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# U. R. S. I.

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## TABLE DES MATIÈRES — CONTENTS

	Pages
NEIL M. BRICE .....	3
R. P. ERNESTO GHERZI S. J. ....	4
ROBERT NAISMITH .....	4
ROBERT ALEXANDER WATSON-WATT .....	5
NEWS OF MEMBER COMMITTEES .....	7
URSI AWARDS 1975 .....	7
1. COMMISSION I AND THE GENERAL ASSEMBLY; 2. THE GENERAL ASSEMBLY AS AN OPEN SYMPOSIUM, H. M. ALTSCHULER .....	10
TIME : CAGLIARI 1974 .....	15
II EUROPEAN REGIONAL MEETING IN ASTRONOMY .....	15
MICROWAVE 1974 .....	16
SCATTERING AND EMISSION OF RADIATION FROM THE EARTH .....	17
BEACON SATELLITES .....	17
GUGLIELMO MARCONI CENTENARY CELEBRATIONS .....	18
FIFTY YEARS OF THE IONOSPHERE .....	18
ANTARCTIC AND SOUTHERN HEMISPHERE AERONOMY YEAR (ASHAY)	20
SOLAR EVENTS : AUGUST 1972 .....	21
DATA ON SOLAR-TERRESTRIAL PHYSICS .....	21
NEW SECONDARY INFORMATION SERVICES .....	22
CHANGE OF ADDRESS .....	23
FUTURE MEETINGS AND SYMPOSIA OF INTEREST TO URSI .....	23
ISIT-3 .....	28
MEETINGS OF BOARD OF OFFICERS AND CHAIRMEN OF COMMIS- SIONS .....	29



## NEIL M. BRICE

1934-1974

With deep regret we announce that Prof. Neil M. Brice, Official Member for the USA in URSI Commission IV, was killed in an airplane crash on 31 January 1974.

Prof. Brice was born in 1934 at Brisbane, Australia. He received B.Sc. and M.Sc. degrees from Queensland University and, in 1965, a Ph.D. degree from Stanford University, USA. Shortly before his death he had been awarded a D. Sc. from Queensland University and had been nominated as Fellow of the IEEE. He participated as a radiophysicist in the 1956-58 Australian National Antarctic Research Expedition to Macquarie Island, and he was leader of the Stanford University Antarctic VLF Expeditions in 1960-61 and 1961-62. After a brief period at Carleton University in Ottawa, Canada, in 1966 he joined the faculty at Cornell University. In 1970-71 he was on leave to serve as Program Director for Solar-Terrestrial Research at the U.S. National Science Foundation, and upon his return to Cornell, he was appointed Professor of Electrical Engineering.

Neil Brice was an extremely active and imaginative scientist, and he performed highly original research in many fields of interest to URSI. His fundamental contributions were related to analysis of auroras, substorms, and ionospheric precipitation, to studies of wave-particle interactions in the Earth's radiation belts, and to the application of these concepts and principles in the construction of very novel models of the magnetospheres of the outer planets.

His interests extended over many scientific fields, and in recent years he participated actively in diverse projects ranging from studies of the Arecibo ionospheric backscatter data to the prediction of giant hydrogen gas rings surrounding Saturn and Jupiter. His approach was always an original one, and he was a pioneer in many areas, such as in the design of a large-scale active experiment to control the particle population trapped in the Earth's radiation belts.

Prof. Brice was a member of the US Delegation to the General Assembly of URSI in 1972, where he spoke on controlled geophysical experiments involving wave amplification. His friends and colleagues will greatly miss his stimulating presence in the future.

## **R. P. ERNESTO GHERZI, S. J.**

1886-1973

A Saint-Jérôme, près de Montréal, est décédé à l'âge de 87 ans le Père Ernesto Gherzi, assigné depuis plus de 18 années à l'Observatoire de Géophysique du Collège Jean-de-Brébeuf.

Né à San Remo, Italie, en 1886, il entra chez les jésuites en 1903, fit un premier séjour à Shanghai, Chine, de 1910 à 1913, fut ordonné prêtre en Angleterre en 1916, et repartit pour la Chine en 1920, cette fois pour y entreprendre une longue carrière scientifique de près de trente années à l'Observatoire météorologique, séismique et magnétique de Zi Ka Wei, à Shanghai. Il y assumait des fonctions importantes dans les services radio pour la navigation, les signaux horaires et tout particulièrement dans la prévision du temps. Il y acquit une renommée proverbiale par sa façon de prédire et de suivre les typhons. Sur la seule météorologie et climatologie de Chine, il a publié plus de vingt volumes et plusieurs articles.

Après avoir quitté la Chine en 1949, il fut appelé par les autorités portugaises pour réorganiser et compléter l'Observatoire de Macao où il demeura jusqu'à 1954. Après de brefs séjours à Saint-Louis et à Nouvelle-Orléans des Etats-Unis d'Amérique, il fut invité en 1955 à l'Observatoire de Géophysique du Collège Jean-de-Brébeuf qui en était à ses débuts. A ce dernier poste, comme directeur de la recherche, le Père Gherzi s'intéressa tout particulièrement au rayonnement solaire, à la propagation des ondes radio, à l'ionosphère et à l'électricité atmosphérique.

Au cours de sa longue carrière, il publia une centaine de volumes et brochures et autant d'articles dans diverses revues scientifiques.

## **ROBERT NAISMITH**

1901-1973

The death of Robert Naismith, in September 1973, has been announced. In the early 1930's he was a member of Watson-Watt's staff at the Radio Research Station at Slough, England where he remained until his retirement. He was closely involved with the development of the early ionospheric sounders and, in consequence, became a member of the British Polar

Year Expedition to Tromsø in 1932-33 which Appleton joined during the University vacation in 1932 (*URSI Inf. Bull.*, No. 158, p. 35). At the URSI Assembly in 1934, Naismith was Secretary of the Polar Year Sub-Commission which had been set up during the Assembly in 1931.

The important new ionospheric data obtained in Tromsø were described in a classic paper by Appleton, Naismith and Ingram published in 1937. Naismith's later interest in the effect of meteor showers on the E layer probably originated in the unusual E-layer phenomena that he had earlier encountered in Tromsø.

Naismith was particularly conscious of the importance of making frequent regular observations of the ionosphere. The long and uninterrupted series of measurements made at Slough from 1931 onwards owes much to his insistence that an ionosonde should be treated as an observatory instrument and that it should not be used for making isolated experiments.

Naismith soon became interested in the long-term trends which were evident in the data he accumulated at Slough; these showed that the critical frequencies varied with the solar cycle. This conclusion was reported by Appleton and Naismith to the URSI Assembly in 1938 in a paper which proposed the use of the "character figure" ( $f^4 \text{ sec } \chi$ ) as an index of the intensity of the solar radiation responsible for the E and F1 layers.

Until his retirement, Naismith was responsible also for the preparation of monthly ionospheric forecast charts covering the whole world. These were issued six months in advance of the date to which they referred and were widely used by radiocommunications organisations, in the UK and elsewhere, in planning the optimum use of the frequency channels available to them.

## ROBERT ALEXANDER WATSON-WATT

1892-1973

With the death of Sir Robert Watson-Watt on 5 December 1973, one of the last remaining links with the early General Assemblies of URSI has been severed. Among the four Commissions created at the I Assembly in 1922, one was concerned with investigations of the nature and origin of atmospheric : at that time a serious source of interference to the developing world radiocommunication network.

By the time of the II Assembly in 1927, the cathode-ray direction finder, which had originally been conceived by Watson-Watt as early as 1916, had made it possible to locate, for the first time and with considerable accuracy, the sources of individual atmospheric. Although Watson-Watt was not present at this Assembly, the results that he had obtained using two such direction finders, in England and Scotland respectively, attracted a great deal of attention and were described by Appleton as “most astounding”.

At the 1928 Assembly, Watson-Watt presided over the meetings of the Commission on Atmospheric and he continued to play an active rôle in this field at the Assemblies in 1931 and 1934.

It was at the Assembly in 1934 that URSI formally adopted the word “ionosphere”, which had been coined several years earlier by Watson-Watt, to describe “that part of the upper atmosphere which is sufficiently ionized to affect the propagation of radio waves”.

Cathode-ray direction finders were later widely adopted by meteorological services for the location of thunderstorms, but Watson-Watt was probably best known, after World War II, as “the father of radar”. It was in 1935 that the British Air Ministry agreed to support his proposals, which then seemed revolutionary, for the detection and location of aircraft by means of the minute amounts of radio energy that could be reflected from them. At that time, Watson-Watt was Superintendent of the Radio Research Station at Slough. He and his staff already had much experience in the transmission and reception of pulses of radio energy, gained in the course of their investigations of the ionosphere, and in the development of special antennas for radio direction-finding systems. However, there was a wide gulf between the experience and the stringent requirements that would have to be met if an operationally useful radar system were to be developed : very much greater radiated power, much shorter pulses, wide-band low-noise receivers, and the instantaneous measurement of the direction of arrival of radio waves in both azimuth and angle of elevation.

The story of how this gulf was bridged has been told by Watson-Watt in his book *Three Steps to Victory*. As Superintendent, from 1936, of the specially created Bawdsey Research Station, Watson-Watt was not only the chief architect of the bridging project and scientific advisor when unforeseen problems emerged; he was equally likely to appear at the laboratory bench or to be found climbing to the top of one of the 100m towers used to support the early radar antennas.

The success of the efforts which he and the small team that worked under him at Bawdsey devoted to their task soon became evident. By early 1936,

it was possible to measure the distance, direction and height of distant aircraft within a few seconds using the laboratory prototype equipment. Four radar stations were in the hands of the Royal Air Force by 1938, and a chain of 20 stations was in full operation at the outbreak of war in September 1939.

Watson-Watt was elected a Fellow of the Royal Society in 1941 and was knighted in 1942. Soon after the end of the War he left the British Government Service and, until his retirement, was engaged in consulting work mainly in Canada and the USA. He spent the final years of his life in Scotland where he was born, in Brechin, Co. Angus, 81 years earlier.

## NEWS OF MEMBER COMMITTEES

### BELGIUM.

At its request, the Belgian URSI Committee (President : Prof. R. Cou-  
trez) has been transferred from Category 3 to Category 4 as from 1 January  
1973 in accordance with Art. 8 of the Statutes.

### INDIA.

Dr. A. P. Mitra has been appointed President of the Indian URSI  
Committee in succession to Prof. J. N. Bhar.

### USA.

Prof. Andrew F. Nagy has been appointed Official Member for Commis-  
sion IV in place of the late Dr. Brice. His address is : Department of Electrical  
Engineering, University of Michigan, Ann Arbor, Michigan 48105, USA.

## URSI AWARDS 1975

The Balth. van der Pol and the J. H. Dellinger Gold Medals and the Apple-  
ton Prize will be awarded in 1975 for work carried out mainly during the  
period August 1968-July 1974. The Rules relating to these awards are  
reproduced below.

All Member Committees of URSI have already been invited to submit names of candidates for these awards not later than 30 September 1974. Any reader of the *URSI Bulletin* who wishes to suggest names of candidates should submit them, for consideration, to the URSI Committee in his country. The URSI Secretariat can accept nominations only from Member Committees of the Union.

RULES FOR THE AWARD OF THE BALTH. VAN DER POL  
AND THE J. H. DELLINGER GOLD MEDALS

1. The Balth. van der Pol and the J. H. Dellinger Gold Medals honour the memory of two scientists who were closely associated with URSI for many years. The awards are made normally at intervals of three years on the occasion of the General Assembly of URSI. If the interval between two General Assemblies is considerably greater or less than three years, the Board of Officers is authorised to modify the date on which the next Medals will be awarded and also the dates referred to in Arts 2, 3 and 5.

2. The Medals are awarded to outstanding scientists whose achievements in any of the branches of science covered by the Commissions of URSI have been particularly valuable. The work to which an award refers must have been carried out mainly during the six-year period ending one year before the General Assembly at which the award is to be made.

3. Each of the Member Committees of URSI and the Board of Officers will be invited to submit not more than two candidates. The names of the candidates must be received by the Secretary General of URSI not later than 30 September of the year which precedes that of the General Assembly.

4. The name of each candidate must be accompanied by :

- (a) a general summary of the candidate's career and scientific activities;
- (b) a review of his recent achievements, including references to papers published by him, alone or jointly, during the six-year period referred to in Art. 2;
- (c) an outline of the reasons for the submission of the candidate.

5. Copies of the documents mentioned in Art. 4 will be sent by the Secretary General to the Chairmen of the appropriate URSI Commissions who will be invited to submit their opinions on the relative merits of the candidates not later than 31 December of the same year.



6. The Board of Officers has full authority to select the candidates to whom the awards will be made. In doing so they will take into account the information provided by the Member Committees and the opinions expressed by the Chairmen of Commissions. They will bear in mind also that it is desirable to make the awards to candidates working in different branches of radio science.

7. The Board of Officers has full authority to withhold either or both awards if, in the opinion of the members, the number of sufficiently qualified candidates is less than two.

8. The President can invite the Honorary Presidents to arbitrate if, in his opinion, the views of the members of the Board of Officers are not sufficiently in agreement on the selection of either or both of the candidates who are to receive the awards.

#### RULES FOR THE AWARD OF THE APPLETON PRIZE

1. The Appleton Prize is awarded by the Royal Society of London and honours the memory of Sir Edward Appleton FRS, President of URSI from 1934 to 1952. The prize of £100 is awarded normally at intervals of three years on the occasion of the General Assembly of URSI. If the interval between two General Assemblies is considerably greater or less than three years, the Board of Officers will consult the Royal Society before modifying the date on which the next award will be made and the dates referred to in Arts. 2, 3 and 5 below. The Royal Society reserves the right to discontinue the award.

2. The Appleton Prize is awarded for outstanding contributions to studies in ionospheric physics. The work to which the award refers must have been carried out mainly during the six-year period ending one year before the General Assembly at which the award is to be made.

3. Each of the Member Committees of URSI and the Board of Officers will be invited to submit one candidate. The name of the candidate must be received by the Secretary General of URSI not later than 30 September of the year which precedes that of the General Assembly.

4. The name of the candidate must be accompanied by :

- (a) a general summary of the candidate's career and scientific activities;
- (b) a review of his recent achievements, including references to papers

published by him, alone or jointly, during the six-year period referred to in Art. 2;

(c) an outline of the reasons for the submission of the candidate.

5. Copies of the documents mentioned in Art. 4 will be sent by the Secretary General to the Chairmen of the appropriate URSI Commissions who will be invited to submit their opinions on the relative merits of the candidates not later than 31 December of the same year.

6. After considering the information provided in accordance with Art. 4 and the opinions expressed by the Chairmen of Commissions, the Board of Officers will prepare a short-list of candidates for submission to the Royal Society.

7. The Royal Society has full authority to select the candidate to whom the Prize will be awarded or to withhold it if, in its opinion, there is no sufficiently qualified candidate.

## **1. COMMISSION I AND THE GENERAL ASSEMBLY**

### **2. THE GENERAL ASSEMBLY AS AN OPEN SYMPOSIUM**

BY

H. M. ALTSCHULER, *Vice-Chairman URSI Commission I*

As the title implies, this discussion is addressed to two distinct topics. It represents material originally confined to correspondence with Prof. Henry G. Booker, who suggested its publication. Hopefully it is of more general interest in connection with the URSI planning of its future.

#### URSI COMMISSION I AND THE GENERAL ASSEMBLY

The place of Commission I in the world of standards of physical measurements will be discussed first, starting with a brief background history. The keystone of world standards activity is the 1875 Treaty of the Meter to which most technologically advanced nations adhere (presently 43 nations) and under which the Comité International des Poids et Mesures (International Committee of Weights and Measures, or CIPM) functions. An inter-

national laboratory, the Bureau International des Poids et Mesures (International Bureau of Weights and Measures, or BIPM) near Paris, acts as a focal point for CIPM. Work in specific areas is carried on by a small number of "Consultative Committees" and their Working Groups. The Comité Consultatif d'Electricité (Consultative Committee on Electricity, or CCE) has, in its scope, almost everything that relates to URSI. The CCE established the Groupe de Travail pour les Grands aux Radiofréquences (High Frequency Working Group) to concern itself with standards at all frequencies above roughly the audio range. The Group first met in 1965. This was the first move within CIPM in the direction of international coordination of electromagnetic standards at these higher frequencies. The Working Group met again in 1968 and 1972. Under its auspices, over 20 international intercomparisons of standards between national standards laboratories have been organized to date. The quantities involved have been power, voltage, noise power, attenuation, etc., at frequencies from about 1 MHz to 60 GHz.

Prior to 1965 a limited number of such intercomparisons had been established under URSI Commission I auspices. Since 1965 Commission I has played the following important rôles :

- It has afforded opportunity for additional contacts between representatives of laboratories participating in the Working Group. One formal meeting in three to four years is inadequate. In this sense it has acted as an informal and productive adjunct to the Working Group.
- It has provided a platform for the presentation and technical discussion of papers concerning the CIPM intercomparisons, which CIPM does not and cannot provide. Also, Commission I makes possible participation in these discussions by a much larger group of individuals, including some who are much closer to the details of the standards problems than some of the Working Group members.
- Commission I has, through its Recommendations and other activities, been able to lay groundwork for subsequent actions by the Working Group. Cases in point are the CIPM intercomparisons of E-field, microwave horn gain and power flux density established in 1972. The impetus for these came from Commission I, starting in Ottawa in 1969 and continued thereafter by correspondence. These are the first formal international intercomparisons of electromagnetic field (and closely related) quantities.
- Because the Working Group includes essentially only the representatives of national standards laboratories, it can become quite difficult, in the

CIPM context, to establish international communication with other organizations regarding certain top-level standards that some national laboratory may not even “possess”. It is easier for members of a broader community of laboratories to communicate about standards within URSI Commission I.

Although the URSI General Assembly is not an “open symposium”, it is the only truly international, regularly scheduled meeting at which papers on measurements and standards, of the type that falls within the Commission I scope of interest, can be given. One qualified exception to this is the Conference on Precision Electromagnetic Measurements (CPEM); another is the series of Congresses of the International Measurement Confederation (IMEKO).

CPEM is generally devoted to the same subject matter as the Commission I sessions at the URSI General Assembly, except as will be noted below. However, CPEM has been primarily a US meeting; it is sponsored by the United States National Committee of URSI, the National Bureau of Standards and the Group on Instrumentation and Measurements of the Institute of Electrical and Electronics Engineers. In the past it has always been held in the USA. Although international attendance at CPEM has been consistently cultivated, about 80 to 90 % of CPEM attendees have been from the USA. In part because of the limited number of sessions available to Commission I (as to all the Commissions) at the URSI General Assembly, various pressures were exerted to make CPEM more international. To implement this, URSI itself became a “cooperating sponsor” of CPEM. This action represented a consensus by the parties concerned that an international forum in the Commission I area is highly desirable and, implicitly, that the URSI General Assembly, as presently organized, cannot accommodate all the Commission I papers that might be given there.

Differences between CPEM and the General Assembly are several. First, CPEM has functioned as “the” international, as well as US national, technical meeting in the field of basic electrical (d.c. and low frequency) standards and measurements. Notably this relates to the ampere, volt, ohm and farad. While URSI has a formal interest in these fundamentals, very little time has been devoted to them at recent General Assemblies. As a natural outgrowth, CPEM has been an international focal point for papers on the Josephson effect as related to measurements and standards, although some material on the Josephson effect has been included at the General Assembly. CPEM has also been relatively strong internationally in the time and frequency area, as has the General Assembly.

The Frequency Control Symposium, which is sponsored by the US Army, also has some international participation in sessions of interest to Commission I. Still, there is a need for expanded specialized coverage in this field that could be met by Commission I, perhaps together with Commission VII. The field includes these substantial sub-areas : frequency generation and measurement, timescales and their international coordination, and the means of accurate dissemination of time and frequency. In all other areas, for example : power, voltage, attenuation, impedance, noise power, electric and magnetic field strength and in the high-frequency, microwave, millimeter wave and laser frequency ranges, the General Assembly has been the more important *international* meeting for Commission I topics, again recognizing that the available sessions are too few as compared to the number that could be filled.

Because of URSI emphasis and of time limitations, the General Assembly has included a large proportion of papers devoted to summaries or reviews of the state-of-the-art. In contrast, CPEM has emphasized current research contributions more strongly.

IMEKO is only partially in the Commission I area in that it covers "radio" as well as other measurements. It holds "Congresses" that are normally devoted to a single broad special topic. For example. IMEKO VI (Dresden, 1973) had as its main subject : "Acquisition and Processing of Measurement Data for Automation". Only a small part of that topic coincides with the interests of Commission I in current automated measurements. IMEKO V (Versailles, 1970) was not so specialized; it included many papers on measurements in industrial processes and on measurement applications, but very few papers suitable for Commission I. IMEKO IV (Warsaw, 1967) stressed instruments, and their design and applications. The IMEKO-sponsored Conference on Microwave Measurements (Budapest, 1966) coincided substantially with Commission I subject matter. IMEKO is far more international than CPEM has been, with especially strong eastern European participation. The author index for IMEKO 1970 (Versailles) indicated 30 France, 22 USSR, 21 Hungary, 17 Poland, 15 DBR, 11 US, 9 Japan, 8 DDR, 7 Yugoslav, 4 UK, 4 Sweden, and 16 other authors from 9 countries.

There are no other regularly scheduled meetings in the Commission I area that have broad international coverage. Of course, as in all other fields, on occasion there are specialized non-recurrent international symposia that include a few papers on the related measurements.

THE GENERAL ASSEMBLY AS AN OPEN SYMPOSIUM

The question of whether or not the scientific programme at the General Assembly should be converted into an open symposium is in no way confined to Commission I, but applies equally to all Commissions. The point of an open symposium would be to accommodate a larger number of research papers, and to increase the pool from which they can be selected. A general call for papers normally produces some excellent submissions that would not even have been solicited had the meeting been closed. The open symposium therefore implies a larger number of papers than in the past, presumably made possible by parallel sessions. The alternative of longer meetings appears to be out of the question; in fact URSI has made efforts to reduce the length of its Assemblies. No doubt Commission I and all other Commissions could make good use of the implied additional sessions by achieving more comprehensive coverage of their fields. The thought of an open symposium therefore becomes very attractive, provided care is taken to preserve sufficiently broad *international* participation in the programme.

The open symposium format may not be without problems that relate equally to all Commissions or to the General Assembly as a whole. Some that might be anticipated are :

- The possibility of one or two large countries, or the host country, swamping the programme with their papers.
- The possibly larger fluctuation in attendance and, consequently, in the technical importance of the meeting as a function of host country (travel cost, etc.). Such fluctuations would probably be much more marked in an open symposium than under the current arrangement under which official support to delegations lends considerable stability.
- The open meeting would potentially result in some substantially larger total attendance numbers than does the present General Assembly, so that it might be more difficult to find a host city or country that has the physical facilities and local professional resources needed to accommodate it.

If the Member Committees of URSI are willing to face questions like the above and make the necessary compromises, a more or less open meeting would become possible and the usefulness of the General Assembly would be increased.

Also, if URSI moves towards a more open General Assembly, and perhaps makes provision for the admission of individual members in addition

to the present Member Committees, it will be important to ensure that there is no deterioration in the present stature of the Union or in its influence with other organizations, including those national bureaucracies which in part support and in part respond to URSI. One concludes from this that URSI's quasi-official status must be deliberately preserved by retaining not only its Member Committees but also its Commissions, with voting Official Members, which meet during the General Assembly and which can generate resolutions and recommendations.

## **TIME : CAGLIARI 1974**

An International Meeting on the Problems of Time Determination, Dissemination and Synchronisation will be held in Cagliari, Italy from 3-5 June 1974. The meeting will deal also with dynamical time scales and the redefinition of ET, relativistic effects on time scales and new techniques.

The members of the Scientific Committee are H. Enslin, B. Guinot, G. A. Wilkins, H. M. Smith and J. Bonanomi.

Further information and Participation Forms are obtainable from the Co-Chairman of the Local Organising Committee :

Prof. E. Proverbio,  
Istituto di Astronomia dell'Università,  
Via Ospedale 72,  
I-09100 Cagliari, Italy.

## **II EUROPEAN REGIONAL MEETING IN ASTRONOMY**

The above meeting will be held at the University of Trieste, Italy from 2-5 September 1974 under the sponsorship of IAU and several Italian scientific organisations.

The topics to be covered are (a) the properties of diffuse interstellar matter and its condensation to form stars; (b) new results relating to stars and galaxies, including the structure of radio galaxies; (c) reports on astronomical activities in Europe.

The final date for registration is 1 May 1974. Further information is obtainable from

Dr. E. A. Müller,  
Observatoire de Genève,  
CH-1290 Sauverny (GE), Switzerland.

## MICROWAVE 1974

The IV European Microwave Conference will be held in Montreux, Switzerland, from 10-13 September 1974. It is supported by several Swiss professional organisations with the cooperation of a number of other national and international bodies, including the Swiss National Committee of URSI.

The topics to be discussed are :

- Active solid-state devices.
- Microwave, mm-wave, and optical communication systems (including low-noise receivers).
- Passive microwave components, computer-aided practices and measurements.
- High-power microwave sources (solid-state and tubes).
- Antennas and arrays.
- Microwave signals processing digital networks and integrated systems.
- Industrial applications of microwaves.

Microwave acoustics and non-reciprocal devices will be discussed in 1975.

Further information is available from the Chairman :

Prof. F. Gardiol,  
Département d'Electricité, EPF-L,  
Chemin de Bellevue 16,  
CH-1007 Lausanne, Switzerland.



## SCATTERING AND EMISSION OF RADIATION FROM THE EARTH

Berne, 23-26 September 1974

Intending participants in this Symposium (*URSI Inf. Bull.*, No. 189, p. 20) are requested to note that the dates have been changed to 23-26 September 1974 so as to avoid an overlap with those of the European Microwave Conference in Montreux : 10-13 September 1974.

### BEACON SATELLITES

A Symposium will be held in Moscow, USSR, from 30 September-4 October 1974 on Beacon Satellite Investigations of Ionospheric Structure, and ATS-F Data under the sponsorship of URSI and COSPAR. The meetings will take place at the Institute of Terrestrial Magnetism, Ionosphere and Radio Wave Propagation of the Academy of Sciences of the USSR (IZMIRAN), about 40 km south of Moscow.

The topics for discussion are :

- (a) improvements of beacon methods for investigating the ionosphere, and recent results;
- (b) structure and formation of the ionosphere related to beacon observations;
- (c) preliminary results of ATS-F beacon experiment, and applications of beacon investigations.

Abstracts of papers must be submitted, so as to arrive not later than 31 May 1974, to

Dr. R. Leitinger,  
Institut für Meteorologie und Geophysik,  
Universität,  
A-8010 Graz, Austria

from whom advance registration forms are available. Abstracts, in English, should be 150-200 words in length and will be photocopied. They should be clearly typed, using single spacing, and the length of the line must not exceed 17 cm. Abstracts relating to the ATS-F satellite will be accepted up to 10 September 1974.

Local arrangements in Moscow are being coordinated by IZMIRAN and additional information is obtainable from

Dr. Ya. L. Al'pert,  
IZMIRAN,  
PO Akademgorodok,  
Moscow Region, USSR.

## **GUGLIELMO MARCONI CENTENARY CELEBRATIONS**

The Italian Consiglio Nazionale delle Ricerche is organising several celebrations of the hundredth anniversary, this year, of the birth of Guglielmo Marconi. One of these will be a Seminar on Radio Wave Propagation to be held in Florence from 8 to 11 October 1974. The Seminar will deal specifically with the propagation of radio waves in natural media : the ionosphere, the troposphere, the sea and the Earth's crust. Particular attention will be given to the initial impetus which Marconi's discoveries gave to the growth of research in these fields. During the Seminar arrangements will be made for a visit to Marconi's former residence near Bologna : the Villa Griffone.

Further information on the Seminar can be obtained from

Prof. P. F. Checcacci,  
Istituto di Ricerca sulle Onde Elettromagnetiche,  
Via Panciatichi 56,  
I-50127 Firenze, Italy.

## **FIFTY YEARS OF THE IONOSPHERE**

December 1974 will see the 50th anniversary of the experiments that were made in England by Appleton and Barnett and in the USA by Breit and Tuve on waves reflected vertically from the ionosphere. The occasion will be marked by a Discussion Meeting at the Royal Society, London, on 5 and 6 December 1974. This will be preceded on the evening of 4 December by the "Appleton Lecture", at the Institution of Electrical Engineers in London, which will be given by Dr. J. V. Evans on the subject of incoherent scatter.

The meeting at the Royal Society is being organised jointly by the Society and by URSI. The programme is as shown below. The first morning will be devoted to the early history of ionospheric investigations and the rest of the meeting to a summary of the present position on the *theory of electric and magnetic waves in the ionosphere and magnetosphere*.

Further information about the Royal Society meeting can be obtained by application made in writing to the Royal Society, 6 Carlton House Terrace, London SW1Y 5AG, United Kingdom, quoting the reference 92/WGE/PMR

THE THEORY OF ELECTRIC AND MAGNETIC WAVES IN THE IONOSPHERE  
AND THE MAGNETOSPHERE

(to mark the 50th anniversary of radio investigations of the ionosphere)

Organized jointly for the Royal Society and URSI  
by W. J. G. Beynon, FRS and J. A. Ratcliffe, FRS

THURSDAY 5 DECEMBER 1974.

*Morning Session, Chairman* : Sir Harrie Massey, Secretary, The Royal Society. Opening remarks.

*Early history of ionospheric investigations*

Mr. J. A. Ratcliffe, FRS	Work in England
Professor A. H. Waynick	Work in the United States of America
Professor W. Dieminger	Work in Germany
Sir Frederick White, FRS	Work in Australia, New Zealand and the Halley Stewart Laboratory, London
Professor W. J. G. Beynon, FRS	Work in URSI.
Discussion.	

*Afternoon Session, Chairman* : Mr. J. A. Ratcliffe, FRS.

*Theory of waves*

Professor H. G. Booker	Electromagnetic and hydromagnetic waves in a cold plasma
Dr. J. P. Dougherty	Waves in a hot plasma

Dr. K. G. Budden, FRS                      Phase integral methods; wave coupling  
Discussion.

FRIDAY 6 DECEMBER 1974.

*Morning Session, Chairman* : Professor W. J. G. Beynon, FRS.

*Interaction between waves and plasma*

Professor J. W. Dungey                      Ultra-low-frequency waves in the magnetosphere  
Professor R. A. Helliwell                      Naturally occurring electromagnetic waves  
Dr. J. A. Fejer                                  Alteration of the ionosphere by man-made waves  
Discussion.

*Afternoon Session, Chairman* : Professor H. G. Booker

*Some specialized topics*

Dr. L. R. O. Storey                              “Resonances” observed in rockets and satellites  
Dr. P. Bauer                                      The theory of waves incoherently scattered  
Dr. J. O. Thomas                                Experiments with plasma waves  
Discussion.

**ANTARCTIC AND SOUTHERN HEMISPHERE  
AERONOMY YEAR (ASHAY)**

1975-1976

Prof. S. M. Radicella (Convener, Southern Hemisphere Ionospheric Studies Group) has prepared a Progress Report on ASHAY dated November 1973. The Report summarises the various aeronomic problems for which solutions are being sought and, in each case, refers to the proposed experiments.

A Working Conference on ASHAY Planning will be held in Buenos Aires from 10-13 June 1974 when special attention will be given to aeronomic effects of the Atlantic anomaly, the low magnetic latitude F region in South America, the sub-auroral ionosphere in the S. Hemisphere and Antarctic aeronomy.

Those wishing for further information should write to Prof. Radicella at

c/o Comission Nacional de Estudios Geo-Heliofisicos,  
Avda Bussolini 1661,  
San Miguel-PCIA de Buenos Aires,  
Argentina.

## SOLAR EVENTS : AUGUST 1972

A Resolution (III.5) of the URSI General Assembly in 1972 recommended the designation of the period 26 July-14 August 1972 as a Retrospective World Interval in view of the exceptional solar and geophysical events which occurred during the period 2-8 August.

On the initiative of the URSI Committee in India, 10 scientific observatories and other organisations in India have jointly cooperated in the preparation of a booklet <sup>(1)</sup> containing numerous data for the above period.

A set of three volumes of data for this period has been prepared by World Data Centre A for Solar-Terrestrial Physics <sup>(2)</sup>.

## DATA ON SOLAR-TERRESTRIAL PHYSICS

World Data Center A for Solar-Terrestrial Physics has prepared a 317-page Catalogue of data relating to solar, interplanetary, ionospheric and geomagnetic phenomena, flare-associated events, aurora and airglow,

<sup>(1)</sup> S. Aggarwal and P. K. Pasrica (compilers). *Ionospheric and Geophysical Data from India related to the Solar Events of August 1972. Scientific Report No. 85.* Issued by Radio Science Division NPL and Indian National Committee for URSI, New Delhi, August 1973.

<sup>(2)</sup> Helen E. Coffrey (ed.) *Collected Data Reports on August 1972 Solar-Terrestrial Events, Parts 1, 2 and 3. Report UAG-28, July 1973.* Obtainable from National Climatic Centre, Federal Building, Asheville NC 28801, USA.

and cosmic radiation (<sup>1</sup>). The Catalogue refers to data received since 1957 when WDCs A, B and C were established in connection with the IGY. It contains full information about the various formats in which the data are available and about the cost of obtaining copies.

## NEW SECONDARY INFORMATION SERVICES

The ICSU Abstracting Board has pointed out that new secondary information services are being organised with the intention of assisting in the solution of problems which involve several disciplines or which are interdisciplinary in character. These services do little more than duplicate the material already being processed and accumulated by secondary services that are already in existence.

The services that adhere to the ICSU AB process more than 3m references to primary literature per year and it is suggested that the requirements of new secondary services could be met more economically by sorting and compiling these existing references. The present services could then concentrate on improving the effectiveness of the dissemination of abstracted and indexed information and could expand their coverage where necessary to meet new requirements.

The ICSU AB recommends that when new needs arise every opportunity should be taken to make use of the output of the existing secondary services. Organisations interested in further discussion of the implementation of this recommendation are invited to write to :

ICSU Abstracting Board,  
17 rue Mirabeau,  
F-75016 Paris, France.

(<sup>1</sup>) *Catalogue of Data on Solar-Terrestrial Physics : Report UAG-30, October 1973.* Copies are available at \$1,75 from National Climatic Center (Publications), Federal Building, Asheville, N. C. 28801, USA.

## CHANGE OF ADDRESS

The address of the Chairman of URSI Commission VI is now as follows :

Prof. K. M. Siegel,  
KMS Industries Inc.,  
P. O. Box 1778,  
3941 Research Park Drive,  
Ann Arbor, Michigan 48106,  
USA.

## FUTURE MEETINGS AND SYMPOSIA OF INTEREST TO URSI

The key to the item numbers given in the list below is as follows :

1. Title or subject of meeting.
2. Place and date.
3. Organisers, sponsors.
4. Source of information.

\* \* \*

1. International Meeting on Problems of Time Determination, Dissemination and Synchronisation.
  2. Cagliari, Italy. 3-5 June 1974.
  3. Astronomical Institute of the Cagliari University and the International Latitude Station of Cagliari-Carloforte.
  4. Prof. E. Proverbio,  
Istituto di Astronomia dell'Universita,  
Via Ospedale 72,  
I - 09100 Cagliari, Italy.
- 
1. Planning the Antarctic and S. Hemisphere Aeronomy Year (ASHAY).
  2. Buenos Aires, Argentina. 10-13 June 1974.
  3. S. Hemisphere Ionospheric Studies Group.

4. Prof. S. M. Radicella,  
c/o Comisión Nacional de Estudios Geo-Heliofísicos,  
Avda Bussolini 1661,  
San Miguel — PCIA de Buenos Aires,  
Argentina.

1. 5th Colloquium on Microwave Communications.
2. Budapest, Hungary. 24-30 June 1974.
3. Department of Technical Sciences of the Hungarian Academy of Sciences  
and Scientific Society of Communication Engineering, URSI.
4. Dr. G. Bogнар,  
Member of the Hungarian Academy of Sciences,  
Münnich Ferenc u. 7,  
Budapest V, Hungary.

1. Symposium on Solar-Terrestrial Physics.
2. Sao Paulo, Brazil. 17-22 June 1974.
3. IUGG, IAU, URSI, IUPAP, COSPAR, SCOSTEP.
4. Dr. E. R. Dyer, Jr.,  
National Academy of Sciences,  
2101 Constitution Avenue,  
Washington D. C. 20418,  
USA.

1. COSPAR VII Plenary Meeting and Specialised Symposia.
2. Sao Paulo, Brazil. 17 June — 1 July 1974.
3. COSPAR and relevant Unions.
4. Mr. Z. Niemirowicz, Executive Secretary, COSPAR,  
55 boulevard Maiesherbes,  
F-75008 Paris, France.
- Dr. F. de Mendonça,  
INPE (COSPAR),  
C.P. 515,  
12.200 Sao José dos Campos, SP,  
Brazil.

1. Conference on Precision Electromagnetic Measurements.
2. London, United Kingdom. 1-5 July 1974.
3. The Royal Society and the Institution of Electrical Engineers, the  
Institution of Electronic and Radio Engineering, National Physical  
Laboratory, Scientific Instrument Manufacturers' Association.



4. 1974 CPEM Secretariat,  
c/o The Conference Department,  
The Institution of Electrical Engineers,  
Savoy Place,  
London WC2R OBL, England.
  
1. Symposium on Electromagnetic Wave Theory.
2. London, United Kingdom. 9-12 July 1974.
3. URSI, The Royal Society and the Institution of Electrical Engineers.
4. The Conference Department,  
The Institution of Electrical Engineers,  
Savoy Place,  
London WC2R OBL, England.
  
1. II European Meeting on Astronomy.
2. Trieste, Italy. 2-5 September 1974.
3. IAU and Italian organisations.
4. Dr. E. A. Müller,  
Observatoire de Genève,  
CH — 1290 Sauverny (GE), Switzerland.
  
1. 5th International Conference on Atmospheric Electricity.
2. Garmisch-Partenkirchen, F. R. of Germany. 2-7 September 1974.
3. The International Commission on Atmospheric Electricity of IUGG/  
IAMAP.
4. Conference Office,  
Physikalisch-Bioklimatische Forschungsstelle,  
D-8100 Garmisch-Partenkirchen, F. R. of Germany.
  
1. 4th European Microwave Conference.
2. Montreux, Switzerland. 10-13 September 1974.
3. Swiss URSI Committee, National Societies of Electrical Engineers in  
West Europe, the Institutions of Electrical Engineers and of Electronic  
and Radio Engineers in the UK, the Institute of Electrical and Electronic  
Engineers (Region 8), Society of Antennas and Propagation of the  
USA, International Microwave Power Institute.

4. Prof. Gardiol,  
Département d'Electricité,  
Ecole Polytechnique de Lausanne,  
Chemin de Bellerive, 16,  
CH-1007 Lausanne, Switzerland.

1. Scattering and Emission of Radiation from the Earth.
2. Berne, Switzerland. 23-26 Septembre 1974.
3. URSI Commission II on Radio and Non-Ionized Media and Swiss URSI Committee.

4. Prof. R. K. Moore,		Prof. E. Schanda,
or		Institute of Applied Physics,
Prof. A. W. Biggs,		University of Berne,
University of Kansas,	or	Sidlerstrasse 5,
2291 Irving Hill Road,		CH-3012 Berne, Switzerland.
Campus West,		
Lawrence, KS 66044, USA,		

1. Symposium on Beacon Satellite Investigations of Ionospheric Structure, and ATS-F Data.
2. Moscow, USSR. 30 September-4 October 1974.
3. COSPAR, URSI and the USSR Academy of Sciences.

4. Dr. R. Leitinger,  
Institut für Meteorologie und Geophysik,  
Universität Graz,  
Halbärthgasse 1,  
A-8010 Graz, Austria.

1. Seminar on Radio Wave Propagation (Marconi Centenary).
2. Florence, Italy. 8-11 October 1974.
3. Consiglio Nazionale delle Ricerche.
4. Prof. P. F. Checcacci,  
Istituto di Ricerca sulle Onde Elettromagnetiche,  
Via Panciatichi 56,  
I-50127 Florence, Italy.



1. COSPAR XVIII Plenary Meeting and Specialised Symposia.
  2. Israel. Dates undecided.
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1. IUGG General Assembly.
  2. Grenoble, France. Provisional dates : 27 August-6 September 1975.

### ISIT-3

The following report has been received from the Organising Committee of ISIT-3.

The 3rd International Symposium on Information Theory was held in Tallinn, USSR, from 18 to 23 June 1973. The Symposium was organised by the Scientific Council for Cybernetics and the Institute for the Transmission of Information of the Academy of Sciences of the USSR, and also by the Cybernetics Institute of the Academy of Sciences of the Estonian SSR.

As on the two previous occasions (Dubna 1969, Tsakhkadzor 1971) the main topics discussed were the mathematical bases of information theory, theoretical and practical problems in coding theory, in statistics and in the theory of the extraction of signals from noise. The papers presented demonstrated the value of applications of information theory and covered also the present status of fundamental ideas on the subject. New proofs were given to show that the principles of communications, first proposed by Shannon 25 years ago, were technically feasible. It appears that the principal aim in the application of information theory is to assist in the further development of the techniques of communications. In particular, high priority continues to be given to the problems associated with the construction of technically realisable schemes for coding and decoding.

The Symposium was attended by about 250 scientists from Bulgaria, Canada, Czechoslovakia, Finland, German D. R., Germany, F. R. and West Berlin, Hungary, India, Italy, Japan, Poland, Romania, Sweden, USA and USSR.

The participants greatly appreciated the high scientific quality of the Symposium, and the moral support given by URSI underlines the increasing importance of the Symposium in the field of international scientific relations. The Organising Committee wishes to express its appreciation to the URSI Board of Officers for its sponsorship.

The next Symposium in the series will be held in 1976.

## MEETINGS OF BOARD OF OFFICERS AND CHAIRMEN OF COMMISSIONS

The URSI Board of Officers held its annual meeting in Brussels on 27 and 29 March 1974. A meeting of the Chairmen and Vice-Chairmen of Commissions III, IV and VIII was held on 28 March to discuss the internal reorganisation and plans for the scientific programme during the General Assembly in 1975.

A summary of the decisions and recommendations made at these meetings will be published in the June issue of the *URSI Information Bulletin*.

