research Council. Indeed the creation, in 1913, of the pioneering International Commission which preceded URSI was due mainly to the initiative of Dr. Robert Goldschmidt, a Belgian scientist who later became the first Secretary General of the Union.

Charles Manneback, at that time Professor in the University of Louvain, was a member of the Belgian delegation to the IIIrd URSI Assembly in 1928. It was in response to his suggestion that the Assembly agreed that a more appropriate title for the Commission on Oscillations, created in 1927 on the proposal of Balth. van der Pol, would be the Commission on Radio Physics. The Proceedings of the 1928 Assembly record the contributions made by Professor Manneback to the lively discussions on the propagation and attenuation of electromagnetic waves in a medium whose characteristics vary rapidly with time, and on the current distribution in an antenna. At the 1934 Assembly, he was involved in the debates on the concept of dielectric constant in an ionized medium, and on the re-introduction into electromagnetic theory, after an interval of 40 years, of Heaviside's operational calculus. It was at this Assembly that he was asked to cooperate with T.L. Eckersley in the preparation of a report, which was presented to the following Assembly in 1938, dealing with the conditions under which the laws of geometric optics can be applied to radio wave propagation and those where wave theory must be used.

Professor Manneback's interest in the discussions, in URSI, on wave propagation continued after the Second World War. At the 1946 Assembly, he was a member of Prof. Booker's sub-commission on wave propagation in the troposphere, which presented an extensive report at the 1948 Assembly. It was in 1948 that Professor Manneback was

elected Treasurer of URSI, a position he retained until his retirement in 1969 when the General Assembly recognised his services to URSI by admitting him to the small circle of Honorary Presidents of the Union. It is worth recalling that the important financial reserves built up during Professor Manneback's term of office as Treasurer enabled the Union to maintain its activities practically at their normal level during the difficult years from 1972 to 1975.

Although Professor Manneback retired in 1969, he took a serious view of his position as Honorary President, and was present at several meetings of the Board of Officers in Brussels where he was always most welcome. Some members of the Board will recall that he continued to follow current developments in wave propagation theory and that he took advantage of the coffee breaks to discuss them. Between Board meetings, he occasionally visited the URSI Secretariat, but he kept in touch more frequently by telephone and, in recent years, was always anxious to hear about the latest opinions on the reorganisation of the Union and the identities of the protagonists of the various points of view.

In 1963, on the occasion of the presentation of the first Balth. van der Pol Gold Medal, Professor Manneback was invited to give an address in which he recalled van der Pol's long and intimate connection with URSI and his important contribution to the development of the Union. The closing words of this address seem to be equally appropriate to the contribution made by Professor Manneback himself:

"This is well remembered at URSI, and in the long future we shall treasure the memory of such a fine leader, companion and friend....."

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HIDETSUGU YAGI
1886-1976

Professor Koga (President of URSI: 1963-1966) has kindly sent the appreciation of Professor Yagi's work which is reproduced below.

Professor Hidetsugu Yagi was born on 28 January 1886 in Osaka Prefecture and died on 19 January 1976 almost at the age of 90.

After graduating from the Electrical Engineering

Department, Tokyo Imperial University in 1909, he was appointed an instructor in Sendai Technical High School, and became professor there the next year.

The Japanese Government sent him abroad as a resident scholar from 1913 to 1916. During this period he studied under the direction of G.H. Barkhausen at the Technische Hochschule zum Dresden from 1913 to 1914; under the direction of J.A. Fleming at University College, London from 1914 to 1915; and under the direction of G.W. Pierce at Harvard University, USA from 1915 to 1916. He spoke very fluent English, French and German and this enabled him to establish a close rapport with scientists abroad.

Immediately after his return to Japan, Prof. Yagi joined the committee for the establishment of a school of engineering in Tohoku Imperial University at Sendai. The School of Engineering was actually inaugurated in 1919.

Prof. Yagi made many contributions to science and his invention of the so-called Yagi antenna (or aerial array) was really striking. This antenna was invented in 1926, and its patent rights in the United States were assigned to RCA. Moreover, he contributed a paper entitled "Beam Transmission of Ultra Short Waves" to the Proceedings of the Institute of Radio Engineers (N.Y.). His lectures on this subject at IRE meetings in New York, Washington, D.C., Boston and San Francisco deeply impressed American scientists and engineers including J.H. Dellinger. Unfortunately, his patent rights in Japan expired in 1941 without having attracted much attention.

During World War II, the Japanese Army was very surprised when it found, in Singapore and the Philippines, that Yagi antennas were being used in the radar equipment of the Allied Forces, and Japanese people felt ashamed for not having positively utilized the same antennas much earlier. Prof. Yagi must have been satisfied, however, that, after the War, the Yagi antenna was adopted for use with every television receiver throughout the world.

In 1936 the Academy of Technical Science in Copenhagen awarded him the Valdemar Poulsen Gold Medal "for his outstanding contributions to radio technique, particularly for his invention and development of the Yagi antenna". In 1962 the International Television Symposium at Montreux presented him with a scroll "in recognition of his outstanding contribution to the advance of television as a medium of international understanding".

Prof. Yagi had long been concerned with the activity of the Japanese National Committee for URSI, and he attended the V General Assembly of URSI in London in 1934, representing the National Committee, accompanied by Dr. I. Koga, Dr. S. Namba and Mr. S. Okamoto. Thanks to the introductions made on this occasion, the activity of Japan in the field of radio science became recognised by the participants who included E.V. Appleton, J.H. Dellinger, W.H. Eccles, T.L. Eckersley, L. Espenschied, Ch.Manneback, R. Mesny, J.A. Ratcliffe, R.L. Smith-Rose, Balh. van der Pol, K.W. Wagner, R.A. Watson-Watt, and others.

Prof. Yagi was appointed Dean of the School of Engineering at Tohoku Imperial University in 1938. He participated in organizing the School of Science at Osaka Imperial University on the invitation of Prof.H. Nagaoka, and was appointed Head of the Physics Department when the University was inaugurated. In 1938 he was made Dean of the School of Science at the Tokyo Institute of Technology and became President of the Institute in 1942. In 1946 he was appointed President of Osaka Imperial University.

In 1951 Prof. Yagi was elected to the Japan Academy of Science and in 1956 was awarded the Order of Cultural Merit, the highest academic honour in Japan.

In addition to being a great scientist, Prof. Yagi also took an active part in political circles in Japan as a member of the House of Councillors in the 1950's. On his death, the Japanese Government conferred upon him posthumously the award of First Class Order of the Rising Sun.

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SATELLITE BEACON OBSERVATIONS

A COSPAR Symposium (cosponsored by URSI) on The Geophysical Use of Satellite Beacon Observations will be held at Boston University, Boston, USA from 1 to 4 June 1976.

The main topics will be:

1. Ionospheric Structure and Dynamics
2. Plasmasphere
3. Disturbed F Region
4. Specification of Trans-ionospheric Functions for

Engineering Purposes

5. Equipment and Future Plans for Satellite Beacon Studies.

The Registration Fee is \$20, if paid before 1 May or \$25 if paid later. Participants who wish to do so may be accommodated in the University dormitories at attractive rates.

Further information is available from:

Prof. M. Mendillo,
Department of Astronomy,
Boston University,
Boston, Mass. 02215, USA.

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EXPERIMENTS IN SPACE PLASMAS

A Symposium on Active Experiments in Space Plasmas will be held in Boulder, Col., USA from 3 to 5 June 1976. The topics to be covered include:

1. Motions of charged particles
2. Sheath and wake phenomena
3. Wave phenomena and dispersion relations
4. Instabilities
5. Kinetic theory effects and treatments
6. Non-linear effects
7. Zero-gravity effects.

Further information is available from:

Dr. M.J. Rycroft,
Department of Physics,
The University,
Southampton SO9 5NH,
United Kingdom.

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INFORMATION THEORY

The 1976 International Symposium on Information Theory will be held at Ronneby Brunn, Ronneby, Sweden from 21-24 June 1976.

Coding Theory	Detection and Estimation
Communications Systems	Pattern Recognition
Computational Complexity	Stochastic Processes
Computer Communications	Shannon Theory

Ronneby is on the south coast of Sweden and is readily accessible from Copenhagen and Stockholm by air, train, ferry or car.

Further information is available from:

Robert W. Lucky,
Bell Laboratories,
Room 1F-532,
Holmdel, New Jersey 07733, USA

or

Lars H. Zetterberg,
Royal Institute of Technology,
Electrical Engineering Department,
Stockholm 70, Sweden.

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CPEM 1976

The Conference on Precision Electromagnetic Measurements will be held at the NBS Laboratories, Boulder, USA from 28 June - 1 July 1976. The provisional programme covers measurements of fields and signal characteristics such as power, current, voltage, field strength and frequency, and the transfer characteristics of devices and networks such as impedance and attenuation. Electromagnetic properties of materials will also be discussed.

Further information on CPEM is available from:

Mr. George Goulette, Director
Bureau of Conferences and Institutes,
University of Colorado,
Boulder, Colorado 80302, USA.

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FREQUENCY STANDARDS AND METROLOGY

The 2nd Symposium on Frequency Standards and Metrology will be held, from 5-7 July 1976, at Copper Mountain, Col., USA. It will be sponsored by the National Bureau of Standards and URSI.

This meeting is intended to serve as a discussion forum on most aspects relating to precision frequency standards and the associated metrology. This topic includes frequency standards throughout the electromagnetic spectrum such as microwave beams, storage devices,

stabilized lasers, infrared and optical beams, 2-photon techniques, aspects of time and length standards, infrared and visible frequency synthesis, measurement principles and limitations, and the relation of this field to specific scientific disciplines such as relativity.

Further information is available from:

L. Kenneth Armstrong,
Program Information Office,
1-4001,
National Bureau of Standards,
325 Broadway,
Boulder, Colorado 80302, USA.

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ELECTROMAGNETIC COMPATIBILITY (EMC)

The 3rd International EMC Symposium will be held in Wrocław, Poland from 22-24 September 1976. The main theme will be the electromagnetic environment and the interaction between man-made electromagnetic radiation and technical and biological systems. Papers will be presented in English or Russian with simultaneous translation.

Further information is available from the Chairman:

Dr. Jan Hołownia,
Technical University of Wrocław,
(EMC Symposium),
ul. Wybrzeże Wyspiańskiego 27,
50-370 Wrocław, Poland.

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RADIO OCEANOGRAPHY

URSI and IUGG announce a colloquium-workshop on Radio Oceanography which will be sponsored by the Inter-Union Commission on Radio Meteorology. The colloquium will be held at the Max-Planck-Institute for Meteorology, Hamburg, F.R. Germany from 29 September to 6 October 1976.

The objectives of the colloquium are:

- 1) to review major theoretical and experimental research on radio, radar and microwave radiometer measurements of the ocean;
- 2) to clarify the needs of ocean scientists for such data;

3) to delineate avenues of research that might be followed by future national and international programmes.

Attendance will be limited to about 50 participants invited by the Programme Committee

The papers to be presented by the invited speakers will be published in a special edition of a major geophysical journal soon after the colloquium. The topics to be covered include the relevant aspects of:

- a) waves, currents, tides, tsunamis, temperature distribution, marine meteorology (including air-sea interaction), climatology, glaciology and geodesy;
- b) radio techniques such as hf radio and radio scattering, radar imagery, microwave radiometry and instrumented satellites.

Persons interested in attending are invited to write to the Chairman:

Dr. John A. Apel,
Atlantic Oceanographic and Meteorological Labs,
US Department of Commerce, NOAA,
15 Rickenbacker Causeway,
Miami, Florida 33149, USA.

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BIOLOGICAL EFFECTS OF ELECTROMAGNETIC WAVES

A Symposium on the above topic will be held from 10-15 October 1976 at the University of Massachusetts, Amherst, USA as part of an international IEEE AP-S Symposium and the Autumn Meeting of the URSI Committee in the USA.

The provisional topics to be covered include:

- Therapeutic and Diagnostic Applications of Microwaves (Hyperthermia, Radiometry, etc.)
- Microwave Cataractogenesis
- Cellular and Mutagenic Effects of Microwaves
- Microwave Effects on CNS
- Microwave Hearing
- Behavioral Effects due to Microwaves
- General Biological and Physiological Effects
- Microwave Exposure Systems and Parameters
- Instrumentation
- Microwave Dosimetry (including dielectric properties of tissues).

Intending speakers must submit abstracts (of 200 words or less) by 1 July 1976 to:

Dr. R.L. Fante,
AFCRL (LZ),
Hanscom Air Force Base,
Bedford, Massachusetts 01731, USA.

Further information about the symposium and the format for the submission of abstracts can be obtained from Dr. Fante.

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URSI REVIEW OF RADIO SCIENCE

Some copies are still available of:

Review of Radio Science 1969-1971: ed. Minnis & Bogitch
(URSI, Brussels, 1972)

and

Review of Radio Science 1972-1974: ed. Bowhill
(URSI, Brussels, 1975).

Both volumes contain summarised information, with numerous references, on advances in radio science during the three-year period preceding the URSI General Assemblies in Warsaw (1972) and Lima (1975).

The price of each volume is US\$7.50 including surface postage. Orders, with remittance, should be sent to:

RRS 1969-1971 URSI Secretariat,
Rue de Nieuwenhove 81,
B - 1180 Brussels, Belgium.

RRS 1972-1974 Aeronomy Laboratory,
Department of Electrical Engineering,
University of Illinois
Urbana, Ill. 61801, USA.

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ELECTROMAGNETIC COMPATIBILITY

The EMC Symposium and Exhibition was held in Montreux in May 1975. The Proceedings (567 pages) contain the full text of the 108 papers presented at the Conference, and 15 abstracts of the papers in the special session on Sequency techniques.

The Proceedings are available at 95 Swiss francs per copy from:

EMC Symposium Montreux,
(attn Mrs Monod),
Box 97,
CH - 1820 Montreux, Switzerland.

A cheque or banker's draft should be sent with the order.

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INTERNATIONAL MAGNETOSPHERIC STUDY (IMS)

The International Magnetospheric Study began on 1 January 1976. Up-to-date information about planned experiments is contained in the IMS Newsletter which will be circulated at monthly intervals to about 1200 experimenters and other addressees. Enquiries about the Newsletter, or information submitted for inclusion in it, should be addressed to:

Mr. J.H. Allen,
WDC-A (STP),
D64, NOAA,
Boulder, Col.80302, USA

or to Dr. P. Simon,
Section d'Astrophysique,
Observatoire de Paris,
F - 92190 Meudon, France.

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PHENOMENES ONDULATOIRES DANS LES MILIEUX NON IONISES
La Baule, France, 28 avril-6 mai 1977

Appel à communications

La Commission F de l'Union Radio-Scientifique Internationale annonce l'organisation d'un Colloque sur les phénomènes ondulatoires dans les milieux non ionisés, qui aura lieu à La Baule, en France, du 28 avril au 6 mai 1977.

On invite des contributions originales sur tous les aspects de l'interaction des ondes électromagnétiques (y compris optiques) avec les milieux terrestres non ionisés.

Une importance particulière sera donnée à:

a) Limitation des performances des systèmes de télécommu-

nication due aux effets de propagation.

b) Méthodes utilisant de tels effets pour la télédétection de la basse atmosphère, de la surface et du sous-sol de la Terre.

Par exemple:

1) Structure de l'indice de réfraction en air clair, y compris les conduits et effets sur la propagation.

2) Structure des averse et leurs effets sur la propagation, y compris les effets des gouttes d'eau non sphériques.

3) Influence de propagation sur les signaux transmis (évanouissement, scintillation, trajets multiples, effets Doppler, dépolarisation, etc...), modèles et statistique.

4) Limitations apportées par la propagation au partage des fréquences.

5) Phénomènes de propagation importants pour la diversité et la compatibilité.

6) Interaction des ondes et de la surface ou du sous-sol de la Terre.

7) Phénomènes de propagation importants pour la télédétection active ou passive de la basse atmosphère et de la surface de la Terre et du sous-sol, la télédétection étant faite par ondes EM (y compris l'optique) ou acoustiques.

8) Problèmes de signature en télédétection, y compris les théories d'inversion.

9) Techniques et méthodes de télédétection en tenant compte particulièrement de la spectroscopie et des techniques à plusieurs longueurs d'ondes ou plusieurs capteurs.

Directives aux auteurs:

Les auteurs sont invités à soumettre au Comité Scientifique un résumé aussi détaillé que possible, mais ne dépassant pas une page dactylographiée.

Ces résumés devront être envoyés en 5 exemplaires, avant le 15 octobre 1976, à:

Mr F. EKLUND
Radio Propagation Division
Research Institute of National Defence, Div. 3
S - 104 50 Stockholm 80, Suède.

Les auteurs seront prévenus de l'acceptation de leur communication. Ils devront alors fournir, avant le 1er janvier 1977, un texte (français ou anglais) d'un maximum de 6 pages, y compris figures et références, dactylographiées sur une forme qui leur sera fournie avec les indications nécessaires.

Le volume contenant ces communications sera remis aux participants au début du colloque.

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WAVE PHENOMENA IN NON-IONIZED MEDIA
La Baule, France, 28 April-6 May 1977

Call for Papers

Commission F of the International Union of Radio Science announces a Symposium on Wave Phenomena in Non-ionized Media which will be held at La Baule, France from 28 April to 6 May 1977.

Original papers are invited on all aspects of electromagnetic (including optical) wave interaction with terrestrial non-ionized media.

Special emphasis will be placed on:

- a) limitations to the performance of telecommunication systems due to propagation effects;
- b) methods of using such propagation effects for the remote sensing of the lower atmosphere, and the Earth's surface and subsurface.

Papers are desired containing new insights into such topics as:

- 1) Clear air refractivity structures (including ducts) and effects on EM-wave propagation.
- 2) Storm structures and EM-wave propagation effects of storms, including effects of non-spherical hydro-meteors.
- 3) Transmission channel propagation characteristics (fading, scintillations, multiple paths, Doppler effects, depolarisation, etc.): models and statistics.
- 4) Propagation limitations to frequency sharing.
- 5) Propagation phenomena of importance to diversity systems and adaptive systems.
- 6) Interaction of EM-waves with the Earth's surface

and crust.

7) Propagation effects of importance to active and passive remote sensing of the lower atmosphere and the Earth's surface and subsurface by radio, optical (including infra-red) and acoustic waves.

8) Signature problems in remote sensing, including the application of inversion theories.

9) Remote sensing techniques and methods, with special reference to spectroscopy, multiwavelength and multisensor techniques.

Instructions for authors:

Authors are requested to submit a detailed abstract, not exceeding one typed page, to the Programme Committee.

Abstracts are to be sent in 5 copies and not later than 15 October 1976 to:

Mr. F. EKLUND
Radio Propagation Division
Research Institute of National Defence, Div.3
S - 104 50 Stockholm 80, Sweden.

Authors whose papers have been accepted will be requested to deliver, not later than 1 January 1977, the full text (in French or English), length maximum 6 pages, including figures and bibliography, typed on the special form which will be provided together with the relevant information.

The Proceedings of the Symposium will be handed out at the beginning of the Symposium.

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URSI MEMBER COMMITTEES

The following names and addresses of Presidents and Secretaries of URSI Member Committees is based on information available in the URSI Secretariat on 25 March 1976. It would be appreciated if any errors or modifications could be notified to the URSI Secretariat before 15 May for inclusion in the next issue of the URSI Bulletin.

ARGENTINA:

President: Ing. A.M. Andreu, CORCA, Av. Libertador 327,
Vicente Lopez (BA).

Secretary: Prof. V.A. Padula-Pintos, Instituto Tecnológico de Buenos Aires, Av. Madero 351, Buenos Aires.

AUSTRALIA:

President: Prof. W.N. Christiansen, School of Electrical Engineering, University of Sydney, Sydney N.S.W.2006.

AUSTRIA:

President: Univ.Prof.Dr. O.M. Burkard, Institut für Meteorologie und Geophysik, Universität Graz, Halbärthgasse 1, A-8010 Graz.

BELGIUM:

President: Prof. P. Hontoy, Laboratoire de Radioélectricité, Université Libre de Bruxelles, 50 avenue F.D. Roosevelt, B-1050 Bruxelles.

Secretary: Prof. R. Gonze, Observatoire Royal de Belgique, 3 avenue Circulaire, B-1180 Bruxelles.

BRAZIL:

President: Dr. F. de Mendonça, Scientific Director CNAE, C.P. 515, São José dos Campos, São Paulo.

BULGARIA:

President: Prof. Dr. K. Serafimov, Scientific Secretary, Bulgarian Academy of Sciences, ul."7 noemvri" 1, Sofia.

Secretary: Dr. A. Spasov, Institute of Electronics, Bulgarian Academy of Sciences, ul."7 noemvri" 1, Sofia.

CANADA:

President: Dr.F.J.F. Osborne, RCA Ltd Research Laboratories, Ste-Anne-de-Bellevue, Quebec.

Secretary: Dr. J.Y. Wong, National Research Council of Canada, Montreal Road, Bldg M-50, Ottawa, Ontario.

CZECHOSLOVAKIA:

President: Prof. Dr. J. Stransky, Faculty of Electrical Engineering, Technical University of Prague, Suchbátarova 4, Praha 6 - Dejvice.

Secretary: Dr. L. Kratena, Institute of Radio Engineering and Electronics, Czechoslovak Academy of Sciences, Lumbova 1, Praha 8 - Kobylišy.

DENMARK:

President: Dr. E. Ungstrup, Danish Space Research Institute, Lundtoftevej 7, DK - 2800 Lyngby.

EGYPT, ARAB REPUBLIC OF:

President: Prof. A. I. Naguib, Department of Scientific Societies and International Unions, Academy of Scientific Research and Technology, 101 Kasr El-Eini Street, Cairo.

GERMAN D.R.:

President: Prof. Dr. Ing. H. Frühauf, Technische Universität Dresden, Helmholtzstrasse 18, DDR-8027 Dresden.

Secretary: Dr. J. Taubenheim, Zentralinstitut für Solar-Terrestrische Physik der DAW, Rudower Chaussee 5, DDR-1199 Berlin-Adlershof.

GERMANY, F.R.:

President: Dr. W. Becker, Max-Planck-Institut für Aeronomie, D-3411 Lindau/Harz.

Secretary: Ing. K.-H. Kappelhoff, Fernmeldetechnisches Zentralamt, FI 31-2, Postfach 800, D-6100 Darmstadt.

FINLAND:

President: Prof. Dr. M. Tiuri, Helsinki University of Technology, SF-02150 Otaniemi.

Secretary: Dipl. Eng. Y. Sirkeinen, Helsinki University of Technology, SF-02150 Otaniemi.

FRANCE:

President: M. M. Thué, CNET, 38 rue du Général Leclerc, F - 92131 Issy-les-Moulineaux.

Secretary: M. M. Petit, Secrétaire général du CNFRS, CNET, 38 rue du Général Leclerc, F-92131 Issy-les-Moulineaux

HUNGARY:

President: Dr. G. Bognar, Member of the Hungarian Academy of Sciences, Münnich F. u. 7, H-1055 Budapest.

Secretary: Prof. K. Géher, Technical University of Budapest, Stoczek u. 2, H-1111 Budapest.

INDIA:

President: Dr. M. K. Basu, Wireless Planning and Coord. Wing, Ministry of Communication, Sardar Patel Bhavan, Parliament Street, New Delhi 110001.

Secretary: Dr. B. M. Reddy, Radio Science Division, National Physical Laboratory, Hillside Road, New Delhi 120012.

ISRAEL:

President: Prof. W. Low, Department of Experimental Physics, The Hebrew University of Jerusalem, Jerusalem.

ITALY:

President: Prof. G. Barzilai, Istituto di Elettronica, Facolta di Ingegneria, Via Eudossiana 18, I-00184 Roma.

Secretary: Dr. G. d'Auria, Istituto di Elettronica, Facolta di Ingegneria, Via Eudossiana 18, I-00184 Roma.

JAPAN:

President: Prof. A. Kimpara, Chubu Institute of Technology, 1200 Matsumoto-cho, Kasugai, Aichi 487.

Secretary: Prof. T. Obayashi, Institute of Space and Aeronautical Science, University of Tokyo, Komaba, Meguro, Tokyo 153.

MEXICO:

President: Ing. Carlos Nunez A., Vocal Director de Coordinacion, Comision Nacional del Espacio Exterior, Av. Eugenia 197-10° piso, Mexico 12, DF.

NETHERLANDS:

President: Prof. F.L.H.M. Stumpers, Philips Research Laboratories, Eindhoven.

Secretary: Dr. ir. J.B.H. Peek, Philips Research Laboratories, Eindhoven.

NEW ZEALAND:

President: Mr. L.H. Martin, NZ Broadcasting Corporation, Bowen State Building, Bowen House, Wellington 1.

Secretary: Mr. G.J. Burt, Physics and Engineering Laboratory, DSIR, Private Bag, Lower Hutt.

NIGERIA:

President: Prof. O. Awe, Department of Physics, University of Ibadan, Ibadan.

Secretary: Dr. G.O. Ajayi, Department of Electronic and Electrical Engineering, University of Ife, Ile-Ife.

NORWAY:

President: Dr. B. Landmark, Chief Scientist, NDRE, Box 25, N-2007 Kjeller.

Secretary: Mr. G. Skovli, Scientific Officer, NDRE, Box 25, N-2007 Kjeller.

PERU:

President: Dr. A.A. Giesecke, Instituto Geofisico del Peru, Ministerio de Fomento, Apartado 3747, Lima.

POLAND:

President: Prof. Dr. A. Smoliński, Instytut Podstaw Elektroniki, Politechnika Warszawska, ul. Nowowiejska 15/19, 00-665 Warszawa.

Secretary: Prof. S. Hahn, Instytut Radioelektroniki, Politechnika Warszawska, ul. Nowowiejska 15/19, 00-665 Warszawa.

PORTUGAL:

President: Mr. A. Silva de Sousa, Director General, Serviço Meteorologico Nacional, R. Saraiva de Carvalho 2, Lisboa 3.

SOUTH AFRICA:

President: Dr. F.J. Hewitt, Deputy-President, CSIR, P.O. Box 395, Pretoria.

Secretary: Mr. P. le R. Malherbe, CSIR, P.O.Box 395, Pretoria.

SPAIN:

President: Col. L. Azcarraga, Director General de Protection de Vuelo, Ministerio del Aire, Madrid.

Secretary: Mr. R. Rivas, Paseo della Castellana 98, Madrid 6.

SWEDEN:

President: Prof. Stig Lundquist, The Institute of High Tension Research, S-755 90 Uppsala.

Secretary: Mr. P. Akerlind, Swedish Telecommunications Administration, S-123 86 Farsta.

SWITZERLAND:

President: Prof. Dr. Walter E. Gerber, Elfenaueg 64, CH-3006 Bern.

Secretary: Dr. H. Wehrlin, Aueg 9, CH-3074 Muri/Bern.

TAIWAN:

President: Prof. H.C. Fang, Directorate General of Telecommunications, P.O.Box 84, Taipei, Taiwan.

Secretary: Director T.I. Ho, Telecommunication Laborator-

ies, Ministry of Communications, P.O.Box 71, Chung-Li, Taiwan.

UNITED KINGDOM:

President: Dr. J.A. Saxton, Director, Appleton Laboratory, Ditton Park, Slough SL3 9JX.

Secretary: Sir David Martin, Executive Secretary, The Royal Society, 6 Carlton House Terrace, London SW1Y 5AG.

USA:

President: Dr. J.V. Evans, MIT, Lincoln Laboratory, Lexington, Mass. 02173.

Secretary: Dr. J.R. Wait, Room 242, RB 1, NOAA/ERL, US Department of Commerce, Boulder, Colorado 80302.

USSR:

President: Prof. V.V. Migulin, IZMIRAN, Akademgorodok, Moscow Region.

Secretary: Dr. M.V. Persikov, Institute of Radioengineering and Electronics, Ac.Sci., Prospekt Marksa 18, g. Moskva, Centr, GSP-3.

YUGOSLAVIA:

President: Prof. R. Horvat, Elektrotehnicki Fakultet, Bulevar Revolucije 73, 11000 Beograd.

Secretary: Prof. Dr. B. Popovic, Electrotechnical Faculty, University of Belgrade, P.O. Box 816, 11001 Beograd.

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URSI COMMISSIONS

We wish to prepare a list of the names and addresses of the Official Members of the new URSI Commissions A - J, which were formed during the General Assembly in 1975. We have received some of the information required and this is given in the list below. We have not reproduced the names of the Official Members of the former Commissions I - VIII since these appointments are now obsolete.

The next issue of the URSI Bulletin will go to press at the end of May and it is hoped that URSI Committees which are not mentioned below will send the names and addresses of their Official Members to the URSI Secretariat before 15 May.

Commission A - Electromagnetic Metrology

Chairman: Dr. H.M. Altschuler, National Bureau of Standards, 272.10 Room 4066, Boulder, Colorado 80302, USA.

Vice-Chairman: Prof. S. Okamura, Faculty of Engineering, University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113, Japan.

Official Members:

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Commission B - Fields and Waves

Chairman: Prof. J. Van Bladel, Laboratorium voor Elektromagnetisme en Acustica, Rijksuniversiteit Gent, St-Pietersnieuwstraat 41, B-9000 Gent, Belgium.

Vice-Chairman: Prof. L.B. Felsen, Polytechnic Institute of New York, 333 Jay Street, Brooklyn, N.Y. 11201, USA.

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Commission C - Signals and Systems

Chairman: Prof. B. Picinbono, Université de Paris-Sud, Laboratoire de signaux et systèmes du CNRS, Ecole supérieure d'électricité, F-91190 Gif-sur-Yvette, France.

Vice-Chairman: Prof. V. Zima, Institute of Radioengineering and Electronics, Czechoslovak Academy of Sciences, Lumumbova 1, 180 88 Praha 8, Czechoslovakia.

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Commission D - Physical Electronics

Chairman: Prof. A. Smoliński, Instytut Podstaw Elektroniki, Politechnika Warszawska, ul. Nowowiejska 15/19, 00-665 Warszawa, Poland.

Vice-Chairman: Prof. W.G. Farnell, Department of Electrical Engineering, McGill University, P.O.Box 6070, Montreal 101, Quebec, Canada.

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Commission E - Interference Environment

Chairman: Dr. Ya. I. Likhter, IZMIRAN, Akademgorodok, Moscow Region, USSR.

Vice-Chairman: Mr. G. Hagn, Stanford Research Institute, SRI-Washington, 1611 North Kent Street, Arlington, Virginia 22209, USA.

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Commission F - Wave Phenomena in Non-ionized Media

Chairman: Mr. F. Eklund, Research Institute of National Defence, Dept. 3, S-104 50 Stockholm 80, Sweden.

Vice-Chairman: Prof. A.T. Waterman, Jr., Stanford Electronics Laboratories, Stanford, Calif. 94305, USA.

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Commission G - Ionospheric Radio and Propagation

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Vice-Chairman: Dr. A.P. Mitra, National Physical Laboratory, Hillside Road, New Delhi 120012, India.

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Commission H - Waves in Plasmas

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Commission J - Radio Astronomy

Chairman: Prof. G. Westerhout, Astronomy Program, University of Maryland, College Park, Maryland 20742, USA.

Vice-Chairman: Prof. H. Tanaka, Research Institute of Atmospherics, Nagoya University, Ichida-cho, Toyokawashi, Aichi Prefecture 442, Japan.

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