Bulletin No 210 Septembre 1979

U.R.S.I.

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EDITORIAL

The Secretary General of URSI has always been, by tradition, the Editor of the URSI Information Bulletin. Since this is the last issue for which I am responsible, I must first apologise for the fact that it appears nearly two months after its normal publication date, and hence for the proximity of the date of publication to the latest dates for the submission of abstracts for future symposia. The delay has been caused mainly by the considerable additional volume of work entailed in the URSI Secretariat by the preparations for the 60th Anniversary of URSI in mid-September.

It is a pleasure for me to acknowledge the help of those who have, over the past 12 years, sent advance notices of future colloquia and other events of interest to radio scientists, and also the thoughtfulness of those who have sent reports, after such events, describing the proceedings and the highlights. I am sure that Professor Van Bladel will welcome your continued cooperation in providing information which is likely to be of general interest to Member Committees of URSI and other readers of the URSI Bulletin.

The December issue will, as usual, contain the names and addresses of Presidents, Secretaries and Official Members of the Member Committees of URSI, and of the Board of Officers and other organs of our Union. Madame Stevanovitch would appreciate early notification of any changes for incorporation in the December issue each year, or for inclusion in the list of amendments which appears in the June issue each year.

8 October 1979

C.M. Minnis
Secretary General 1968-78

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APPOINTMENT OF SECRETARY GENERAL

In November 1978, Member Committees of URSI were informed that Prof. Hontoy, who had been elected Secretary General in Helsinki, was ill and that Dr. Minnis had been asked by the President to act in Prof.Hontoy's place pending his return to health.

Unfortunately, Prof. Hontoy's recovery has been

slower than he had hoped, and he has only recently been authorised by his doctors to resume part-time work. In view of these circumstances, Prof. Hontoy regretfully decided to submit his resignation to the President, especially since he was aware of the increasing volume of work arising from the advance planning of the General Assembly in 1981.

At the meeting of the Board of Officers in Brussels on 19-20 September 1979, Prof. Hontoy's resignation was accepted. The President informed the Board that some time ago, on the suggestion of Prof. Hontoy, he had asked Prof. J. Van Bladel whether he would be willing to accept an invitation to take over the responsibilities of the Secretary General, at least up till 1981. He was glad to report that Prof. Van Bladel had agreed to accept the invitation.

The Board accordingly agreed unanimously to appoint Prof. Van Bladel as Secretary General, in accordance with Art. 46 of the Statutes with effect from 1 October 1979.

Prof. Van Bladel is at present Director of the Laboratory of Electromagnetism and Acoustics at the University of Ghent. He represented the Belgian National Committee for Radio Science in the URSI Council at the General Assembly in Lima in 1975, and he was elected Chairman of the URSI Commission on Fields and Waves for the period 1975-1978. Since 1978 he has been an active member of the Steering Committee for the Scientific Programme for the triennium 1979-81 and he was responsible for the questionnaire, widely circulated earlier this year, which is of great help in planning the scientific sessions to be held in Washington in 1981. Prof. Van Bladel was also a member of the Programme Committee for the recent Colloquium in Brussels which marked the 60th Anniversary of URSI.

Readers of the URSI Bulletin will wish to join the Board of Officers in offering their best wishes to Prof. Van Bladel for a successful term of office as Secretary General and to Prof. Hontoy for an early and complete recovery from his illness.

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60th ANNIVERSARY OF THE CONSTITUTION OF URSI

At the 19th General Assembly of URSI, the Council accepted the invitation of the Belgian National Committee for Radio Science to celebrate the 60th Anniversary of our Union in Brussels in September 1979. During more than 12 months, the Belgian National Committee, under its President, Prof. L. Bossy, and the Programme Committee, chaired by M. J. Voge, worked closely with the international URSI Secretariat in Brussels on the detailed planning of all aspects of the event.

The decision was made to organise a Colloquium, consisting of three half-day sessions on 17 and 18 September, during which a number of distinguished speakers would present papers on various aspects of the pre-history of URSI, in 1912-1914, and of the activities of the Union itself since it was created in 1919. The programme of the Colloquium is reproduced below and it is worth recording that the speakers included three Nobel Prizewinners and three Honorary Presidents of the Union. The Colloquium was held in the Palace of the Academies in Brussels, the actual building in which URSI was constituted 60 years ago.

The first Secretary General of URSI was Dr. Robert Goldschmidt whose pioneering researches on radiocommunications at the beginning of the century brought him to the notice of King Leopold II and, later, King Albert I. As a result of the interest and encouragement, particularly of King Albert, Dr. Goldschmidt succeeded in setting up a radiotelegraph link between Brussels and the Belgian Congo (now Zaïre), which was in regular operation up to August 1914. In view of these early contacts with two Kings of the Belgians, it is of particular interest to record that His Majesty King Baudouin accorded his Patronage to the 60th Anniversary, and honoured the occasion by attending, in person, part of the Inaugural Session on 17 September.

Thanks to the generous hospitality of the Belgian Committee, participants had an opportunity to meet each other and to exchange reminiscences at a most enjoyable reception in the Palace of the Academies, and also at a dinner in honour of the speakers and other distinguished guests. Another notable event was the visit to the Hôtel de Ville in Brussels, at the invitation of the Burgomaster, which allowed many participants to admire the

architectural and other splendours of this historic building in the Grand'Place.

About 250 participants attended the Colloquium. They included representatives from nearly all our Member Committees, and from other Scientific Unions and international organisations with which URSI has close contacts. Many senior representatives of the scientific community and of public life in Belgium were also present, including the Minister for Posts, Telegraphs and Telephones.

The papers presented at the Colloquium have been printed in a 125-page volume, copies of which were available to participants when they registered. The text of Mr. McBride's paper was received too late for inclusion in this volume, but it will appear in the Supplement which will include also the Opening and Closing Addresses of the President, which are reproduced below.

Copies of this volume and of the Supplement will be sent to all Member Committees of URSI before the end of 1979.

At the Meeting of the URSI Board of Officers in Brussels on 19-20 September, a Resolution was adopted in which the Board expressed its thanks to all those who had contributed to the successful outcome of the Anniversary, and also its appreciation of the fact that so many Member Committees of the Union were represented.

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PROGRAMME

Aspects of Radio Science

Opening Address by the Chairman, Prof. W.N. Christiansen, President of URSI.

Address on behalf of the Belgian Government, M. R.Urbain, Minister of Posts, Telegraphs and Telephones.

60 years of research on the propagation of radio waves, Prof. W. Dieminger, Honorary President of URSI.

Acoustic gravity waves, travelling ionospheric disturbances, spread F, and ionospheric scintillation, Prof. H.G. Booker, Honorary President of URSI.

Highlights in the development of semi-conductor devices, Dr. L. Esaki, Nobel Prizewinner in Physics (1973).

adio science in the study of the Universe: Radioastronomy, Prof. A. Hewish, Nobel Prizewinner in Physics (1974).

History of URSI

Chairman: M. J. Voge, outgoing President of URSI and Chairman of the Programme Committee.

The origins of URSI: 1913-1914. King Albert I of Belgium, R. Goldschmidt and the International Commission on Scientific Wireless Telegraphy, Prof. L. Bossy, President of the Belgian National Committee for Radio Science.

The first 20 years of URSI, M. B. Decaux, Honorary President of URSI.

Radio science half a century ago, Prof. J. Groszkowski, Past Vice-President of URSI and Past President of the Academy of Sciences in Poland.

URSI after World War II, Sir Granville Beynon, Past President of URSI.

Musical tribute to the memory of Queen Elisabeth of Belgium, in commemoration of the first concert broadcast from Brussels on 28 March 1914.

Introduced by Prof. J. Van Bladel, Member of the Programme Committee:

Sonata for violin and piano in A major by César Franck, played by MM. C. Van Neste and N. Sluszny, members of the Trio Reine Elisabeth de Belgique.

Communication science in the service of information

Chairman: Mr. R.C. Kirby, Director of the International Radio Consultative Committee (CCIR).

Message from Prof. I. Prigogine, Nobel Prizewinner in Chemistry (1977).

Radiocommunications as an aid to development, M. M. Mili, Secretary General of the International Telecommunication Union.

Radio science, transmission and instrumentation in the service of progress, Prof. P. Grivet, Member of the Institut de France.

The economic value of information, Prof. R. Radner, Harvard University and University of California, Berkeley.

Radiocommunications and international relations, Mr. S. McBride, Nobel Prizewinner for Peace (1974), President of the International Commission for the Study of Communication Problems and President of the International Peace Bureau.

Closing address, Prof. W.N. Christiansen, President of URSI.

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Opening Remarks of the President at the Inaugural Session on 17 September

Mr. Minister, Your Excellencies, Ladies and Gentlemen

Sixty years ago in 1919, at the invitation of the Government of Belgium, the Constitutive Assembly of the International Research Council was convened in this building. Many of the world's Academies of Science sent delegations to that Assembly, and one of its tasks was to promote scientific cooperation through the creation of a number of International Scientific Unions, each concerned with a particular branch of science.

At one of the sessions, presided over by Sir Arthur Schuster, the International Union of Radio Science was formally constituted on the proposal of the delegation of the Royal Academy of Sciences in Belgium. Thus the particular circumstances of the birth of our Union seem, by themselves, to be sufficient to justify our holding this 60th Anniversary Colloquium in the Palace of the Academies in Brussels.

But there are several deeper reasons for the choice of Brussels for this event. First of all, in 1919 the URSI Secretariat was set up only 200 metres from this building. Although it has changed its address three times since then, it has never left Brussels during the past 60 years. What is even more important is the fact that, during this long period, five of our six Secretaries General have been Belgian scientists. In consequence, URSI has always remained in touch with Brussels - the city of its birth - and with the scientific community in Belgium.

Finally, we are celebrating this Anniversary in Brussels at the invitation of the Belgian National Committee for Radio Science, one of the founder members of our Union.

My first, and very pleasant, duty is to say how honoured we are to have the Patronage of His Majesty the King for this Colloquium. As you will know from your programme, we shall welcome His Majesty later in the proceedings this afternoon.

In view of the long association between our Union and Belgium, we appreciate very much the fact that the Belgian Government has agreed to support the Anniversary Colloquium. Unfortunately, the Prime Minister cannot be present, but he has sent his apologies and has authorised the Minister for Posts, Telegraphs and Telephones, Monsieur Urbain, to speak on behalf of the Government.

Because of parliamentary responsibilities, several other Ministers are unable to attend in person, but we are most glad to welcome their representatives. I must refer, in particular, to the Ministers for National Education who are responsible for the Royal Academies. We are most grateful to the Academies for welcoming us to this Palace, and for their generous hospitality. Many of us will recall the great services rendered to URSI by a former Permanent Secretary of the Academy, Professor Charles Manneback, who was our Treasurer for many years and who was elected Honorary President at our General Assembly in 1969.

The Academies are represented today by one of their Presidents, Monsieur Davin, and one of their Permanent Secretaries, Mijnheer Verbeke, and also by both of the Directors of the Division of Science.

I must also welcome the many senior representatives of public life in Belgium, and especially those who kindly agreed to serve as members of the Honorary Committee for the Colloquium. I am happy to report that this Committee has received strong support from many Universities and public bodies in Belgium and we are most grateful for this.

The Burgomaster of the City of Brussels is, unfortunately, not present since he has many responsibilities relating to the present celebration of the 1000th Anniversary of Brussels. However, he has very kindly invited us to visit the City Hall in the world-famous Grand'Place tomorrow afternoon.

Now I must express to our very distinguished speakers our appreciation of their participation in this meeting. I know that most of them have spent considerable time during the summer months, at some inconvenience to

themselves, in the preparation of the text of their papers. However, thanks to their cooperation, we already have in our hands the Proceedings of the Colloquium.

Many of you will know that the statutory Members of our Union are the National Committees formed under the auspices of the Academies of Science and similar bodies in many countries. It gives me particular pleasure to find that nearly all of them have decided to honour this occasion by sending representatives and I should like to offer them all a very warm welcome.

I must, of course, make a special reference to our hosts today, the President and Members of the Belgian National Committee for Radio Science, and I wish to offer to them our very warm thanks for inviting us to Brussels. The arrangements for this event have been greatly helped by the financial support provided by the Directors General for Higher Education and Scientific Research and our thanks are due to them for this.

As an international organisation, URSI necessarily has contacts with other international organisations concerned with science. I am glad that several of them are represented here today. They include two of the Unions, also formed in 1919, the Astronomical Union and the Union for Geodesy and Geophysics, and also the International Council of Scientific Unions. The International Telecommunication Union , the International Radio Consultative Committee and the European Broadcasting Union are also represented here today.

Before I introduce the first speaker, I should like to refer to several messages of greeting that I have received.

One of our oldest Honorary Presidents is Mr. J.A. Ratcliffe. We had hoped that he would be here, but his health has prevented him from travelling and he has sent us a telegram containing his best wishes for the success of the Colloquium. Madame Le Corbeiller, widow of Prof. Balth. van der Pol has also sent her best wishes.

Our Committee in the German Democratic Republic is not represented but I have received a letter of greetings and good wishes from its President, Professor Frühauf. I must refer also to a letter of greetings from the Academy of Sciences of the USSR, which has been brought to Brussels by Prof. Migulin, Vice-President of URSI for many years.

The President of the International Association for Geomagnetism and Aeronomy, Professor Roederer, has sent his congratulations also. His is one of the Associations of the International Union of Geodesy and Geophysics which is represented today by its Secretary General, Professor Melchior.

We are indeed most grateful to all those persons and organisations for having sent us their greetings on this occasion.

Supplementary Remarks by the President after the arrival of His Majesty the King

Sire,

In the course of my earlier opening remarks this afternoon, I referred to several reasons why it seemed appropriate to hold the present Anniversary Colloquium in Brussels:

firstly,our Union was born here in this building;

secondly, our Secretariat has remained in Brussels, through peace and war, since 1919;

thirdly, we have had many contacts with the scientific community in Belgium during the past 60 years.

I have not, so far, mentioned another justification for celebrating this Anniversary in Brussels. I refer to the personal contacts maintained by Dr. Robert Goldschmidt, our first Secretary General, with King Leopold II in the early years of the century, and later with King Albert. It was the personal interest and encouragement, especially of King Albert, which stimulated Dr. Goldschmidt to pursue his pioneering work in radio science and to establish one of the earliest international radiocommunication stations in the world in the grounds of the Royal Palace at Laeken.

In view of this we are most grateful to Your Majesty for having honoured this event, not only by according your Patronage, but also by your presence this afternoon.

Closing Address by the President
18 September

The Programme Committee has given me the difficult task of making some closing remarks, and perhaps of trying to sum up the proceedings of this Anniversary

Colloquium.

Our speakers have been concerned mainly with two things. One of these is the progress of radio science during the last 60 years, and the other is the manner in which URSI organised its work during this period.

We are fortunate that 60 years is short enough to allow us to have some people with us who have a detailed knowledge of URSI during most of its life. Professor Bossy, Monsieur Decaux and Sir Granville Beynon have traced for us the origin and activities of URSI, and also the changes that were required in its structure as its interests expanded. We have also seen that difficulties arise in trying to define the spheres of activity of a Union when its boundaries are both diffuse and moving.

We have had a number of very interesting accounts of the history of radio research. Professor Dieminger, and also Professor Groszkowski who is unfortunately not with us, have presented fascinating accounts of work covering half a century; during this time, radio communication has changed from a splendid new invention, that allowed us to communicate with ships at sea and even with aeroplanes, to the present time when millions of different radio messages are passing around the world at any instant, and we accept with no great public interest close-up pictures of distant planets sent after several years journey by radio from a radio-controlled spacecraft.

As our speakers have shown, progress has involved two things; firstly, a development of new techniques both in and outside radio science, and secondly an understanding of fundamental processes concerning waves in space and in matter. These two things have gone hand in hand. Sometimes one was ahead, sometimes the other but they have never been separated by more than two arms lengths.

In the early days of URSI, one of the main research interests was in the propagation of radio waves of long wavelength used at that time for most radio communication. With the development of improved techniques for generating and receiving radio waves of shorter and shorter wavelength, it was found that the metre-length waves provided a much more economical, although less reliable, means of communication over long distances. Scientific investigations into the mode of propagation of these waves opened up a new field of research concerned with the earth's upper atmosphere. Professor Dieminger and

Professor Booker have spoken about this work which has been one of the main interests of URSI until the present time. Out of measurements of short-wave signals came a new discovery - radio waves emitted by natural processes from astronomical objects. Thus arose a new URSI interest: radio astronomy, which has been described by Prof. Hewish. This new activity, as well as contributing to astronomical knowledge, generated new radio techniques that have been used in fields as remote from each other as brain surgery and the forecasting of earth-quakes.

But in techniques, the most important was the development and theoretical understanding of solid-state semi-conductor devices, described by Dr. Esaki. These techniques have now spread through almost the whole range of electromagnetic research and development, and new microscopically-small devices have made possible electronic equipment that is orders of magnitude more complicated than was possible a few years ago. Some of the things that are now possible have been described by Monsieur Mili and Professor Grivet. The amount of information that can be collected, stored and recovered for use is now so great that new techniques have had to be devised to deal with it. Some of the problems involved in dealing with the information now available in such large quantities were described by Professor Radner.

The ease of transfer of information over long distances, combined with methods of turning it into use by means of electronic computers, means that our present methods of manufacture, of buying and selling goods, of banking and of obtaining information will change drastically in the future. Just as, in the industrial revolution, steam and machines replaced human hands, so in the electronic revolution human brains are being replaced. Again, as in the industrial revolution, this will produce hardships for many people for quite a long period unless, as is unlikely, the necessary social changes are made to cope with the new situation. This is not the most cheerful note on which to close the colloquium, and I turn quickly to something more pleasant.

I must one again thank our hosts, the Belgian National Committee, for inviting us to Brussels and for the support of the Belgian Government and the Royal Academies. We have appreciated very much the hospitality we have received during our short stay.

I must also express our appreciation of the way in

which Prof. Hontoy, after his recent illness, resumed his activities in planning the Anniversary, and also of the unfailing support given to him by Dr. Minnis and Mme Stevanovitch in the URSI Secretariat.

We are especially grateful to the speakers who have made an essential and all-important contribution to the success of this event, and to the Programme Committee under its Chairman, Monsieur Voge. I am particularly glad that so many of our Member Committees were able to send representatives to this celebration, because the international coordinating rôle played by URSI is necessarily based ultimately on the achievements of the many individual members of these Committees.

Finally may I wish you all a pleasant return journey and I look forward with pleasure to meeting many of you in Washington during the 20th General Assembly in 1981.

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WORLD TELECOMMUNICATION FORUM 1979
Geneva, 23-26 September 1979

Ceremonial Session
Sunday 23 September

The World Telecommunication Forum, in the Committee of Honour of which many heads of government had participated, devoted this Sunday afternoon session to the 50th Anniversary of CCIR. The Secretary General of ITU, M. Mili, the Secretary of Commerce of the USA, Mrs Kreps, and Mr. Hirano, Chairman of the 14th Plenary Assembly of CCIR, all stressed the importance of the work of CCIR. Mrs Kreps brought a personal letter of congratulation from President Carter for the present Director of CCIR, Mr. Kirby.

M. Thué discussed technical and scientific aspects, and Mr. Bellchambers organisational aspects of the future of CCIR. Dr. Rosen gave a talk on Future television satellites; Prof. Krivocheev on Television in CCIR, Mr. Hayashi on Radio relay systems, and Prof. van der Laan on The radio exploration of the universe. Ill health prevented Dr. van Duuren, who had been a participant in 1929, to reminisce on the difference between this first Assembly and present Assemblies.

The Baroque Quartet of Suisse Romande contributed to the festive character of the occasion by providing musical interludes.

In a separate part of this ceremonial session, the first ITU Centenary Prize was awarded to Mr. Valensi, past Director of CCITT. Mr. Mili gave an address on the significance of this Prize, and Mr. Jipguep, President of the Administrative Council of ITU, sketched the work of Mr. Valensi. He then handed the Prize to Mr. Laloux, a long time collaborator of Mr. Valensi who was not able to be present because of illness.

ITU Technical Symposium on
The integration of the world telecommunication network
24 - 26 September

A total of 43 Societies cooperated in the organisation of this Symposium, which formed the second part of the Third World Telecommunication Forum. The Proceedings contain papers from 33 countries, selected by the

Programme Committee out of over 500 abstracts submitted. In the morning Plenary Session, seven papers were given. In the afternoon, four parallel sessions of eight papers discussed the subjects in more detail.

Mr. Bangali chaired the plenary session on the integration of the world telecommunication network. Mr. Irmer, in his general review paper, considered telephony to be the dominant service, also in the future. Telex and data services are coming up, thanks to electronic developments. Facsimile, teletex and electronic mail will follow. Roche examined several scenarios for the development of a digital system with integration of services in France. Haughton did the same for Canada, and Maruyama for Japan. Williamson gave much attention to switching in the evolution of a digital network. Harris described the development of System X, a coordinated effort of the British Post Office and industry. This is a software controlled system, with stress on modular approach and extensive use of microelectronics, and it should suffice for all requirements up to 1990. Ellis highlighted progress in technology and the consequant evolution in the corporate network of the future with its numerous new services.

The afternoon sessions on Switching, structure and technology, Management and maintenance, Radio links and satellites were chaired by Ryan, Irmer, Haughton and Carassa, respectively.

In switching, Agricola described a fully-electronic switching array, with a time-space-time structure. System X was described in detail by Fisher and others. In Canada a broadly based, fully integrated digital switching and transmission product line is being established (Gordon). The special problems of an SPC switching system for multi-national communications were discussed by Wedmore, who uses multiprocessor and distributed processing arrangements. Fritz examined the introduction of TDM switching in the French E10 time-switching system. The number of E10 lines ordered per year rose from 10,000 in 1970 to 643,000 in 1978. ITT (Richards) conceived Network 2000 as a framework for all future developments. It stresses software defined system architecture. A Danish digital local telephone network is based on switched 64 kbit connections (Andersen). Stürz (DDR) introduced ENSAD, a standard communication system for analogue and digital switching.

Braek (Norway) discussed the benefits of functional specification and description languages. Shimizu described an improved software structure for the electronic switching system ESS. Frequency stabilization with microwave cavities and dielectric resonators was the main subject of a talk by Ivanov. The use of inactivity times during conversation in the CELTIC system was discussed by Lombard. VLSI techniques (up to 100,000 transistors on a chip) permit improved utilization of telecommunication systems (vocoders) and permit the construction of special software (VLSI-ROM's), but economic considerations then require a high turnover, said Goser. Shepard discussed the central rôle of the Canadian Government in communications R and D. Ridler (STC) reviewed the trends in cable transmission systems with emphasis on LSI and fibre optics.

According to Lehto (University of Oulu, Finland) the world radio network can be systematically improved towards a multilevel structure of adaptive links of different services. Focarile had operation support systems, serving many telephone exchanges from a centralized point, and leading to centralized maintenance, traffic data gathering and processing, billing and network management. A centralized supervisory system was discussed by Sado. Another centralized exploitation system for telephony was examined by Debiesse. Backzo discussed reliability of telephone communication and its measurement. Coolen reviewed a remote controlled management and supervisory system. Lewis treated Canadian international management experiences and, in general, the further development of network management. Park and Longley discussed the problems of the interim analogue/digital network in Canada.

Haga discussed the international maritime satellite organization Inmarsat. Hyamson and Robinson reviewed a radio relay system for digital transmission at 140 Mbit/s in the 11 GHz band in the UK. Yamamoto treated a novel long-haul digital radio system, which has 200 Mbit/s capacity. It was tried over a 63 km path at 5 GHz. Magne and Maurel described 140 Mbit/s digital radio relay links in the band 10.7-11.7 GHz, to be used in the French national network. Thaler and Mahner discussed a German radio link system of 240 channels at 15 GHz. In satellite communications Foldes and Berkowitz reviewed the design problems associated with multibeam antennas. Allen made

an adaptive equalizer for correction of multipath distortion in 90 Mbit/s, 8 PSK microwave systems. In Canada a new generation of communication satellites will be introduced in 1981. High-speed digital satellite links will operate at 91 Mbit/s in the 14/12 GHz bands (Lester). Withers (UK) discussed the choice of satellite system constants for effective orbit and spectrum utilization.

The second plenary session, with Mr. Joel in the chair, treated the theme "From existing to new telecommunications networks: new technologies and new potentials in telecommunications". Delchier discussed the plans of CEPT (Conférence européenne des Administrations des Postes et des Télécommunications) for a European data network, Euronet. Baur reviewed innovation and rationalization in the component sector of the communications industry. Tirro and Drioli treated a satellite system at 20/30 GHz, to be integrated into the Italian terrestrial network. Martin outlined the coordinated contribution made by various technologies to the overall design of System X. Ichihara treated the Japanese project Venus for efficient network organization with service integration. Facilities include packet-switching, terminal interfacing, message store-and-forward and conversion. The Australian telecommunications network has special requirements, due to the population structure of the country. McKinnon reviewed new developments, such as a digital data network linking Melbourne, Sydney and Canberra in 1981. The European Space Agency plans a Spacelab-Orbiter system,and it is hoped that the Ariane launch vehicle will be operational towards the end of 1980. Gibson discussed several scientific and communications programmes (point-to-point, mobile services, and direct broadcasting).

On the second day the afternoon sessions covered Digital and data transmission networks; Mobile systems, troposcatter propagation; System performance and implementation; Rural telecommunications. Knudtzon, Thué, Leuthold and Sir Edward Fennessey acted as Chairmen.

The Unified Digital Switching System, UDS, seeks to provide the users with a wide range of data services in an integrated manner. The design utilizes functional modularity (Walters, RCA). An organic aggregate of network synchronization, synchronous multiplexing, local loop digital transmission and existing long-haul digital transmission techniques efficiently provides Japan with end-to-end digital services (Okimi, NTT). In Canada the

Infoswitch system combines circuit and packet modes of service within the same network (Carleton). Another Canadian system is the public packet switched data network, Datapac (McGibbon). It is interconnected with the US packet networks Telenet and Tymnet. A general survey of European public data networks was given by Cardarelli (Datec, Transpac, IPSS, Nordic public data network, Euronet). The European Space Agency is exploring two satellite projects for digital applications: Stella and Spine. The French network Transpac was discussed by Picard. Bocker treated packet-data switching, based on the Siemens EDS switching system, and Kohl dealt with a nation wide digital data network for FR Germany.

The common automatic mobile telephone system of the Nordic countries was treated by Haug, and a new public mobile communications system in Japan by Ooi and Nishimaru. A new digital phase modulation method(designed to establish digital voice transmission in mobile radio networks with optimum spectrum efficiency) based on Tamed Frequency Modulation and its derivatives, was discussed by Noordanus. Research at Bath University showed unexpected advantages for mobile service use of single sideband (McGeehan). The Eastern microwave system links Bali, Celebes and five other islands of the Indonesian archipelago. According to Wikanto, Sugimoto and other, the long hop line-of-sight sections fulfil the CCIR objectives with a sufficient margin, notwithstanding fading. The North Sea oil fields are linked to the UK, Netherlands and Germany by troposcatter. Quadruple phase diversity combats fading. Duct propagation can be a problem (Rider). Van der Vorst measured propagation on 12 and 35 GHz (attenuation and depolarization). A study on microwave propagation in dust storms in Iraq was published in the Proceedings, but its authors (Al Hafid, Buni et al.) did not show up.

Pehani developed a model of an integrated communication system, based on the closed digital loop, controlled by a central microprocessor. This has advantages in case of conference calls. Bellanger exploited multipliers in digital signal processors. Pelloni treated a digital transmultiplexer (FDM to PCM), based on Bellanger's earlier work. Krebser discussed spread-spectrum multiple access with frequency-time hopping multi-carrier modulation. Sophisticated design of transmitters and receivers would be necessary. Ingram compared baseband digital systems. In his opinion ternary transmission is now the most attractive scheme, but further improvement in

technology may shift the best choice to a larger number of levels. Digital sound programme transmission of up to five 15 KHz channels over 2048 kbit/s paths was presented by Thoma. The problem of selection of pseudo-noise signals for address and data transmission was solved by Varakin (USSR). A new method of adaptive equalisation by mini-computer was discussed by Rivero Laguna. A multi-access rural telephone system with microprocessor technology was established in Japan (Itoh). Langenbach-Belz discussed a cost-effective small local digital exchange. Rousset and Carrier have given attention to the planning of rural systems taking into account expected future developments. Shanholt compared analogue and digital switching systems for rural areas on a cost basis. McCallum discussed a fibre optics field trial in a rural Canadian environment. Different strategies for conversion to digital systems in India were treated by Saran and Agarwal. The geography of Chile makes the use of a satellite a reasonable technical and economical alternative, according to Pavez. Finally Rudilosso reviewed the different possibilities open to rural zones in developing countries.

The last plenary session on "The future of world-wide communications" had Professor Stumpers as Chairman. Mr. Larsson sketched the technical long-term plan prepared for the Swedish telecommunication network, taking into account the possibilities of microprocessors, optical fibres and stored programme control. Dr. Boehm described forecasting methods and market analysis for communication, based on econometric models. Dr. Reid gave a very interesting demonstration of Prestel by direct connection London-Geneva. Mr. Séan McBride (Nobel Peace Laureate) discussed the importance of assistance to developing countries on communication problems. Mr. Gressmann (EBU) treated the future development of broadcasting systems. SSB techniques may be introduced in radio sound broadcasting. Teletext and telesoftware are possibilities for extensions to be introduced fairly soon. Glowinsky and others discussed future new services and their introduction in France. Mr. Clifford asked whether the human resources in telecommunications were optimally used.

The afternoon sessions of this last day were devoted to Optical fibre communications; New facilities, new services; Transition problems, economic and social implications; Integration of services and systems, network models. The respective Chairmen were Prof. Borgnis, Mr. Masters, Dr. White and Prof. Inose.

As to optical fibres, Dr. Midwinter thought that, at the 140 Mbit/s level, repeater sections in the 6 to 8 km range would be the norm. A great deal of attention has been paid to the production of mechanically perfect fibres with impressive results. For a 500 metre length of cable, the coaxial one weighs five tons and the optical fibre one only 25 kg. The level of impurities in the glass is virtually zero, and the loss is due to Rayleigh scattering (2dB/km at 800 to 900 nm wavelength and 0.4 to 0.5 dB/km at 1.3μ). Operation between 3μ and 5μ may reduce losses to only 10^{-3}dB/km. A comparison of 565 Mbit/s signals on coaxial cable and graded index optical waveguides was made by Kuegler. He reported on measurements made only during the last few months. In Japan ITT has installed 48 optical fibres totalling 20 km in length with 2.8 dB/km loss and 10 km repeater spacing (Kuriyama and others). Optical fibre systems are more economical than conventional cables and more appropriate for new services. Wavelength division multiplex has become realizable and attractive, according to Hinoshita. The Hitchin-Stevenage 140 Mbit/s optical fibre system, planned in 1975 and completed in 1977, consists of 50 km of graded index silica fibre, made in 1 km lengths, with an installed attenuation of less than 5 dB and a lower dispersion than 7 nsec. Bouillie sketched French progress in optical fibre communication. Banks and Mills described a trial fibre-optic loop system serving 36 subscribers along two city blocks in Toronto. Kao (who shared the Ericsson Prize last year for his 1966 paper) discussed the prospects for optical fibre system technology and found them excellent.

The progress from Viewdata to the public Prestel service was sketched by Fedida. Among the new services Kanzow found telefax and teletex of special interest to the business community. Interactive and broadcast videotex may become important in the private sector. Chiariglione and Corsi hope that redundancy reduction techniques will enhance the feasibility of visual services. Wah discussed an efficient two-dimensional facsimile source encoding procedure, proposed to CCITT (with several others). Videotex is launched in France too (Leclerq). Custom calling services, such as call waiting, call forwarding, three-way calling, speed calling, call answering-advance calling, message retrieval, message recording are being made available by the Bell system (Nacon). Videotex, an interactive telecommunications

network based information retrieval service is currently evaluated in Canada (Nicholls). Leaky reviewed new services for the UK business community.

The smooth transition towards digital public switching networks was discussed by Suckfüll for Germany and by Wuhrman and Zbinden for Switzerland. A general strategy for conversion to digital SPC equipment was given by Calafell. Meurling discussed the transition to the AXE 10 digital telephone switching system in Sweden for various situations (international, rural, mobile systems). Giraud discussed the social impact of improved telecommunication services. Our only lady speaker, Miss Bird, examined the impact of new telecommunication and information systems on work patterns in the office sector. Cosway and others discussed the problems of the handicapped in telecommunications and the efforts made in Canada to improve their situation. Serrano reviewed manufacturing strategies for low-capacity earth stations in developing countries.

Leysieffer suggested an intense effort to establish an international standard of integrated services digital networks, based on a uniform 64 kbit/s channel. Arifon discussed a French multiservice packet-switching system. Del Vecchio presented some proposals for new record services, which an integration process of existing or planned services would permit. Lajhta reviewed the changing cost ratio of telecommunication network elements and their effect on the optimum network structure. Wojnar discussed optimum network structure for mobile radio systems and for VHF/UHF broadcast systems. Braaten reviewed applications and experiences with digital processing techniques for service integrated networks in Norway. Canada faces the problems of creating an integrated digital network by effective planning (Fellows). A universal data transfer service has been conceived to integrate the international record services with the advanced services of tomorrow (Intartaglia).

The Proceedings of this Symposium also published 24 alternate papers and 8 papers accepted for publication only. They include messages from the Secretary General of ITU, M. Mili, and the Symposium Chairman, Mr. Burtz, Director of CCITT. The volume contains over 1,000 pages. Copies are still available from the ITU Publications Dept. at 200 Swiss francs (surface mail included). The Telecom hostesses were of great help to Chairmen, speakers and participants alike. The work of the Coordinating

Committee Chairman, Mr. Wolter and his secretariat was greatly appreciated. Many participants used the occasion to visit the magnificent exhibition, where nearly all communication industries must have been represented. The books and journals section also attracted much interest.

16 October 1979 F.L.H.M. Stumpers

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UTC TIME STEP ON 1st JANUARY 1980

According to the Recommendations of the International Radio Consultative Committee and of the International Astronomical Union, notice is hereby given that:

a positive leap second will be introduced at the end of December 1979. The sequence of dates of the UTC second markers will be:

31 Dec. 1979, $23^h\ 59^m\ 59^s$
31 Dec. 1979, $23^h\ 59^m\ 60^s$
1 Jan. 1980, $0^h\ 0^m\ 0^s$

B. Guinot
Director, BIH Paris.

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ELECTROMAGNETIC FIELDS AND BIOLOGICAL SYSTEMS

The URSI Commission A Working Group on the Measurements relating to the Interaction of Electromagnetic Fields with Biological Systems was asked, in Helsinki, to continue its activities during the period 1979-81.

The Chairman is Prof. Saul W. Rosenthal whose address is

Microwave Research Institute,
Polytechnic Institute of New York,
Route 110,
Farmingdale, New York 11735, USA.

The Committee is at present actively engaged in the following tasks:

1. Planning the International Bioeffects Symposium in Paris, 30 June - 4 July 1980. A call for papers will soon be circulated. This event is being organised by URSI and the French National Committee for URSI, in cooperation with several other international bodies.
2. It is proposed to include a bioeffects symposium in the programme for the XX General Assembly of URSI in Washington, D.C. in August 1981. The Steering Committee for the overall Assembly programme is at present

considering this proposal.

3. The possibility of organising an international bio-effects Symposium in Czechoslovakia in 1983 is being explored.

More generally the Working Group is considering other future activities which would contribute, in some way, to the scientific advancement of the bio-effects field on an international level. Suggestions from those who are interested should be sent to Prof. Rosenthal at the address given above.

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WORLD ADMINISTRATIVE RADIO CONFERENCE 1979

WARC 79 began in Geneva in late September 1979 and will last for 10 weeks. The great importance of this Conference is generally appreciated, since the decisions to be made will affect radiocommunications of all kinds over the next 20 years. In revising the Radio Regulations, published by the International Telecommunications Union, it will often be necessary to try, as far as possible, to foresee developments in radiocommunication systems up to the beginning of the 21st century.

Quite apart from the normal facilities provided by radiocommunication services of many kinds (navigational aids, television, international telephones, etc.), scientists have a special interest in two Services (officially recognised by ITU) in which the use of radio waves is indispensable: galactic and extra-galactic radioastronomy, and the use of space vehicles for studies of the terrestrial atmosphere and the solar system, and even for use as platforms for telescopes. Within ICSU, the two Unions concerned with these branches of research are URSI, and the Astronomical Union. COSPAR has a special interest in space research. The views and the requirements of radioastronomers and space scientists are brought together in the Inter-Union Commission on Frequency Allocations for Radio Astronomy and Space Science (IUCAF) in which URSI, IAU and COSPAR are all represented. This Commission has been actively engaged in presenting the views of scientists to ITU since 1960, when it was formed. It has been particularly busy during the past 3 or 4 years making preparations for WARC 79. The Commission itself has met on various occasions in many parts of the world:

Bonn, Brussels, Geneva, Slough, etc., but it has also maintained direct contact with scientists through its National Correspondents (listed in URSI Bulletin No 205).

The Commission has recently (July 1979) issued its final recommendations on the changes in frequency allocations which are needed, and which will be discussed during WARC 79. It would probably be naïve to suggest that all the requirements of radioastronomers and space scientists will be satisfied in full. On the other hand, IUCAF collaborates closely with CCIR, the technical advisory body of ITU, and the members of the Commission are well aware of the difficulties in finding ideal solutions to the problem of obtaining appropriate frequency allocations for scientists. The proposals made by IUCAF are, therefore, necessarily based on a realistic appreciation of the situation and it is hoped that most of them will be accepted perhaps, after discussion, with some modifications.

In order to ensure that the views of the scientist can be heard during WARC, IUCAF will be represented during the whole of the Conference by at least one member of the Commission.

Since only the official national delegations have a vote during WARC, IUCAF depends for its success on transmitting its views, through its own national correspondents, to the official delegations. This action has already been taken and the outcome will be known after October 1979.

The expenses of IUCAF are supported entirely by URSI, IAU and COSPAR and hence, indirectly, by the Academies of Science and similar national bodies that are concerned with the encouragement of scientific research.

With the termination of WARC 79, a major task of IUCAF will have been completed. The Unions and COSPAR will later review the structure and rôle of the Commission in the light of the future activities of radioastronomers and space scientists.

8 October

C.M. Minnis
Secretary General 1968-78

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PRESENTATION OF NUMERICAL DATA IN THE GEOSCIENCES

CODATA Bulletin No 32 (August 1979) is entitled "Guide for the Presentation in the Primary Literature of "Numerical Data Derived from Observations in the Geo- "sciences", and has been prepared by Dr. G.A. Wilkins, Past Chairman of the CODATA Advisory Panel on the Geosciences.

This report deals with the presentation of data derived from the observation of material systems in the geosciences and astronomy. Such data are usually dependent on the position of the object or the phenomenon observed, on the position of the observer, and on the time of observation. Hence it would often be impracticable, or even impossible, to repeat the observation in order to test its validity or to improve the precision of the measurements.

The important difference between laboratory experiments and observational studies is that, in an experiment, the system is kept as simple as possible and the conditions are varied in systematic ways that are decided by the experimenter. In contrast, in an observational study, the system is often very complex and the conditions can not be controlled by the observer. Moreover, the data that are actually measured represent only a sample (in terms of type, location or time) of the complete data that would ideally be required to provide a full description of the system or the phenomenon.

It follows from this that the record of the observations made should be complete and should give all the information that would be required by others who may wish to use the data.

CODATA Bulletin No 32 contains recommendations relating to the description of observational procedures, the reduction of the observations, and the presentation of numerical results. The recommendations are relevant to many of the observations made by radio scientists in connection with the propagation of radio waves, tropospheric and ionospheric soundings, and radioastronomical measurements. It seems worth adding that CODATA Bulletin No 9 deals with the presentation of numerical data derived from laboratory experiments and is complementary to No 32.

The annual subscription to the CODATA Bulletin is $20 or 100 French francs. Enquiries should be addressed to:

CODATA Secretariat,
51 boulevard de Montmorency,
F-75016 Paris, France.

October 1979

C.M. Minnis
Secretary General
1968-78

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SPACE TELECOMMUNICATIONS AND RADIO BROADCASTING

An international conference on the above subject was held in Toulouse from 5-9 March 1979.

Recent progress in space technology has offered new opportunities in the field of telecommunications and broadcasting which are, as yet, unsuspected by the public and very often poorly understood by specialists. The aim of the conference was to survey recent progress and to present the technical possibilities and the projects which will be implemented in the next few years.

The Proceedings contain 72 papers, and are published in the language chosen by the respective authors (English or French), and include 800 pages.

Orders for copies must be accompanied by a bank or post-office cheque for 200 French francs payable to "Centre National d'Etudes Spatiales".

The address of CNES is:

Département des Affaires Universitaires,
18 avenue Edouard-Belin,
F-31055 Toulouse, France.

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SOLAR-TERRESTRIAL PREDICTIONS

A Workshop on Solar-Terrestrial Predictions was held in Boulder, Colorado, from 23-27 April 1979.

The Proceedings will be published later in 1979 by the US Government Printing Office and will consist of three volumes:

Vol.I - Review papers by groups which make routine solar-terrestrial predictions of some sort;

Vol.II - Reports of Working Groups, and topical review papers;

Vol.III - Contributed papers on new prediction techniques.

Enquiries about purchases of this publication should be addressed to:

R.F. Donnelly,
Space Environment Laboratory,
NOAA ERL,
Boulder, Col. 80303, USA.

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INTERNATIONAL SYMPOSIUM ON INFORMATION THEORY
Grignano, June 1979

The 1979 International Symposium on Information Theory of the Information Theory Group of the IEEE (Institute of Electrical and Electronics Engineers) was held at Grignano, a small sea-side resort near Trieste, Italy, from 25th to 29th June 1979.

Over 250 papers were presented in the 41 sessions, which were devoted not only to the more classical areas of information theory (Shannon theory, algebraic and convolutional coding, source coding, stochastic processes, pattern recognition, detection and estimation, etc.), but also to the newer emerging topics, such as the complexity of computations, cryptography, routing algorithms, information networks, multi-terminal communications, etc.

Two particularly rich sessions were also devoted to recent results in information theory and two invited sessions were organised: by F.P. Preparata on Problems in the Complexity of Computations, and by A.H. Haddad on Problems in Stochastic Systems.

Among the major events of the Symposium was the Shannon lecture, which was delivered this year by Jacob Wolfowitz ("On the rate-distortion function for source coding with side information at the decoder"), and also four invited lectures, delivered respectively by James Massey ("Convolutional codes: theory lagging practice"), by Suguru Arimoto ("The complexity of decoding for tree

codes and convolutional codes"), by Robert Gallager ("Distributed algorithms and network routing"), and by Aaron Wyner ("An analog scrambling scheme which does not expand bandwidth").

Although it is too early to distinguish the really important contributions from the less valuable ones, it is fair to say that many significant new advances were presented at the Symposium in various fields of Information Theory. Moreover, the pleasant environment and the fine weather contributed to give the over 300 delegates from about 30 countries a nice opportunity to meet and to discuss matters of common interest.

Finally, it should be mentioned that the 1978 Information Theory Paper Prize has been jointly awarded to Diffie and Hellman ("New directions in cryptography", IEEE Trans. on Info. Th., November 1976) and to Rivest, Shamir and Adleman ("Digital Signatures, one-way functions, and public-key cryptography", 1977 Tech. Rept. from MIT).

Trieste
3 August 1979

Giuseppe Longo

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XXII COSPAR MEETING
Bangalore, 29 May-9 June 1979

The following Resolutions were adopted by the Executive Council and the Plenary Meeting on 9 June 1979.

Decision No 1/79, proposed by Interdisciplinary Scientific Commission D.

Recognizing the considerable experimental effort that has been expended in many countries in order to make observations during the International Magnetospheric Study (IMS), and

noting the difficulties experienced in certain countries in obtaining funds for the data analysis of experimental data,

COSPAR

strongly recommends that funding agencies provide suffi-

cient resources for carrying out efficient and rapid data analysis and physical interpretation of IMS data to realize the scientific goals of this international program and further

recommends that Coordination Data Analysis Workshops as demonstrated by the IMS Satellite Situation Center in December 1978, be supported in the IMS Data Analysis Phase 1980-1985.

Decision No 2/79, proposed by the Panel on Potentially Environmentally Detrimental Activities in Space.

Considering that the increase of satellite weight and size increases the danger of unwanted effects during atmosphere re-entry, e.g. localized atmospheric pollution by burn out or damage to human property or even lives by re-entering debris,

COSPAR

urges the launching agencies to be cognizant of these effects and to make appropriate provisions to have such debris impact in areas where no damage to human activity is expected.

Decision No 3/79, proposed by the Advisory Panel on Space Research and Developing Countries.

COSPAR,

considering the importance of encouraging in developing countries the growth of technologies relevant to the field of space sciences, and

noting the proposal of the Workshop held at Ootacamund, India, last April,

recommends to the concerned national institutions and international organizations to take the necessary actions with appropriate authorities to support the proposal to establish an international institute for space studies and electronics and to erect a giant radio telescope at an equatorial location, and

further recommends that early attention be given by the participating parties to the problem of training and building up an adequate number of scientific and technical personnel to adequately staff the facilities.

Decision No 4/79, proposed by Interdisciplinary Scientific Commission C.

Noting the approval by ICSU of the Middle Atmosphere Program (MAP) which requires extensive and detailed sounding of the stratosphere and mesosphere for the preparation of the necessary high altitude maps of the region, and

noting the indispensable rôle played by the world wide meteorological rocket networks,

COSPAR

views with concern the proposed reduction in the US Meteorological Rocket Network from 14 to 6 launching sites, and

urges the US Academy of Sciences to bring to the attention of the relevant US agencies the need to maintain the present or preferably increase the frequency of meteorological rocket soundings, at least until the completion of MAP at the end of 1985.

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OCEANOGRAPHY FROM SPACE

Venice, Italy
May 26 - 30, 1980

The ICSU Committees on Space Research and on Oceanic Research, and the Inter-Union (IUGG and URSI) Commission on Radio Meteorology announce a Symposium on the subject of oceanography from space. The purpose of the meeting is to review recent studies of the oceans based largely upon observations from space, to examine the accuracy and usefulness of satellite measurements, and to delineate future programs of both national and international scope.

Papers for oral presentation will be mostly by invitation. Other papers at the meeting will be given in poster sessions. The program will also include informal discussions and will precede COSPAR activities to be held at Budapest, Hungary, 2-14 June, 1980.

The talks and posters will consist of a) reviews of satellite observations of such phenomena as waves, currents, tides, the geoid, surface winds, the distribution of marine organisms, and oceanic climate; and

b) satellite techniques including optical, infrared and radio observations of the sea and satellite technology. The papers will be edited and published as a book shortly after the meeting.

The symposium will be hosted by the Applied Project for Oceanography of the Italian National Research Council (CNR) in Venice, Italy, and will be held 26-30 May. Submissions for presentations should include a 200-word abstract and should be sent before December 31, 1979 to:

J.F.R. Gower,
Institute of Ocean Sciences,
P.O.Box 6000,
Sidney, British Columbia V8L 4B2,
Canada

Telephone (604) 656-8258
Telex 049 7281.

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CONFERENCE ON PRECISION ELECTROMAGNETIC MEASUREMENTS

Braunschweig, Fed. Rep. of Germany June 23 - 27 1980

The Conference on Precision Electromagnetic Measurements (CPEM) will be held at Stadthalle Braunschweig from June 23 to 27, 1980. It will be organized by the Physikalisch-Technische Bundesanstalt.

Questions of electrical precision measuring techniques will be reviewed at the conference in lectures and discussions, in particular:

- Results and methods of measurement for the realisation and maintenance of electrical units;
- Direct current and low frequency; High frequency and microwaves; Special standards;
- Antennas and fields; Time and frequency; Time domain measurements;
- Automated measurements; Computer-oriented procedures; Application of microprocessors;
- Component and system metrology; Cryoelectronics; Fiberoptics; Lasers;
- Technical calibration services.

The CPEM, which was originally held every two years exclusively in the USA, has over the years gained no

little international reputation beyond the borders of that country. For this reason every second conference is now held outside the USA.

The conference language is English. CPEM '80 requests hitherto unpublished lectures on results of scientific work in the above-named fields. The authors should submit an abstract (35-50 words) and a summary (500-1000 words) in English by 1 January 1980.

The special prize "Helmholtz-Preis 1980", of value DM 5,000, will in that year be an international award for the best paper on "Precision electromagnetic metrology" submitted to CPEM '80. The conditions for this scientific competition have been published in scientific and technical periodicals.

In conjunction with the conference, it is planned to hold an exhibition of precision measuring instruments giving a general survey of the most recent developments in the field of measuring techniques.

Further information:

Prof. Dr. H. Capptuller,
Technical Program Chairman,
Physikalisch-Technische Bundesanstalt,
Bundesallee 100,
D-3300 Braunschweig, F.R. Germany.

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EFFECTS OF THE LOWER ATMOSPHERE ON RADIO PROPAGATION AT FREQUENCIES ABOVE 1 GHz

This International Open Symposium, organised by URSI Commission F, will take place at Bishop's University, Lennoxville, Quebec Province, Canada from 26 to 30 May 1980. The Symposium is directed towards telecommunications interests in the radio spectrum above 1 GHz and will include workshop sessions for the preparation of documents for submission to the CCIR.

The following sessions are planned:

- Scattering from hydrometeors;
- Prediction of attenuation due to rain on terrestrial links;
- Clear-air propagation on line-of-sight radio paths;

- Prediction of attenuation due to rainfall on earth-space links;
- Cross-polarisation on terrestrial links;
- Cross-polarisation on earth-space links;
- Trans-horizon propagation.

Information for intending authors was issued in June in URSI Bulletin No 209 (deadline for receipt of synopses: 30 September). Those persons wishing to attend the Symposium but not to give a paper should write, at the earliest opportunity, to Dr. K.S. McCormick at the Communications Research Centre, Post Box 11490 - Station H, Ottawa, Ontario, Canada, who will be able to supply further information, including arrangements for accommodation.

The Symposium registration fee is expected to be 70 Canadian dollars, which will include the cost of a pre-print volume.

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ELECTROMAGNETIC WAVES AND BIOLOGY

30 June - 4 July 1980

The next International URSI Symposium on "Electromagnetic Waves and Biology" will be held in Jouy-en-Josas, in the Centre d'Enseignement Supérieur des Affaires (CESA) near Paris, from June 30 to July 4, 1980.

It is cosponsored by URSI Commissions A and B, and CNFRS, together with the cooperation of international and national organizations such as IRPA, CNRS, BEMS, etc.

André-Jean Berteaud and Bernard Servantié will be co-chairmen of the Symposium.

French and English will be the working languages of the Symposium.

Contributed papers will be selected on the basis of a 100-word abstract and a two-page summary to be submitted before the end of January 1980.

Topics of current interest are:

- Dielectric properties of living matter;
- Dosimetry, energy distribution, exposure system;
- Molecular effects, cellular effects;

- Physiological effects, psychophysiological effects, physio-pathological effects;
- Standards and safety;
- Diagnostic and therapeutic applications.

The Technical Program Committee will reply to prospective authors before mid-March 1980. The full texts of papers accepted must be received before 15 June, 1980 for publication in the Proceedings which participants will receive, after registration, before Autumn 1980.

Arrangements for lodging will be made in the CESA centre itself, in Jouy-en-Josas.

For further information contact:

Dr. A.J. Berteaud,
C.N.R.S.,
2 rue Henry Dunant,
F - 94320 Thiais, France.

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RADIO SPECTRUM CONSERVATION

An international conference entitled "Radio Spectrum Conservation Techniques" will be held at the Institution of Electrical Engineers, London. The provisional dates are 7-9 July 1980 but, in view of the interest already shown, the time may be extended by a day or two.

The Conference will discuss scientific, technological and engineering-economic aspects of conservation, but not the administrative principles which will have been discussed elsewhere.

The texts of papers submitted will be reviewed in January 1980 and details will be made available to intending participants soon afterwards.

The Conference is being organised by the IEE with the collaboration and support of other British and international bodies.

Further information is available from:

IEE Conference Department,
Savoy Place,
London WC2R OBL,
United Kingdom.

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ELECTROMAGNETIC COMPATIBILITY

Wroclaw, Poland, September 1980

General

The 5th EMC Symposium in the Wroclaw series will be held, from 17-19 September 1980, in the Wroclaw Technical University, Poland. The Symposium and associated Exhibition will be organised by the Association of Polish Electrical Engineers in cooperation with other Polish and international societies, including URSI Commission E.

The Officers of the Organising Committee are:

Prof. R.G. Struzak (Chairman),
Prof. D.J. Bem (Vice-Chairman),
Mr. W. Moron (Secretary General).

The Chairman and Vice-Chairman of the Scientific Programme Committee are respectively:

Prof. F.L. Stumpers (Netherlands), and
Mr. R.C. Kirby (Switzerland).

Topics

The Symposium will deal with all aspects of EMC, with particular emphasis on radio-technological aspects, including the following:

- Predicting RFI effects in devices and systems;
- EM fields, antennas and propagation;
- EMC and cable communication;
- Spectrum management - computer assisted;
- Immunity and susceptibility;
- Spectrum economy and impact of new techniques on EMC;
- Lightning and EMC;
- Computer-assisted spectrum monitoring and direction-finding;
- National and international cooperation in EMC - regulations, standards and specifications;
- Harmful effects of RF energy;
- Shielding and filtering;
- Mathematical and computer models in EMC studies;
- Measuring methods and smart instrumentation;
- Spectrum pollution and specific sources of RFI;
- Radio system planning;
- Others.

Timetable for authors

Five copies of one-page abstract by 30 October 1979. Authors will be notified of acceptance by 31 December 1979. Camera-ready copy (up to 9 pages) by 31 March 1980.

Authors are requested to submit their papers in either English or Russian, and to indicate to which of the above topics they refer.

Two copies of abstracts should be sent to:

Prof. F.L. Stumpers,
Elzentlaan 11,
Eindhoven, Netherlands,

and three copies to:

Prof. R.G. Struzak,
EMC Symposium,
Box 2141,
51-645 Wroclaw 12, Poland.

Further information is available from:

Mr. W. Moron,
EMC Symposium,
Box 2141,
51-645 Wroclaw 12, Poland.

Intending participants are reminded of the following events in Poland:

- European Conference on Circuit Theory, Warsaw, 2-5 September 1980;
- European Microwave Conference, Warsaw, 8-12 September 1980.

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FIRST EUROPEAN SIGNAL PROCESSING CONFERENCE (EUSIPCO-80)
Lausanne, Switzerland, 16-19 Sept. 1980

Objectives

EUSIPCO is a triennial International Conference promoted and organised by the European Association for Signal Processing (EURASIP) in cooperation with several other organisations and URSI. Its aim is to cover all aspects of signal processing theory and practice, and to promote the exchange and cross-fertilization of ideas

between individuals working in such a multi-disciplinary field.

The sessions in 1980 will include tutorial and review papers, new research results, presentations of applications and technological novelties, and will probably include panel discussions and poster sessions. The Proceedings will be published by North-Holland Publishing Co.

The official language of the Conference will be English.

Areas of Interest

The Conference is open to all aspects of signal processing including:

- Signal and noise theory;
- Filtering;
- Spectral analysis;
- Image and 2-D signal processing;
- Optical signal processing;
- New signal processing technology;
- Special purpose hardware and software developments;
- Radar - Sonar signals and systems;
- Speech processing;
- Applications in communication, biomedicine, pattern recognition, seismology , industrial processes,etc.

Submission of Papers

Prospective authors are encouraged to submit papers in quadruplicate to the Conference Secretariat in one of the following forms:

- Tutorial papers: suitable for a 40 minute presentation. Acceptance on the basis of full text only.
- Regular papers: suitable for a 25 minute presentation. Acceptance on the basis of a detailed summary of 3 to 5 pages emphasising the originality and/or the relevance of the subject.
- Short communications: (will not be included in the Proceedings) suitable for a 10 minute presentation or for a poster session. Acceptance on the basis of a summary of 1 to 2 pages.

Publication of Acdepted Papers

Authors of accepted papers (excluding those of short communications) will receive instructions for preparing

their final manuscript on special double-column camera-ready sheets for publication in the Conference Proceedings. Tutorial and regular papers are limited to 10 and 6 sheets respectively. Selected papers of exceptional interest and merit will be considered for an extended publication in Signal Processing, EURASIP's official journal.

Deadlines

January 15, 1980	Submission of tutorial and regular papers
March..... 1980	Notification of acceptance/rejection
April 30, 1980	Reception by the Conference Secretariat of final manuscripts to be included in the Conference Proceedings
April 30, 1980	Submission of short communications
May..... 1980	Notification of acceptance/rejection of short communications.

Registration Fee (including a copy of the Proceedings)

	EURASIP members	Non-members
If paid before 1 June 1980	150 Swiss fr.	220 Swiss fr.
" " after " " "	200 " "	270 " "

A reduction of 100 Sw.fr. will be allowed to students enrolled in a regular academic programme.

Speakers whose papers have been accepted will not be asked to pay the Registration Fee.

Payment must be made in Swiss francs only to the EUSIPCO-80 Account No 322397-41 at:

Swiss Credit Bank,
Rue du Lion d'Or,
CH-1002 Lausanne, Switzerland.

Chairmen and Secretariat

The Co-chairmen of the Conference are M. Kunt and F. de Coulon of the Laboratoire de Traitement des Signaux at the Swiss Federal Institute of Technology. Further information can be obtained from the Conference Secretary: Mrs C. Stehlé, EUSIPCO-80, Department of Electrical Engineering, Swiss Federal Institute of Technology, 16 Chemin de Bellerive, CH-1007 Lausanne, Switzerland. Tel.(21)47 26 24 Telex 24478 EPFVD CH.

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ELECTROMAGNETIC COMPATIBILITY
Baltimore, October 1980

The IEEE EMC Society is organising an International Symposium on Electromagnetic Compatibility in Baltimore (Md), USA from 7-9 October 1980. URSI Commission E is actively involved and at least one session will be arranged by the Commission in which preference will be given to speakers from outside the USA. Mr. George Hagn (Chairman, URSI Commission E) is a member of the Steering Committee for the Symposium.

As our society becomes increasingly technological in character, the concept of EMC is spreading into many new disciplines. With this thought in mind, the technical programme for EMC '80 is intended to offer a "Constellation of Ideas" in line with the broadening scope of the EMC field.

Original, unpublished papers are invited in the following or in related areas:

Electromagnetic Compatibility

Technological Areas	System Applications
Electromagnetic environment	Biomedical applications
RF hazards	Communication systems
Interference control	Computers
Design techniques	Consumer electronics
Grounding and bonding	Defense
Materials and shielding	Aerospace
Lightning and EMP	Power systems
Antennas and propagation	Transportation
Measurements	Railroad
Fiber optics	Automotive
Instrumentation	Aviation
Techniques	Maritime
Spectrum management	Process controls
Computer analysis techniques	
Assignment techniques	
Susceptibility and immunity	
EMIC analysis techniques	
Non-design characteristics	
Standards and specifications	

Non-sinusoidal Signals

Technological Areas	System Applications
Sequency theory	Digital signal processing
Walsh functions	Speech and image processing
Orthogonal functions	Communications
Transforms	Radio
Switching theory	Multiplexing
Pattern classification and recognition	Spread spectrum
Filters	Radar
Logic/Coding	Spectroscopy
Radiated interference	Nonlinear systems
	Generators/transmitters
	Analyzers/receivers

Prospective authors are invited to submit 3 copies of a 50-70 word abstract, and of a 600-800 word summary (including not more than four illustrations), which clearly explain their contributions in the context of EMC technology. The authors of papers that have been accepted will receive forms and instructions for the preparation of the material to be printed in the Symposium Record.

Papers written by students will be eligible for a student prize.

Timetable for Submissions, etc.

Abstract and Summary (3 copies)	by 15 Jan 1980
Notification of acceptance	by 14 March 1980
Camera-ready copy	by 15 May 1980.

Abstracts and summaries should be submitted to:

Bernhard E. Keiser,
Technical Papers Chairman,
P.O.Box 1711,
Annapolis (Md) 21404,
Phone (703) 281-9582.

Further information is available from:

Andrew Farrar,
General Chairman,
P.O.Box 1711,
Annapolis (Md) 21404,
Phone (301) 267-4321.

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4th EMC SYMPOSIUM AND TECHNICAL EXHIBITION

Call for Papers

After successful presentations at Montreux (1975, 1977), the 4th Electromagnetic Compatibility (EMC) Symposium and Technical Exhibition is planned for March 10 to 12, 1981 at the Federal Institute of Technology Zurich (Switzerland). The conference is chaired by Prof. Dr. P. Leuthold, replacing the retiring Past Chairman Professor Borgnis. Program Chairman is again Prof. F.L. Stumpers. The conference is sponsored by the Association of Swiss Electrotechnicians and organised by the Institute of Communications Technology of the above mentioned University under the direction of Dr. T. Dvorak.

Authors are invited to send 300 to 500 word summaries of papers not previously published and describing original work to:

EMC 1981 Program Committee,
ETH Zentrum-HF,
CH-8092 Zurich, Switzerland,

so that they arrive not later than 15 March 1980. Authors will be notified by 16 June 1980; photo-ready manuscripts will be due till 15 November 1980.

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JOHN W. WRIGHT

1929-1978

Dr. John Wright, an Official Member of URSI - USA Commission F died in a single automobile accident on 20 November 1978.

John Wright obtained the B.Sc. and Ph.D. degrees in Physics from the Massachusetts Institute of Technology, USA in 1951 and 1961 respectively. In 1956 he joined the US Naval Research Laboratory in Washington, D.C. from where he published the two classical works on Bragg scattering of microwaves from water waves (1966) and on the composite surface scattering model (1968) which today are recognised and used world wide. Since then he played a key rôle in the development of the new field of radio oceanography.

He was a leading figure and one of the most creative

minds in the field of coherent-radar probing of wind-waves. First under controlled laboratory conditions in wave-tanks, and later with the supplement of measurements from coastal piers (Nags Head and Duck, N.C., USA) and oceanographic towers, he obtained new knowledge on the dynamics of wind-waves and ocean waves. John Wright had the rare talent that, through quantitative measurements of physical phenomena, he could infer the basic physical processes involved and than describe them by simple analytical linear models.

Among his principal contributions to the areas of radio oceanography, physical oceanography and remote sensing are new knowledge on the dynamics of short gravity and capillary waves in the ocean (i.e. phase speed, wind-drift effects, generation, growth rates and air-water transfer). Dr. Wright was also instrumental in the development of the dual-frequency radar to measure long ocean waves and the relaxation-time model for the modulation of short gravity waves by long waves in the ocean. Finally he also contributed to the correct interpretation and treatment of synthetic aperture radar images of the ocean.

Dr. Wright was a member of the US Delegation to the General Assemblies of URSI in 1972 and 1975. In Lima, Peru he spoke on Mechanisms of microwave imaging of the ocean. His friends and colleagues will greatly miss his creative mind and unique physical insight.