

U.R.S.I.

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OBITUARY

JOHN ASHWORTH RATCLIFFE

1902 - 1987

It is with deep regret that we record the death on 25 October 1987 of Mr. J.A. Ratcliffe, C.B., C.B.E., F.R.S., an Honorary President of the Union,

He was born in Bacup, Lancashire, England on 12 December 1902. In October 1921 he entered Sidney Sussex College, Cambridge with an Open Scholarship. He obtained a double first class degree in physics, and in June 1924 he started research in the Cavendish Laboratory on Radio Wave Propagation, under E.V. Appleton (later Sir Edward Appleton, F.R.S., President of URSI in 1934-1952). Appleton left Cambridge in October 1924 to take up a professorship at King's College London, but he continued to direct Ratcliffe's work for the next few years. In December 1924 Appleton with M.A.F. Barnett, and with Ratcliffe's help, used a wave interference method known as the 'frequency change' method to demonstrate conclusively that radio waves are reflected from one or more layers in the upper atmosphere. They continued to use this method for studying the ionospheric layers and measuring their equivalent height.

In 1927 Ratcliffe was appointed a University Demonstrator in Physics at the Cavendish Laboratory and was elected to a Fellowship of Sidney Sussex College. He then began to build up the research group that was concerned with the physics of the ionosphere. A pulse transmitter was installed about 1932. The use of radio pulses then replaced the frequency change method and became the main method of research. But work had also started on the continuous waves or Morse code signals from commercial senders. This made it possible to use lower frequencies and to investigate the lower parts of the ionosphere. In particular a series of experiments was started with the Post Office sender GBR at Rugby, frequency 16 kHz, as the source of the waves.

When war started in 1939 Ratcliffe joined the British radar research establishment which was later known as the Telecommunications Research Establishment (T.R.E.).

In September 1940 he founded the Army Radar School where he organised the training of scientists to work with the radar equipments that were used for controlling anti-aircraft gunfire. The army operators had found these radars difficult to use, and the trained scientists were needed to keep them working. In 1941 he moved back to T.R.E. and became head of a new group known as P.D.S. (Post Design Services) that tackled the problems of taking radar equipments that had been designed in a laboratory, adapting them to work in aircraft or in the field in the hands of service personnel, and keeping them working.

In 1945 after the war Ratcliffe returned to Cambridge. There was now more space and better facilities in the Cavendish Laboratory. Work was resumed on the research topics that had been in progress before the war and several new projects were started including studies of wave interaction, the irregularities and movements of the ionosphere, the formation and structure of the F1 and F2 ionospheric layers and the behaviour of whistlers. M. Ryle (later Sir Martin Ryle, F.R.S., Astronomer Royal) had known Ratcliffe since 1939 and worked with him briefly at T.R.E. He now joined Ratcliffe's group at Cambridge but decided not to work on the ionosphere. Instead, he and his immediate colleagues started research work on Radio Astronomy, with Ratcliffe's full support.

In 1960 Ratcliffe left Cambridge to become Director of the Radio Research Station, Slough, U.K. At this time satellites were coming into use for studying the ionosphere, and the technique of "topside sounding" was a new and important part of the work at Slough. He also became interested in the magnetosphere.

He retired from the Directorship in 1966 partly because of domestic problems but also because he had been elected President of the Institution of Electrical Engineers for the year Oct. 1966 - Oct. 1967 and he was to devote his full efforts to this important office. He was editor of the Journal of Atmospheric and Terrestrial Physics from 1965 to 1976.

He was elected a Fellow of the Royal Society in 1951.

Ratcliffe served on several URSI Commissions and Committees. He attended the V General Assembly of URSI in London, in 1934, as a member of the U.K. delegation and took an active part in the discussions of Sub-Commission 1 on Ionospheric Measurements. At the VI General Assembly in Italy,

1938, he presented several papers dealing with the propagation of waves in the ionosphere. Ratcliffe was Chairman of Commission 4 on Radio Noise of Terrestrial Origin from 1952 to 1957 and, at the X General Assembly in Sydney (1952) he gave an account of the recent work on whistlers by L.R.O. Storey at Cambridge. He was Chairman of Commission 3 on Ionospheric Radio from 1960 to 1963. He was Chairman of the British National Committee in 1959. He was also Chairman of the Committee on Frequency Allocations for Scientific Purposes, and he was a member of the Committee for Space Radio Research. He was elected an Honorary President of URSI in 1966 in recognition of his outstanding contributions to URSI.

Ratcliffe's many research students and colleagues will remember his superb ability as a teacher. One of his outstanding characteristics was his extreme lucidity as a lecturer and his mastery of clear exposition in his writings. He was a leader whose death marks the end of an era in the advance of ionospheric research.

K.G. Budden

NEWS FROM MEMBER COMMITTEES

ONE-DAY SYMPOSIUM ON RADIO SCIENCE IN IRELAND

Dublin, 19th November 1987

This Symposium, the third of a series begun in October 1984, was organised by the URSI Sub-Committee of the Royal Irish Academy's National Committee for Engineering Sciences.

There were 56 participants, comprising engineers and scientists from academic, government and industrial institutions. This was a significant increase on the attendance at the previous symposia. It was especially satisfying to see so many of the participants coming from areas outside of Dublin, and particularly from Belfast.

The Symposium was considered a success by the organizers. Apart from its scientific content, it provided a cordial meeting ground for all the participants, whose interests and activities cover a wide range of aspects of radio science.

The following papers were discussed:

"Far-infrared polarimetry/interferometry diagnostics for magnetic field/electron density profiles in fusion plasmas"
Prof. M.C. Sexton, M.R.I.A., University College, Cork.

"Pioneering spacecraft observations of solar radio emissions"
Prof. S. McKenna-Lawlor, St. Patrick's College, Maynooth.

"Non-linear microwave MESFET amplifier design"
Dr. T.J. Brazil, University College, Dublin.

"Developments in radio and television broadcasting"
Mr. K. O'Donnell, Radio Telefis Eireann.

"A trans-horizon propagation experiment to assess the influence of the atmosphere between radio communication systems at frequencies above 1 GHz, across the Irish Sea"
Mr. G. Fahy, Telecom Eireann.

"The difference in HF propagation between Dublin and West Africa and Dublin and North America"
Mr. C. Hunter, Aer Lingus.

"Radio Aids in Limmology"

Dr. N.E. Evans, University of Ulster.

"Digital Telecommunications Services via Intelsat and Telecom 1 satellites"

Mr. L. Garvey, Telecom Eireann.

"System design tools for the operation of microwave/mm high-power non-linear amplifiers"

Dr. M.O. Droma, National Institute for Higher Education, Limerick.

"An Irish contribution to the development of European cellular radio networks"

Mr. J. Reilly, Motorols Ltd.

"GaAs MESFET doublers for mm-wave power"

Prof. J.A.C. Stewart, Queen's University of Belfast.

Dublin, January 1988

M.C. Sexton
Royal Irish Academy.

URSI REGISTER OF NATIONAL STANDARDS LABORATORIES

At the General Assembly in Tel Aviv (1987), Commission A on Electromagnetic Metrology adopted the following recommendation, which was endorsed by the URSI Council:

A.3 Updating of the URSI Register of National Standards Laboratories

Commission A,

considering the new arrangements for the publication of the URSI Register of National Standards Laboratories, resulting from the recommendations in Recommendation A.5 (Florence, 1984) and Recommendation A.2 (Tel Aviv, 1987);

recommends that the next updated edition of the Register should appear in 1988 and that updating should take place at intervals of four years thereafter;

instructs its Official Members to submit to the Chairman of the Working Group, by 31 December 1987 and at 4-year intervals thereafter, information updating the entry for their country in the document (or a nil return),"

Mr. A.E. Bailey, Chairman of the Working Group on National Standards Laboratories, is working on the preparation of the 1988 edition of the Register of National Standards Laboratories. All Member Committees of URSI, and in particular Official Members of Commission A, are hereby invited to cooperate in this effort, and to send the relevant information to Mr. Bailey if they have not already done so. Mr. Bailey's address is as follows:

Mr. A.E. Bailey
Foxgloves
New Valley Road
Milford-on-Sea, Lyminster
Hampshire SO4 0SA
England.

THE IMPACT OF VLBI ON ASTROPHYSICS AND GEOPHYSICS

The Symposium "The Impact of VLBI on Astrophysics and Geophysics" was held in Cambridge, Massachusetts, USA, from 10 to 15 May 1987. It was sponsored by URSI, the International Astronomical Union (IAU Symposium 129), the American Geophysical Union (AGU), and hosted by the Harvard-Smithsonian Center for Astrophysics. The Scientific Organizing Committee consisted of D. Backer (USA), N. Broten (Canada), J. Campbell (FRG), A. Caporali (Italy), W. Carter (USA), M. Cohen (USA), K. Kellermann (USA), L. Matveyenko (USSR), J. Moran (USA, Chairman), M. Morimoto (Japan), I. Pauliny-Toth (FRG), G. Setti (Italy), I. Shapiro (USA) and A. Stolz (Australia). The Local Organizing Committee consisted of N. Bartel (USA), B. Burke (USA), C. Counselman (USA), M. Gorenstein (USA), T. Herring (USA), A. Marscher (USA), M. Reid (USA, Chairman), D. Roberts (USA), A. Rogers (USA), and I. Shapiro (USA). Additional financial support was received from the National Aeronautics and Space Administration, National Science Foundation, Smithsonian Institution, Interferometrics Corporation, and Signatron Corporation. 268 participants from 23 countries attended the meeting, and 182 papers were presented, including 23 invited review papers, 45 other oral presentations, and 114 poster papers. Travel grants were provided to 45 of the participants. This Symposium was the fifth in a series of meetings concerning the scientific results of VLBI that have been held at approximately four-year intervals since 1970. Previous meetings were held in Charlottesville, VA 1970, Pasadena CA 1974, Heidelberg, FRG 1978, Bologna, Italy 1983. The present meeting was held on the twentieth anniversary of the first coherent VLBI experiments conducted in 1967 by groups in Canada and the US and also on the 100th anniversary of the discovery of radio waves by Hertz and of the Michelson-Morley experiment. There were 18 scientific sessions: 6 devoted to extragalactic astronomy; 3 to galactic astronomy; 1 to astrometry; 4 to geophysics; and 3 to instrumentation and analysis. Major topics of discussion included: superluminal radio sources; gravitational lenses; steep spectrum sources; low frequency variables, polarization; distance measurements; cosmic masers; radio stars; interstellar scattering; reference frames; plate tectonics; earth orientation; propagation effects; space VLBI; new telescopes and arrays; and image formation and processing techniques. At the end of most

sessions, time was set aside for an oral review of a group of poster papers by a knowledgeable reviewer. Excursions were made to a Red Sox baseball game; a performance by the Boston Pops orchestra; Plymouth Plantation; Haystack Observatory; and the Museum of Fine Arts. A banquet was held at the Museum of Science in Boston, in the midst of a special exhibit on Science in India that included a model of the Ooty array. The proceedings of the Symposium were edited by M.J. Reid and J.M. Moran and will be published by D. Reidel in April 1988.

J.M. Moran

XVIII INTERNATIONAL CONFERENCE ON PHENOMENA IN IONIZED GASES

The XVIII International Conference on Phenomena in Ionized Gases was held in Swansea, Wales, UK from 13 to 17 July 1987. The organization of the Conference was carried out by a Committee consisting mainly of members of the Department of Physics, University College of Swansea, but including representatives of URSI and the IEE. The Conference was sponsored by the International Union of Pure and Applied Physics, the International Union of Radio Science, the Institute of Physics, and the Institution of Electrical Engineers. There were 424 participants from 33 countries, with a further 120 accompanying persons.

Eleven General Invited Lectures, giving reviews of a broad field of interest, and twenty-six Topical Invited Lectures, giving specialised reviews of topics within the Subject Areas were presented by speakers nominated by the International Scientific Committee of the Conference who were responsible for the scientific content of the programme. There were 434 Contributed Papers presented in 8 poster sessions. The scientific programme covered all aspects of ionization phenomena in gases and plasmas with special emphasis on moderate-temperature plasmas in which atomic physics processes are important. The subject areas were:

- (1) Kinetics, thermodynamics and transport phenomena.
- (2) Waves and instabilities including self-organization processes.
- (3) Interactions of plasmas with particle and laser beams.
- (4) Plasma in space.
- (5) Physical aspects of plasma chemistry and plasma processing of surfaces.
- (6) Non-ideal plasmas.
- (7) Elementary processes.
- (8) Electrode and surface effects.
- (9) Ionization growth and transition to breakdown.
- (10) Low pressure glows, radio frequency, high frequency and microwave discharges.
- (11) Coronas, sparks and high pressure glows.
- (12) Arcs.
- (13) Numerical modelling.
- (14) Laser-induced discharges.
- (15) Discharges for generation of laser radiation.
- (16) Generation and dynamics of plasma flows.
- (17) Plasma spectroscopy (including laser-induced fluorescence).
- (18) Diagnostic methods.

Topic (2) in the subject areas attracted the greatest number of contributed papers with 66 contributions.

The Conference fee of £130 was reduced to £95 for students, and eleven participants received grants from the British Council, thereby enabling them to attend. Five further participants were given financial assistance by the Organising Committee from sponsorship funds provided for the Conference by C.E.G.B. and Culham Laboratory.

The Proceedings are published in two hardbacked Volumes. Volume I contains the Contributed Papers and Volume II the Invited Lectures. The cost for the set of two volumes is £80, and can be obtained from:

Adam Hilger; Publishers
Techno House
Redcliffe Way
Bristol BS1 6NX
United Kingdom.

W.T. Williams
Secretary, Local Organising
Committee

ANNOUNCEMENTS OF MEETINGS AND SYMPOSIA

INTERNATIONAL SCHOOL ON ATMOSPHERIC RADAR (ISAR)

24 - 28 November 1988, Kyoto, Japan

The Radio Atmospheric Science Centre of Kyoto University will hold an International School on Atmospheric Radar (ISAR) just before the Fourth Workshop on Technical and Scientific Aspects of MST Radar to be held at the same place from 29 November to 2 December 1988.

Radar techniques provide a very powerful means of studying atmospheric dynamics. Many such radars have already been operational around the world, and several new ones are under construction. Networks of such radars are beginning to provide inputs to meteorological research and prototype prediction experiments.

The objective of ISAR is to provide an international learning environment for scientists and engineers who are new to this field.

ISAR is cosponsored by SCOSTEP, URSI, the Society of Geomagnetism and Earth, Planetary and Space Sciences, and the Meteorological Society of Japan.

Invited speakers will give tutorials on the topics outlined below. The tutorial outline will be published in the ISAR Monograph prior to the School.

- I. Historical Aspects of Radar Atmospheric Science
- II. Radar Techniques, Control and Signal Processing
 - (a) Radar Tutorial
 - (b) Radar Control and Hardware
 - (c) Data Acquisition and Processing
 - (d) Spectral and Correlation Analysis
 - (e) Target Parameter Estimation
 - (f) Data Validation and Analysis
- III. Theory, Practice and Applications
 - (a) Lower and Middle Atmosphere

- (b) Meteorological Research Applications
- (c) Ionosphere

IV. Discussion and Conclusions.

The International Organizing Committee is composed as follows: S. Kato (Chairman), S. Fukao, C.H. Liu, P.K. Rastogi, and J. Röttger.

Scientists and engineers who are interested in attending ISAR and wish to receive further notification are asked to write to:

Dr. S. Fukao
Secretary to ISAR
RASC, Kyoto University
Uji, Kyoto 611
Japan.

(Phone) 774-32-3111
(Fax) 774-31-8463
(Telex) 5453665 RASCKU J.

The final announcement including the registration form will be sent out in June 1988.

URSI INTERNATIONAL SYMPOSIUM

ON ELECTROMAGNETIC THEORY

14-17 August 1989, Stockholm, Sweden

This Symposium, which is one of the activities of Commission B "Fields and Waves" of URSI, will cover progress in all areas of electromagnetic theory. It is organized in cooperation with the Swedish URSI Committee (SNRV) and the Royal Institute of Technology (KTH).

Technical Programme

Contributions which describe recent and original results concerning new methods and/or applications are invited in all

areas of electromagnetic theory. Included are areas such as:

- 1) General scattering and diffraction
- 2) Inverse scattering
- 3) Numerical techniques
- 4) Transient fields
- 5) High frequency techniques
- 6) Guided waves
- 7) Antennas and arrays
- 8) Propagation in random, inhomogeneous and non-linear media.

In particular, the Technical Programme Committee encourages contributions on the following topics:

- a) scattering by fractals
- b) catastrophe theory and rays
- c) non-linear electromagnetics (including non linear optics)
- d) differential geometric methods in electromagnetics

which could be the subject of special sessions.

Technical Programme Committee

The Technical Programme Committee includes the following:

T.B.A. Senior (USA), Chairman	D.L. Jaggard (USA)
J. Bach Andersen (Denmark)	A.D. Olver (UK)
C.M. Butler (USA)	S. Ström (Sweden)
F. Gardiol (Switzerland)	P.M. van den Berg (Netherlands)

Abstracts

Authors are requested to submit a title and a full page Abstract in English before 15 November 1988.

The Abstract should explain clearly the content and relevance of the proposed contribution. References and/or figures may be included. The time available for presentation of a contributed paper will be 20 minutes, plus 5 minutes for discussion and questions. Notice of acceptance will be mailed to authors before 15 February 1989.

Authors of accepted papers will be asked to prepare a photo-ready manuscript, which will be printed in the Proceedings of the Symposium. The deadline for this is planned to be 15 April 1989.

All Abstracts should be sent to

URSI EM Theory Symposium 1989
Congrex AB
Box 5619
S - 114 86 Stockholm
Sweden.

Organizing Committee

The Organizing Committee is composed of S. Ström,
Chairman, G. Kristensson, A. Karlsson, G. Larson, G. Peterson.
The address is as follows:

Prof. S. Ström
Department of Electromagnetic Theory
Royal Institute of Technology
S - 100 44 Stockholm
Sweden.

Telephone: (46-8) 790 81 95.

MICROWAVE TECHNOLOGY AND OPTICAL COMMUNICATIONS

10th National Scientific and Technical Conference
with International Participation
26-28 May 1988, Varna, Bulgaria

The Conference will cover the following topics:

- Physical principles of microwave theory and technology;
- Microwave components, circuits and equipment parts;
- Radar and navigation technology;
- Radiolink systems and land-based microwave communications;
- Space communications and radio and TV broadcasting;
- Remote sensing and applications;
- Microwave antennas;
- Microwave propagation and EMC;
- Microwave measurements;
- Industrial, medical and biological applications; microwave power equipment;
- CAD-CAM in microwave technology;
- Optoelectronic components and optoelectronic equipments;

- Optoelectronic measurements;
- Optical communications.

The Chairman of the Programme Committee is Professor Ch.D. Tihtchev. The working languages of the Conference will be English, Bulgarian and Russian, with simultaneous translation.

All the enquiries concerning the Conference should be addressed to:

Faculty of Communication Technology
Chair "Radiotechnika"
Room 1440 for X NSTC, MTOC'88
Darvenitza, VMEI - Sofia
1156 Sofia, Bulgaria.

BEIJING INTERNATIONAL SYMPOSIUM ON ELECTROMAGNETIC FIELD
IN ELECTRICAL ENGINEERING

This Symposium will be held in Beijing, China from 19 to 21 October 1988. It is sponsored by the Chinese Electro-technical Society, and organized by the Institute of Electrical Engineering of the Academia Sinica.

The aim of this Symposium is to act as a forum for scientists and engineers engaged in research and design of electromagnetic devices. The programme will cover the following topics:

- (1) Electric and magnetic fields in electrical machines, transformers and other electromagnetic devices
- (2) Method of analysis and computation of electromagnetic field
- (3) Theory and application of time-varying electromagnetic field
- (4) Material properties
- (5) Numerical techniques, software and CAD for electromagnetics
- (6) Electromagnetic fields coupled to other fields.

The official language of the Symposium will be English.

The deadline for submission of abstracts is 30 April 1988.

For further information, contact:

Institute of Electrical Engineering
Academia Sinica
P.O. Box 2703
Beijing, China.

Telephone: 281863

Telex : 22789 KHZBC (to Inst. of E.E.).

INTERNATIONAL SYMPOSIUM ON ANTENNAS (JINA' 88)

8 - 10 November 1988, Nice, France

The International Symposium on Antennas is organized by CNET-PAB Centre de la Turbie, the Laboratory of Electronics of the University of Nice, SEE, the French URSI Committee and IEEE. The International Technical Programme Committee is chaired by M. D. Lombard.

The following topics are suggested in the Call for Papers:

- EM theory applied to antennas
- Numerical and asymptotic techniques
- Scattering and diffraction
- Inverse scattering
- Antenna synthesis
- Feeds and radiating elements
- Reflector antennas
- Shaped reflectors
- Selective surfaces
- Unfurlable antennas
- Earth station antennas
- Wideband antennas
- Millimeter wave antennas
- Microstrip antennas
- Active antennas
- Mobile antennas
- Array antennas
- Antenna measurement techniques
- Microwave and millimeter measurements

- EM measurements using satellites
- Environmental effects on antennas
- Industrial applications
- Medical applications.

Time Table

Deadline for submission of summaries.....30 April 1988
Notification of accepted papers.....31 May 1988
Deadline for submission of completed papers..31 July 1988

The working languages will be French and English, with simultaneous translation.

For further information, apply to:

Secrétariat JINA'88
CNETPAB Centre de la Turbie
F - 06320 Cap d'Ail
France.

Telephone: M. Guiraud (33-93) 41 15 30
(33-93) 41 17 17.

SOLAR-TERRESTRIAL PREDICTIONS WORKSHOP

The next Solar-Terrestrial Predictions Workshop, organised by the International Ursigram and World Days Service (IUWDS), will be held in Sydney, Australia from 18 to 22 September 1989. It follows the very successful predictions workshops in Boulder (L979) and Meudon (1984). Discussions suggest that the Workshop will retain the basic format used in previous Workshops. It will consist of the following Working Groups:

- Long-term solar forecasting
- Medium-term solar forecasting
- Short-term solar forecasting
- Geomagnetic activity forecasting
- Ionospheric prediction

- General topics
- Forecasters Working Group.

For further information, contact:

Dr. Richard Thompson
Chairman of IUWDS
Sydney Regional Warning Centre
IPS Radio and Space Services
P.O.Box 702
Darlinghurst 2010
Australia.

Note: The activities of the International Ureigram and World Days Service (IUWDS) were described in the 1986 Report of the Chairman, published in URSI Information Bulletin No240, page 75.

XX GENERAL ASSEMBLY OF THE INTERNATIONAL

ASTRONOMICAL UNION

The International Astronomical Union (IAU) will hold its XX General Assembly in Baltimore, USA, during the period 2-11 August 1988.

It is expected that many of the 6000 individual members of IAU and official representatives of Adhering Organisations in about 50 countries will attend this most important event for the Union. In addition to the administrative programme, the General Assembly will feature several hundred scientific meetings of IAU Commissions, dealing with all aspects of astronomy and astrophysics. The highlights will be a number of Invited Discourses by eminent scientists and so-called Joint Discussions during which major scientific problems of great actuality will be discussed in detail. Ongoing international cooperative programmes will be reviewed and new ones will be initiated.

Further information may be obtained from:

IAU Secretariat, 61 avenue de l'Observatoire, F-75014 Paris,
France.

URSI INTERNATIONAL SYMPOSIUM ON SIGNALS, SYSTEMS

AND ELECTRONICS (ISSSE'89)

18 - 20 September 1989, Erlangen, Fed. Rep. of Germany
Universität Erlangen - Nürnberg

The International Symposium on Signals, Systems and Electronics is the first of a series of triennial international symposia promoted and organized by URSI Commission C "Signals and Systems" and Commission D "Electronic and Optical Devices and Applications". Its aim is to cover all fields of activities of the two Commissions and to promote the exchange of research results between scientists and engineers working in these multidisciplinary fields. Sessions will include regular, invited and tutorial papers. English is the official language of the Symposium. It is intended to supplement the Symposium by a Technical Exhibition. The Symposium is open to all aspects of Signals, Systems and Electronics particularly

Signal and Information Theory

- Analysis, synthesis and modelling
- Detection and estimation
- Modulation and coding

System Theory and Applications

- Adaptive, nonlinear and chaotic systems
- Communications systems (including speech, video and mobile systems)

Electronic Devices and Applications

- Materials and devices
- Signal processing circuits

Optical Devices and Applications

- Transmitters and receivers
- Signal transmission and processing

CAD for Devices and Circuits

- Device modelling and process simulation
- CAD for microelectronic circuits

Prospective authors are encouraged to submit papers to the conference secretary after the "First Call for Papers" planned for March 1988. Accepted papers will be published in the Conference Proceedings.

Steering Committee

General Chairman: H.W. Schüssler, Universität Erlangen-Nürnberg

Vice-Chairmen: T. Okoshi, University of Tokyo
Chairman of Commission D
R. Saal, Technische Universität München
Chairman of Commission C

Technical Programme: J.W. Klein, Ruhr-Universität Bochum
Representative of Commission D, FRG
D. Wolf, J.W. Goethe-Universität,
Frankfurt
Representative of Commission C, FRG

Publicity: Ms J. Hénaff, CNET, Paris
Vice-Chairman of Commission D
P.A. Matthews, University of Leeds
Vice-Chairman of Commission C

Finance: B. Bosch, Ruhr-Universität Bochum

Publications: W. Entenmann, Technische Universität München

Secretary: Ms. U. Arnold
Lehrstuhl für Nachrichtentechnik
Universität Erlangen-Nürnberg
Cauerstr. 7, D-8520 Erlangen
Fed. Rep. of Germany
Tel. +49 (9131) 857100.

6TH SCIENTIFIC ASSEMBLY OF THE INTERNATIONAL ASSOCIATION

OF GEOMAGNETISM AND AERONOMY

The 6th Scientific Assembly of IAGA will be held at Exeter University, United Kingdom, from 24 July to 4 August 1989.

A full programme of scientific sessions is planned, covering:

- Internal magnetic fields
- Aeronomic phenomena
- Magnetospheric phenomena
- Solar wind and interplanetary magnetic field
- Observatories, instruments, surveys, and analysis
- History of geomagnetism and aeronomy
- Geomagnetism and aeronomy in developing countries.

Further information available from:

Dr. Roy Jady
IAGA 1989 Organizing Secretary
Department of Mathematics
University of Exeter
Exeter EX4 4QE
United Kingdom.

4TH EUROPEAN SIGNAL PROCESSING CONFERENCE

(EUSIPCO - 88)

5-8 September 1988, Grenoble, France

The European Signal Processing Conference is a biennial international conference promoted and organised by EURASIP, the European Association for Signal Processing, in cooperation with other scientific and technical organizations. The aim of EUSIPCO-88 is to cover all aspects of signal processing theory and practice and to promote the exchange of ideas between scientists and engineers working in the same field.

The President of the Honorary Committee is Prof. A. Blanc-Lapierre, and the Conference Chairman is Prof. J.L. Lacoume.

Sessions will include tutorial and review papers, new research results, applications, posters and outstanding technological results. The conference is open to all aspects of signal processing, including:

Theory of signals and systems:

Modelling, detection, estimation, spectral analysis, adaptive filtering

Mono and multi-dimensional processing:

Array and image processing, speech, coding, digital filtering

Signal interpretation:

Semantics, artificial intelligence, experts systems

Applications:

Biomedical, radar, sonar, vibrations, geophysics, communications, astrophysics, robotics...

Hardware and software:

VLSI, general purpose processors, ASIC, novel architectures, languages.

Further information available from:

EUSIPCO-88 Conference Secretariat
CEPHAG-ENSIEG
B.P. 46
F-38402 St-Martin d'Hères Cedex
France.

Telephone:(33-76) 51 83 41
Telex: 320 205 F
Fax: (33-76) 42 04 90.

IAU Colloquium No 112

LIGHT POLLUTION, RADIO INTERFERENCE, AND SPACE DEBRIS

The Increasing Environmental Impacts on Observational Astronomy

This Colloquium will be held at the Omni Shoreham Hotel, Washington D.C., USA, from 13 to 16 August 1988. It is sponsored by Commission 50 (The Identification and Protection of Existing and Potential Observatory Sites), with the co-sponsorship of Commission 21 (Light of the Night Sky) and Commission 40 (Radio Astronomy) of the International Astronomical Union. Co-sponsoring international organizations include: URSI, COSPAR and the Commission Internationale de l'Eclairage.

Because man-made interference seriously threatens astronomical observations of priceless scientific value, astronomers and other scientists are organizing this Colloquium to discuss the problem and potential solutions, raise public awareness, and call for appropriate action to safeguard the operation of observatories on earth and in space.

Background of the Colloquium:

- Most existing observatories are already suffering from light pollution, radio interference, or effects of space debris.
- Observatories in space, built at great cost, may be seriously affected by orbital debris or other man-made space pollution.
- The environmental threat to observatories is rapidly increasing.
- The spectacular beauty of the cosmos is fading for all people, not just scientists, as light pollution destroys our view of the inspiring night sky.

Discussion Topics:

- Status and history of light pollution, radio interference, and orbital debris ("space junk").
- Impacts of environmental deterioration on scientific research.
- Effects on amateur astronomy and on the nighttime environment.
- Predictions of the future scope of the problem unless protective actions are taken.
- Reactions to the problem by governments, local, state, and national; by international organizations; by the outdoor

lighting profession; by the general business community; and by organizations active in using and protecting radio frequencies.

- Implications for energy conservation.
- Legal ramifications.
- Needs for further studies of the issues.
- Proposed recommendations and solutions.

It is not necessary to be a member of the IAU in order to attend an IAU Colloquium. The registration fee will be \$80 if payment is made before 20 May 1988. After this date, it will be \$100.

The Chairman of the Scientific Organizing Committee is Dr. David L. Crawford, and the Chairman of the Local Organizing Committee is Dr. Tomas Gergely.

For further information, contact:

Dr. David L. Crawford
Kitt Peak National Observatory
P.O.Box 26732
Tucson AZ 85726, USA.
Phone: 602-325-9346
Telex: 0666-484 Aura Noao Tuc
E-Mail: dcrawford.NOAO.ARIZONA.EDU,

or

Dr. Tomas Gergely
Div. Astron. Sc.
National Science Foundation
1800 G Street, N.W.
Washington D.C. 20550, USA.
Phone: 202-357-9696
E-Mail: tgergely.note.nsf.gov.

COOPERATION BETWEEN URSI AND THE INTERNATIONAL
TELECOMMUNICATION UNION (ITU)

SUBMISSION OF NEW QUESTIONS BY THE INTERNATIONAL FREQUENCY
REGISTRATION BOARD (IFRB)

The International Frequency Registration Board has submitted four new Questions to the CCIR and other participants in its work. These Questions, which have been forwarded to URSI by the Director of CCIR are reproduced below for the information of the URSI community. The Chairmen of URSI Commissions and the members of the URSI-CCIR-CCITT Liaison Committee have received the text earlier, and any reactions should be directed to the URSI Secretariat in Brussels.

Question 78/8

COORDINATION BETWEEN AN EARTH STATION AND MOBILE
STATIONS IN THE MOBILE SERVICES

(1987)

The International Frequency Registration Board (IFRB),

considering

- (a) the provisions of No.326 of the International Telecommunication Convention (Nairobi, 1982);
- (b) that the present Appendix 28 to the Radio Regulations does not contain the sharing criteria to be used for coordination between an earth station of the fixed-satellite service, the maritime mobile-satellite service, the aeronautical mobile-satellite service or the land mobile-satellite service on the one hand and a mobile station of the land mobile service, the maritime mobile service or the aeronautical mobile service on the other hand;
- (c) that the Board, in its day-to-day application of provisions of the Radio Regulations, encounters cases involving stations of the space and terrestrial services mentioned in (b) above and as such urgently needs guidance from the CCIR on a method to be used to determine the coordination area in such

cases,

requests the CCIR urgently to study the following question:

1. what characteristics should be used for the terrestrial mobile stations (land, maritime and aeronautical) to calculate a coordination area involving these stations;
2. what method should be used to identify administrations, the services of which may be affected when terrestrial mobile stations (ship or aircraft or a vehicle on land) and ship earth stations, aircraft earth stations or land earth stations are operating in the same area?

Question 79/8

USE OF STEERABLE SPOT BEAMS BY SPACE STATIONS
IN THE GEOSTATIONARY-SATELLITE ORBIT

(1987)

The International Frequency Registration Board (IFRB),

considering

- (a) the provisions of No 326 of the International Telecommunication Convention (Nairobi, 1982);
- (b) the inadequacy of suitable technical guidance to consider the interference potential created by the use of steerable spot beams from a space station on a geostationary-satellite orbit;
- (c) the urgent need of the IFRB to have such a guidance to enable it to treat cases of steerable spot beams used by such space stations within the framework of Appendix 29 to the Radio Regulations,

requests the CCIR:

urgently to study the method to be used to calculate interference between satellite networks in which the space stations on the geostationary-satellite orbit use steerable spot beams.

Question 80/8

SHARING BETWEEN THE EARTH EXPLORATION-SATELLITE SERVICE
OR THE METEOROLOGICAL-SATELLITE SERVICE ON THE ONE HAND AND
OTHER SPACE SERVICES OR THE METEOROLOGICAL AIDS SERVICE ON
THE OTHER

(1987)

The International Frequency Registration Board (IFRB),

considering

- (a) the provisions of No 326 of the International Telecommunication Convention (Nairobi, 1982);
- (b) that Question 12-2/2 and Study Programmes 12A-2/2, 12B-1/2, 12C/2 and associated Reports and Recommendations do not provide the necessary information for the application of Appendices 28 and 29 to the Radio Regulations to frequency assignment notices to space or earth stations in the Earth exploration-satellite service and the meteorological-satellite service when the Board has to examine them with respect to the provisions of No 1060 and No 1107 of the Radio Regulations, as well as in cases where the Board has to apply other procedures, such as the procedure of Article 14, to these notices;
- (c) that in view of the urgency to treat the concerned frequency assignment notices, the Board adopted provisional Rules of Procedure in these cases (see Note);
- (d) that it is necessary for the Board to develop its Technical Standards to have the required information through appropriate Recommendations of the CCIR (see No 1582 of the Radio Regulations),

requests the CCIR:

to study the parameters which need to be used in application of Appendices 28 and 29 to the Radio Regulations when the Earth exploration-satellite service or the meteorological-satellite service shares the same frequency bands with the meteorological aids service or with other space services.

Note - The provisional Rules of Procedure have been published in Documents 2/39, 4/129, 8/27, 9/136, IFRB (1986-1990) (available from Secretariat or CCIR).

Question 81/8

COORDINATION AREA OF AN EARTH STATION OF THE FIXED-SATELLITE
SERVICE SHARING THE SAME FREQUENCY BAND WITH
WITH THE RADIONAVIGATION SERVICE

(1987)

The International Frequency Registration Board (IFRB),

considering

- (a) the provisions of No 326 of the International Telecommunication Convention (Nairobi, 1982);
- (b) that Question 17-1/9, Question 32/4, related Study Programmes 17E/9 and 17F/9 and 32A/4, 32B/4 and 32C/4, as well as the associated Reports and Recommendations of the CCIR, do not provide information permitting the application of the method of Appendix 28 to the Radio Regulations to calculate the coordination area of an earth station in the fixed-satellite service sharing the same frequency band with the radionavigation service;
- (c) that in view of the urgency to treat the concerned frequency assignment notices, the Board adopted provisional Rules of Procedure in these cases (see Note);
- (d) that it is necessary for the Board to develop its Technical Standards to have the required information through appropriate Recommendations of the CCIR (see No 1582 of the Radio Regulations),

requests the CCIR:

to study the situation of sharing referred to above and provide, as soon as possible, the parameters of the radionavigation service to be taken into account in applying the method described in Appendix 28 to the Radio Regulations in such a case.

Note - The provisional Rules of Procedure have been published in Documents 4/130, 8/28, 9/137, IFRB (1986-1990).
(available from Secretariat or CCIR).

INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS

The December issue of the ICSU Newsletter *Science International* contains an article entitled "Rome meeting sets programmes and priorities". This is reproduced below.

Despite an expected budget deficit of \$122,000 in 1988, the meetings of the General Committee and other bodies in Rome from 26 October to 1 November made it clear that the International Council of Scientific Unions will not only continue to expand its activities in the year to come but that it will support some major new initiatives as well.

The week-long programme provided time for housekeeping, information sessions, management reports, open discussion and social events. Complete reports on the proceedings are available from the ICSU Secretariat but we have selected the points below as being of special interest to the readers of *Science International*.

Global Change: the International Geosphere-Biosphere Programme is underway with the establishment of eight working groups and panels and a central office at the Royal Swedish Academy headquarters in Stockholm. Thomas Rosswall, Executive Director of the IGBP, reported that national committees for the study of global change have been set up in eleven countries already (Australia, Chile, France, Hungary, Israel, Netherlands, South Africa, Sweden, Switzerland, United Kingdom and the USA) and more are expected. Among the main tasks ahead are those of identifying research objectives; organizing a coherent network out of professional, national and international efforts; and, finally, fund-raising to supplement the seed money provided by ICSU, the Swedish Government, the Mellon Foundation and others.

International Space Year (ISY) 1992: ICSU has given its blessing to this project which will highlight the contributions of space sciences to human progress and will convey through a series of specific events, the exciting opportunities that space exploration offers. The proposed central theme for the ISY is "Understanding and Utilizing Space for Humanity".

At its October meeting the Executive Board of ICSU heard a detailed report from Dr. Richard West about the recommendations of the Ad hoc Group set up in 1986 under his chairmanship on the possible role of ICSU and ICSU members in the ISY, and decided to create a Coordinating Committee for the planning of the ISY. This Committee will be composed of representatives of: COSPAR, CTS, COSTED, SCGB, the International Astronautical Academy, the International Astronautical Federation, the International Agency Consultative Group, the International Association of Universities and the International Science Writers' Association. The principal tasks of the Coordinating Committee will be to agree on the overall objectives of the ISY and to define its operational modes, notably in the areas of space projects and public education activities.

The Coordinating Committee will also propose a schedule of activities in the period prior to 1992 and recommend a management structure for the ISY. The Committee will report to the 1988 General Assembly with suggestions for further action to be undertaken by ICSU and its members.

World Climate Programme: presentations about this Programme and ICSU's role as a joint sponsor (with the World Meteorological Organization) of the World Climate Research Programme (WCRP) were made by J.C.I. Dooge, B.J. Mason and P. Morel. The World Climate Programme has three general objectives:

- to aid nations in the application of climatic data and present knowledge of climate to the planning and management of all aspects of man's activities;
- to improve significantly the present knowledge of climate and to understand more fully the relative roles of the various influences on climate;
- to provide the means to foresee possible future changes of climate and warn of potential man-made changes that might be adverse to the well-being of humanity.

The World Climate Research Programme provides the scientific input for achieving these aims. Its objectives are threefold:

- to establish the physical basis of long-range weather prediction;
- to understand the predictable aspects of global climate

variations over periods of several months to several years;
- to assess the response of climate to natural or man-made influences over periods of several decades.

It was agreed that ICSU should continue to support the World Climate Research Programme.

Toxic Waste Disposal: the ICSU General Assembly of 1984 established a Special Committee on Toxic Waste Disposal. A draft report was prepared by the Committee under the chairmanship of J.M. Harrison and was discussed at the 1986 General Assembly in Berne. The final report was circulated during August 1987. ICSU has now recommended that SCOPE (Scientific Committee on Problems of the Environment) keep an eye on developments concerned with the disposal of hazardous wastes, and that it report back to ICSU from time to time. If necessary, further studies can be carried out later.

Solar Terrestrial Energy Programme (STEP): this project proposed by the Scientific Committee on Solar-Terrestrial Physics (SCOSTEP) has been endorsed by ICSU. Its main goal will be to advance the quantitative understanding of the coupling mechanisms that are responsible for the transfer of energy and mass from one region of the Sun-Earth system to another. A STEP Steering Committee has been established to help define the specific research aims of the programme for the 1990-1995 period, which will involve ground-based, aircraft, balloon and rocket experiments; theory, simulation and modelling studies; and dedicated data and information systems.

A special Symposium on "STEP: Major Scientific Problems" will be held on 23 July 1988 during the next COSPAR meeting in Helsinki, Finland. At that time working groups will be established and a preliminary research plan drawn up.

Reviews: the proposal for a World Digital Database for Environmental Science will be re-examined after the 1988 meeting on Global Data Base Planning. Also in 1988, there will be reviews of the Committee on Biotechnology (COBIOTECH), the Committee on Genetic Experimentation (COGENE), the Inter-Union Commission on the Application of Science to Agriculture, Forestry and Aquaculture (CASAFA) and the International Biosciences Networks (IBN).

New Members: the General Committee accepted applications for

associate status from the International Institute for Applied Systems Analysis (IIASA) and the International Union of Toxicology (IUTOX).

The next meeting of the General Committee will take place in Beijing on 9 September 1988 during the week preceding the ICSU General Assembly.

INTERNATIONAL UNION OF CRYSTALLOGRAPHY

Note: The International Union of Crystallography (IUCr) has issued an announcement of a Logo Design Contest, and asked ICSU and the other International Unions to give the contest as much publicity as possible.

LOGO DESIGN CONTEST

Prize: US\$ 1000 in IUCr publications
or US\$600 in cash, as chosen by the winner

Entries are invited for the design of a LOGO for the International Union of Crystallography.

Conditions

- (1) All designs must be received by the

IUCr Logo Committee
c/o Prof. Kaarle Kurki-Suonio
Department of Physics
University of Helsinki
Siltavuorenpenger 20 D
SF-00170 Helsinki, Finland.
Telephone: 358 0 650211
Telex: 122229 nuphu sf
Telefax: 358 0 656591

on, or before, the closing date of 15 July 1988.

(2) The selection of the winning logo will be the responsibility of the IUCr Logo Committee subject to the approval of the Executive Committee. The winning entrant will be informed directly and the winner's name will be published in *Acta Crystallographica* and *Journal of Applied Crystallography*.

(3) Each entrant is limited to a maximum of three designs.

(4) The logo suggestion should be transmitted by registered mail and must be submitted under a pseudonym. The entrant's real name and address must be supplied in a sealed envelope, which will be opened only in the case of the winner, when the

decision has been made. The entries will not be returned after the competition.

(5) The designs should be drawn on sheets not larger than the standard A3 size (29.7 cm x 42.0 cm).

(6) No correspondence will be entered into after the closing date. Enquiries prior to the closing date should be directed to any of the members of the Logo Committee: Prof. Kaarle Kurki-Suonion (address above), Prof. Sydney R. Hall (Telephone: 380 2725 or 380 2738. Address: Crystallography Centre, University of Western Australia, Nedlands, Western Australia 6009, Australia) or Dr. Moreton Moore (Telephone: 0784 39941, Telex 935504. Address: Department of Physics, Royal Holloway and Bedford New College, University of London, Egham, Surrey TW20 OEX, England).

(7) The winning logo will become the sole property of the IUCr and may not be used, printed or copied for any purpose without the express written permission of the Executive Committee.

(8) The IUCr reserves the right to buy any of the designs for other purposes, for example for the basis of the logos of the IUCr Congresses.

(9) The Committee reserves the right to contact the entrant with recommended changes to a submitted logo prior to the announcement of the winner.

Information

The Logo will be used for IUCr publications, letter-heads, brochures and other purposes as may be decided by the Executive Committee. The logo may depict or represent any aspect of the field of crystallography or of the IUCr. In the past, logos for crystallographic conferences have tended to represent some aspect of crystals, symmetry or diffraction - subjects which are fundamental to crystallography. The logo may contain the initials I U Cr, but this is not essential. Use of colour is allowed, but more than two colours is discouraged and the main use of the logo will be in black and white.

BOOKS PUBLISHED BY URSI PERSONALITIES

F.E. GARDIOL (President of the Swiss URSI Committee)

Lossy Transmission Lines

published by Artech House, Inc. Norwood, MA, USA,
1987, 475 pages.
ISBN: 0-890006-198-X.

D. POZAR (Recipient of the Issac Koga Gold Medal 1987)

Antenna Design Using Personal Computers

published by Artech House, 1985, 141 pages.

LIST OF FUTURE SYMPOSIA AND MEETINGS

Addition to List published in
"URSI Information Bulletin" No 243

Page 123, complete entry as follows:

19th International Conference on Phenomena in Ionized Gases
(ICPIG-XIX) *
Belgrade, Yugoslavia, 10-14 July 1989.

Contact address: Prof. J. Purić
Department of Physics and Meteorology
P.O. Box 550
11001 Belgrade, Yugoslavia.
Telephone: (38 + 11) 63 01 52.

LIST OF URSI OFFICERS AND OFFICERS OF MEMBER COMMITTEES: AMENDMENTS

Amendments to the List published in No 243 (December) of the "URSI Information Bulletin" are listed below.

1. Member Committees

CHINA (CIE, Beijing)

Secretary: Prof. Sha Zong, Academy Advisor of the China Research Institute of Radio Propagation and Vice-Secretary General of the Chinese Institute of Electronics, P.O. Box 139, Beijing, China.

SOUTH AFRICA

President: Dr. A.W.V. Poole, Hermann Olthaver Institute for Aeronomy, Rhodes University, P.O.Box 94, Grahamstown, 6140, South Africa.

2. Commissions

Commission A on Electromagnetic Metrology

Australia: Dr. P.I. Somlo, Senior Principal Research Scientist, CSIRO Division of Applied Physics, P.O.Box 218, Lindfield, NSW 2070, Australia.

Germany, F.R.: Dr. K. Dorenwendt, Physikalisch-Technische Bundesanstalt, Bundesallee 100, D-3300 Braunschweig, FRG.

Commission B on Fields and Waves

Australia: Dr. J.G. Lucas, Reader in Electrical Engineering, University of Sydney, Sydney, NSW 2006, Australia.

Germany, F.R.: Prof. Dr. K.J. Langenberg, Gesamthochschule Kassel, Fachbereich Elektrotechnik, Wilhelmshöher Allee 73, D-3500 Kassel, FRG.

Commission C on Signals and Systems

Germany, F.R.: Prof. Dr. D. Wolf, Institut für Angewandte Physik, Universität Frankfurt, Robert-Meyer-

Strasse 2-4, D-6000 Frankfurt 1, FRG.

Commission D on Electronic and Optical Devices and Applications

Australia: Dr. D.J. Skellern, Senior Lecturer, School of Electrical Engineering, University of Sydney, NSW 2006, Australia.

Commission E on Electromagnetic Noise and Interference

Australia: Dr. J.G. Lucas, University of Sydney, Sydney, NSW 2006, Australia.

China (CIE, Beijing): Dr. Gao You-gang, Beijing Institute of Posts and Telecommunications, Beijing, China.

Commission F on Wave Propagation and Remote Sensing

Australia: Dr. J.G. Lucas, University of Sydney, Sydney, NSW 2006, Australia.

China (CIE, Beijing): Dr. Hu Da-zhang, Qing-dao Research Centre, China Research Institute of Radio Propagation, 18 A, Qi-dong Road, Qingdao, China.

Commission H - Waves in Plasmas

Australia: Dr. J.G. Lucas, University of Sydney, Sydney, NSW 2006, Australia.

Commission J on Radio Astronomy

Australia: Dr. R.N. Manchester, CSIRO Division of Radio-physics, P.O. Box 76, Epping, NSW 2121, Australia.

Germany, F.R.: Dr. K.-W. Sieber, Max-Planck-Institut für Radioastronomie, Auf dem Hügel 69, D-5300 Bonn 1, FRG.

3. URSI-CCIR-CCITT Liaison Committee

Representing Commission J: Prof. R.H. Frater (Australia)
Dr. B.J. Robinson (Australia)

4. Temporary change of address

WERNIK, Dr. A.W. (Vice-Chairman, Commission G)

Department of Electrical and Computer Engineering
University of Illinois at Urbana-Champaign
1406 West Green Street
USA.

Telex: 5101011969 ui telcom urud.

From 7 February to 15 August 1988.

5. Change of address

KAUFMANN, Prof. P. (Secretary, Brazilian URSI Committee)

Universidade de Sao Paulo
Escola Politécnica, PTR,
Caixa Postal, 61548
05508 Sao Paulo, SP
Brazil.

MOPFOUMA, Dr. F. (Member, Standing Committee on Developing
Countries)

Avions Marcel Dassault
Bureau d'Etudes Electricité
78 quai M. Dassault
F-92214 Saint-Cloud
France.

