Bulletin No 216 Mars 1981

U.R.S.I.

Table des matières - Contents

BERNARD DECAUX
1900-1981

C'est avec une profonde tristesse que nous annonçons le décès de Monsieur Bernard Decaux, survenu à Paris le 8 février 1981. Ancien Président de la Commission I de l'URSI, Monsieur Decaux avait été élu Vice-Président de l'Union en 1960 et Président d'honneur en 1966.

Un article consacré à la carrière de Monsieur Decaux et à ses activités au sein de l'URSI paraîtra dans le numéro de juin du Bulletin d'Information.

+ + + + +

GEORG GOUBAU
1907-1980

Dr. Georg Goubau, internationally known scientist, died on 17 October 1980 at the age of 73 years. He was born in Munich, Germany, and lived since 1950 in Eatontown, New Jersey.

He studied at the Technical University of Munich where he majored in physics under the guidance of Prof. Zenneck. He earned his Diploma and PhD degrees in 1930 and 1931; in 1936, he earned the Dr. habilitatus degree. He remained at the Technical University of Munich as an Associate and Dozent (Associate Professor) until 1939.

Dr. Goubau's field of research in this period was the experimental and theoretical investigation of ionospheric wave propagation. Already in 1929 he designed and installed an ionospheric research station near Kochel, 60 km south of Munich, the "Versuchsstation Herzogstand"[+]. In the early stage he used a pulsed transmitter that could be switched to several frequencies in sequence.

[+]R. Eyfrig: Versuchsstation Herzogstand, die Wiege der deutschen Ionosphärenforschung, Kleinheubacher Berichte 18 (1975), 291-304.

Oblique-incidence observations on a link Kochel-Berlin allowed the study of motions in the ionosphere. The first German ionosonde, which Goubau developed, was in operation at the station from 1937 until 1946. W. Dieminger was one of the students who performed his PhD thesis in ionospheric research with Goubau.

In 1939, Dr. Goubau was appointed Full Professor and Director of the Department of Applied Physics at the University of Jena. Here, he lectured on high frequency techniques; he conducted research on antennas and performed fundamental studies on waveguides, cavities, and microwave circuits. The results of these studies are presented in the book "Elektromagnetische Wellenleiter und Hohlräume", which Prof. Goubau wrote together with his associates during 1947. Because of postwar conditions in Germany publication was delayed until 1955. The book was translated into English in 1961.

In 1947, Prof. Goubau joined the US Army Signal Corps Engineering Laboratories at Fort Monmouth, N.J. (later to become the US Army Electronics Command), where he worked until his retirement in 1973. During this time he conducted research on a wide variety of subjects in the general area of electromagnetics, including unconventional antennas, free-space and guided wave propagation, optical transmission, scatter and diffraction, microwave power transmission, microwave network components, and measurement techniques. He made original contributions to the state-of-the-art in all these fields. Among these contributions, two are outstanding and have become associated with his name: the surface wave transmission line, also known as the Goubau line; and the beam waveguide, a low-loss lens guide for long distance transmission of coherent optical beams. In the theoretical investigation of these beam waveguides, which he first studied at millimeter wavelength, he developed the now widely-used concept of Gaussian beam modes. His papers on these investigations have become classics.

Dr. Goubau's retirement in 1973 was only nominal. He now investigated fundamental questions in the area of low-profile antennas and new, multi-element approaches to their design. For several years he worked as a consultant to the Electronics Command Laboratories, where in 1976 he chaired a Workshop on Electrically Small Antennas which was attended by an international audience.

In 1974, he became a Visiting Professor at Rutgers University, where he joined the faculty of the Electrical Engineering Department working as a thesis advisor. In the course of his work there, he developed a novel computer modelling method for small antennas of complex configuration.

Dr. Goubau was the author of numerous publications and the holder of twelve major patents. His achievements were recognized by many awards including Fellowship of the IEEE, the IEEE Harry Diamond Award, the John T. Bolljahn Award of the IRE Professional Group on Antennas and Propagation, and the highly-esteemed Decoration for Meritorious Civilian Service of the Department of the Army.

He was a member of URSI Commission VI since 1954.

Dr. Goubau was a physicist of unusual creativity. His work was distinguished by adherence to the highest professional standards. He was uncompromising in his quest for excellence. The question of whether he was primarily a theoretical or an experimental physicist is difficult to answer; he was an expert in both disciplines. His particular strength was an exceptional insight and intuitive understanding of physics. He insisted on exactness in his theoretical work and favored analytical approaches guided throughout by physical reasoning, often resulting in elegant solutions. In his experimental work, he favored techniques which were refined but simple and, hence, highly accurate.

He, himself, was his most demanding critic and liked to clarify his ideas in discussions with his associates. In these discussions, which were both enjoyable and enlightening, he persisted until all aspects of the problem at hand were fully understood. He regarded only significant advancements worthy of publication and used great care in preparing these publications. To those who had the opportunity and good fortune to work with him, he was an inspiring teacher. Several of the students he taught in Germany are now professors; many of his associates in the United States earned their PhD degrees under his stimulating guidance.

Dr. Goubau will be remembered by his friends and colleagues for his integrity, sincerity, sense of humor, and personal concern for his co-workers. Even under the

burden of a heavy workload he was perfectly composed; he was easily accessible to everyone who sought his consultation and advice. In his personal approach, Dr. Goubau was direct, sincere, and unassuming. Close relationship with him resulted not only in friendship with him, but in admiration and respect. Dr. Goubau's death is a great loss to both his friends and the scientific community.

Felix Schwering

+ + + + +

RENE RIVAULT
1908-1980

Avec la disparition du Professeur René Rivault, le 29 octobre 1980, le Comité national français de radioélectricité scientifique a perdu l'un de ses membres les plus éminents, et l'URSI une des personnalités qui ont particulièrement influencé l'évolution des recherches dans le domaine de la propagation des ondes radioélectriques.

Né le 12 septembre 1908 à Poitiers, René Rivault avait pris sa retraite en septembre 1978 après une longue carrière partagée entre l'enseignement et la recherche.

Pendant plus d'un demi-siècle, il enseigna la physique à la Faculté des Sciences de l'Université de Poitiers, où il fut titulaire d'une chaire à partir d'octobre 1964. En octobre 1956, il avait été détaché à Tours où venait d'être créé un Collège scientifique universitaire, dont il fut directeur de janvier 1959 à décembre 1961.

René Rivault a été un des pionniers des recherches ionosphériques en France.

Dès 1928, alors qu'il était encore étudiant, il s'intéressa à l'ionosphère, responsable de la propagation à grande distance des ondes décamétriques utilisées par les radioamateurs. C'est en 1933 qu'il publia ses premiers résultats scientifiques dans les Comptes Rendus de l'Académie des Sciences, après avoir constaté que les

images émises par la télévision de Londres sur 261,5 m de longueur d'onde, et qu'il recevait à Poitiers pendant la nuit, présentaient souvent des dédoublements dont l'amplitude variait d'un instant à l'autre; il attribua ce phénomène à des réflexions ionosphériques multiples. Ce fut le point de départ de très nombreux travaux qu'il ne cessa, depuis, de développer avec tant de ténacité et d'enthousiasme.

Les raisons pour lesquelles René Rivault fut amené à s'intéresser ensuite aux atmosphériques et à la localisation des éclairs, puis aux sifflements radioélectriques, sont évoquées plus loin par le Dr. Minnis.

L'activité scientifique de René Rivault s'est déroulée dans le Laboratoire de physique de la haute atmosphère, créé en 1946 comme annexe du Laboratoire national de radioélectricité à la Faculté des Sciences de Poitiers. René Rivault en a été le fondateur et, jusqu'à sa retraite, a animé et stimulé les recherches qui s'y poursuivaient.

C'est dans ce Laboratoire que René Rivault a conçu et réalisé le prototype des sondeurs ionosphériques français qui ont été installés dans les stations françaises pour l'Année Géophysique Internationale, et dont certains fonctionnent encore. Les sondages réguliers ont commencé à Poitiers le 1er juillet 1948 et n'ont jamais été interrompus depuis. Cette station constitue donc une des stations clés du réseau ionosphérique mondial.

L'équipement que René Rivault conçut pour la réception et l'analyse des sifflements radioélectriques lui permit d'effectuer quotidiennement des enregistrements pendant toute la durée de l'Année Géophysique. L'étude de ces phénomènes, qui constituent un moyen de diagnostic du plasma dans la magnétosphère, s'est poursuivie depuis et demeure un des thèmes de recherche développés au Laboratoire de physique de la haute atmosphère de Poitiers.

C'est au sein de l'URSI que René Rivault trouva la coopération internationale indispensable dans le domaine de l'ionosphère, comme de la magnétosphère. Il participa aux Assemblées générales de l'URSI depuis celle de Stockholm en 1948 jusqu'à celle de Varsovie en 1972.

De 1946 à 1957, il fut Rapporteur de la Commission IV (Perturbations radioélectriques d'origine terrestre). Ses

nombreuses contributions à ce domaine de recherches le conduisirent à la vice-présidence de la Commission VIII (Bruits radioélectriques d'origine terrestre) de 1966 à 1969, puis à la présidence de cette même Commission de 1969 à 1972.

Sur le plan français, il fut Vice-président du Comité national de radioélectricité scientifique de 1959 à 1968.

La médaille André Blondel lui fut attribuée en 1945 pour l'intérêt et la portée de ses études électrotechniques, et l'Académie des Sciences a récompensé l'ensemble de son oeuvre en lui décernant, en 1980, le Prix Charles Louis de Saulces de Freycinet pour ses travaux sur les problèmes de propagation des ondes intervenant dans les radiocommunications.

Tous ceux qui l'ont connu conserveront le souvenir de sa personnalité marquante, de la clarté de ses idées et de son attachement au principe de la coopération scientifique internationale.

Geneviève Pillet
Secrétaire Général du CNFRS

x
x x

La disparition inopinée du Professeur René Rivault a profondément attristé les scientifiques radioélectriciens associés à l'URSI. C'est dès la fin de ses études universitaires que l'intérêt du Professeur Rivault pour la radioélectricité scientifique s'était manifesté; il consacra sa thèse de doctorat en 1937 à l'étude - entamée en 1933 - des dédoublements des images de télévision émises par Londres, afin de déterminer les variations de la hauteur de l'ionosphère entre Poitiers et Londres.

En juillet 1939, avec Jouaust et Haubert, il participa à une expérience concertée de sondages ionosphériques simultanés, à incidences verticale et oblique, reliant Poitiers, Brest et Paris. Ces essais prometteurs durent être suspendus au début de la Deuxième guerre mondiale.

Pendant la guerre, les chercheurs français furent obligés de renoncer à l'utilisation de tout appareil susceptible de produire une radiation électromagnétique. Cette interdiction contribua néanmoins à stimuler le programme

de recherches entrepris au Laboratoire national de radioélectricité à Bagneux, sous la direction de Robert Bureau, sur la propagation des ondes radioélectriques utilisant les impulsions intégrées émises par les éclairs dans les lointains foyers orageux. L'une des contributions du Professeur Rivault à cette époque fut l'étude des réflexions multiples subies par les éclairs entre l'ionosphère et la surface de la terre pour obtenir des données sur les caractéristiques de l'ionosphère.

Après la fin de la guerre, le Professeur Rivault encouragea la recherche ionosphérique à Poitiers et, grâce au sondeur de modèle original qu'il avait conçu, Poitiers demeure l'un des maillons clés du réseau mondial. S'étant intéressé aux émissions électromagnétiques pendant la guerre, le Professeur Rivault est naturellement devenu l'un des pionniers de l'étude des "sifflements" comme moyen pour obtenir des données sur les conditions physiques de la magnétosphère. Dès 1955, il avait construit un appareil automatique pour l'enregistrement des composantes spectrales des sifflements. Le programme de recherches sur la magnétosphère qu'il avait lancé à Poitiers se développa rapidement, et il a été poursuivi sous la direction de Mlle Y. Corcuff.

Pendant de nombreuses années, le Professeur Rivault participa activement aux affaires de l'URSI et du Comité national français de radioélectricité scientifique, et il assista à toutes les Assemblées générales de 1946 à 1972. Il demeura un partisan inconditionnel de l'URSI et se montra farouchement opposé aux suggestions émises en 1969 en vue de la création d'une nouvelle Union sur l'Environnement, qui aurait entraîné la disparition de l'URSI en tant qu'Union indépendante. Lors d'une consultation des Présidents des Commissions organisée à cette occasion, il avait été demandé à chacun d'exprimer son opinion sur cette proposition. Quelques réponses avaient déjà été faites, quelque peu hésitantes peut-être, lorsque fusa celle du Professeur Rivault, claire et non équivoque, dans un seul mot explosif: "Impensable!"

Lorsqu'il défendait un point de vue qui lui était cher, il n'hésitait pas à s'exprimer en termes énergiques et ses interventions, souvent vigoureuses, stimulaient des discussions fertiles et animées. Bien que sa personnalité marquante ait pu parfois intimider des collègues, surtout parmi les plus jeunes, ceux qui eurent le privi-

lège de le bien connaître savaient que des qualités humaines exceptionnelles se cachaient sous cette apparence extérieure. Le Professeur Rivault ne sera pas oublié de ses nombreux amis à l'URSI.

C.M. Minnis

+ + + + +

URSI SYMPOSIUM ON ELECTROMAGNETIC WAVE THEORY

26-29 August 1980

URSI Symposia on Electromagnetic Wave Theory have been held at 3-year intervals ever since 1953. The site of the 1980 Symposium was Munich, and judging from the broad response to the call for papers, it was obviously a good choice. Beginning 26 August and ending 29 August, the conference took place in one of the newer buildings of the Technical University of Munich, where adequate lecture halls were available to house simultaneously three parallel sessions each day. The programme committee had selected 170 contributions from 25 different countries, and although not all those who had planned to come could do so, the lectures presented showed a good cross-section of all major aspects of electromagnetic theory and practice. Whereas there are many events such as microwave and antenna conferences where applied electromagnetics can be discussed, this conference proved again that URSI Symposia on Electromagnetic Waves are indispensible forums for those mainly engaged in theory rather than immediate application.

The scientific programme featured sessions on bio-electromagnetics, waves in inhomogeneous and random media, open waveguide structures, electromagnetic sensing and probing, and miscellaneous problems. A good part of the time was devoted to sessions on scattering and diffraction, including inverse scattering, and on antennas. Judging from the lively discussions that followed many presentations, and from the talks during the coffee-breaks, electromagnetics is still a rapidly developing science with many open problems, and the euphoria of the late sixties and early seventies when computers seemed to be a cure-all is now gone. In his closing remarks, L.B. Felsen, the Chairman of URSI Commission B, put it this way: "Electromagnetics is again a burdensome discipline which needs a lot of interaction between analysts, numerical people and appliers". He also stressed the need for a more precise terminology in order to prevent electromagnetics from becoming an "Orwellian" science with "some exact solutions being more exact than others".

Among the highlights of the conference were

undoubtedly the invited papers which, for transparent reasons, the organizers had placed at the beginning and at the end of the conference. It is perhaps because of this bracket that the attendance remained rather high during all the days of the conference. The series of invited papers was led by Felsen's highly interesting remarks on the concept of complex rays and hybrid ray mode fields. In the first review session at the end of the conference, dedicated to electromagnetic analysis, Marcuvitz in his talk presented a quasi-particle view of wave propagation apt to deal with propagation problems in non-linear media, a method which,in some way, is related to the complex rays as introduced by Felsen. An alternate and convenient representation of electromagnetic quantities by application of exterior differential forms was discussed by Deschamps in his talk in the same session, and Langenberg gave a comprehensive survey on methods and applications in transient analysis.

In the second review session, dealing with recent developments in electromagnetics, Gjessing presented an expert survey on remote probing by active and passive techniques, while Maystre discussed guided waves at the surface of open periodic structures and grating anomalies.

The emphasis was back on application with Lindenmeier's convincing review of the capabilities of transistorized receiving antennas.

As experience shows, the success of any conference is associated not only with the technical programme but also with the social activities. The reception by the Lord Mayor of Munich and the Bavarian evening (even if perhaps too Bavarian for the liking of real Bavarians) did their part in making the travel to Munich worthwhile.

Those who were unable to attend can obtain the Proceedings for DM 60,-, or US$35.00, by writing to:

Prof. Dr. G. Piefke,
Technische Hochschule Darmstadt,
Hochschulstrasse 1,
D - 6100 Darmstadt, FR Germany.

F. Landstorfer

+ + + + +

EUROPEAN SIGNAL PROCESSING CONFERENCE 1980[+]

16-19 September 1980

EUSIPCO-80, the first European Signal Processing Conference was held in the picturesque city of Lausanne. Organized by EURASIP, the European Association for Signal Processing, and co-chaired by M. Kunt and F. de Coulon, it was attended by approximately 700 participants. It aimed to cover all aspects of signal processing theory and practice including: Signal and noise theory; Filtering; Spectral analysis; Image processing; Special purpose hardware and software developments; Radar-Sonar signals and systems; Speech processing; Application in communication, biomedicine, pattern recognition, seismology, industrial processes, etc.

Twenty-nine regular sessions and four poster sessions encompassed new research results as well as tutorial papers. The facilities provided by the Ecole Polytechnique (of Swiss Federal Government), overlooking the beautiful Lake Leman, were outstanding.

One of the highlights of the conference was the banquet on a boat. The three hour trip on Lake Geneva will undoubtedly remain a memorable event in the minds of the participants.

The conference committee and everyone concerned deserve congratulations from the Signal Processing Community, and Electrical Engineering Community at large.

The next conference, EUSIPCO-83, will be held in Nurenburg, Germany, hosted by the University of Erlangen.

Vijay K. Jain
University of South
Florida

+ + + + +

[+]Reproduced from IEEE-ASSP Newsletter, December 1980.

IAU-URSI SYMPOSIUM ON PULSARS

26-29 August 1980, Bonn, FRG

Organized by the IAU and cosponsored by URSI, this Symposium was the first major international meeting devoted to pulsars, the fascinating objects whose discovery was reported in 1968. The meeting was attended by over a hundred participants from about twenty countries, and very satisfactory arrangements for it had been made by the local organizing committee. A programme of 64 oral papers and 22 poster papers covering almost every aspect of pulsar research, both observational and theoretical, was arranged by the scientific organizing committee chaired by R.N. Manchester.

Fifteen sessions over four days were grouped together under five main headings: Pulsar emission observations; Pulsar timing; Neutron star structure; Magnetospheric theory; and Distribution and evolution. Invited reviews - about one third of the total number of oral papers - provided excellent summaries of the present state of our knowledge about pulsars and the attempts to understand their extraordinary behaviour. These reviews were followed by the contributed papers which dealt with recent observations or new theories pertaining to different aspects. In addition, there was a panel discussion on the last day, at which a number of participants exchanged views on perhaps the most controversial aspect of pulsar theory: "From whence the pulses?"

The Symposium was a success and enabled the participants to get a total view of all the significant investigations carried out on pulsars since their discovery. It brought home what many in the field were aware of, namely that we are still a long way from a detailed understanding of the bewildering variety of phenomena displayed by pulsars. But it also reinforced the belief that one was generally on the right track when seeking explanations for these phenomena.

The Proceedings of the meeting will be available as No.95 in the IAU Symposium series, edited by R.Wielebinski and W. Sieber, and published by Reidel, Dordrecht.

V. Radhakrishnan
Vice-Chairman, URSI Commission J

THIRD SYMPOSIUM ON FREQUENCY STANDARDS AND METROLOGY

5-7 October 1981, Aussois, France

This International Symposium will be organized by the Centre National de la Recherche Scientifique and will follow the lines of the previous one, held at Forêt Montmorency, Quebec, Canada in September 1971 and at Copper Mountain, Colorado, USA, in July 1976.

It is intended to serve as a discussion forum on recent progress and ideas relating to precision frequency standards, the associated metrology and the specific fields of applications.

A tentative list of the topics to be covered is as follows:

- Progress in the field of atomic/molecular frequency standards throughout the electromagnetic spectrum.
- Current problems (theoretical and practical) related to frequency standards and precision metrology.
- Current trends and discussion of the precision capabilities of new techniques (Ramsey fringes in optics, cooling of atoms and ions.
- System application (VLBI, navigation...) and scientific applications (relativity, geodesy...) of atomic/molecular frequency standards and needs in these fields.
- Modern distant time and frequency comparisons.
- Progress in frequency synthesis of microwave to visible frequencies, etc.

Most of the talks will be by invitation. Time will be provided for discussion, as well as for presentation of selected late ideas and results.

Those interested in the Symposium should communicate with:

Dr. C. Audouin
Laboratoire de l'Horloge Atomique
Bât.221 - Université Paris-Sud
F - 91405 Orsay Cedex - France.

+ + + + +

1982 INTERNATIONAL CONFERENCE ON PLASMA PHYSICS

9-15 June 1982, Gothenburg, Sweden

In April 1980 the first joint conference of the Kiev International Conference on Plasma Theory and the International Congresson Waves and Instabilities was held in Nagoya, Japan, under the short title International Conference on Plasma Physics. Due to the success of this meeting, covering almost all subjects of plasma physics, it was decided that the next meeting should be a joint conference. The 1982 Conference will be hosted by the Chalmers University of Technology in Gothenburg.

All parts of plasma physics will be included in the conference (although emphasis will be put on problems with relevance to hot plasmas). In particular basic problems in theory and experiments on waves and instabilities, transport phenomena, non-linear effects, turbulence, stochasticity, coherence particle acceleration will be considered. Special emphasis will be given to applications in fusion physics, laboratory and space plasmas as well as astrophysics. Problems of diagnostics will also be included.

Correspondence concerning the pre-registration and scientific questions should be sent to the scientific secretariat at the following address:

1982 International Conference on Plasma Physics,
Scientific Secretariat,
Chalmers University of Technology,
S - 412 96 Gothenburg, Sweden.

+ + + + +

UTC TIME STEP
ON 1 JULY 1981

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 June 1981. The sequence of dates of the UTC second markers will be:

30 June 1981, $23^h\ 59^m\ 59^s$

30 June 1981, $23^h\ 59^m\ 60^s$

1 July 1981, $0^h\ 0^m\ 0^s$

B. Guinot
Director, BIH.

+ + + + +

SUNSPOT NUMBERS

The proposals reproduced below were prepared jointly by the Observatories at Uccle, Locarno and Zurich in June 1980 on the basis of a draft prepared by Dr. A. Koeckelenbergh.

Readers of the URSI Bulletin who have not been contacted through the IAU and who are interested in the continuation of the Wolf Sunspot Numbers are invited to submit their comments to the URSI Secretariat in Brussels. It is possible that the Chairmen of the interested URSI Commissions may wish to arrange a discussion of the subject during the General Assembly in Washington.

x
x x

Proposal on the Future Determination of the Wolf Number

1. Beginning January 1, 1981, the international service of the Wolf number will be provided by the "Sunspot

Index Data Centre" (SIDC) under the responsibility of Dr. A. Koeckelenbergh, in collaboration with the Département de Radioastronomie et de Physique Solaire of the Observatoire Royal de Belgique (Uccle) and the Institut d'Astronomie et d'Astrophysique of the Université Libre de Bruxelles.

2. The objectives of SIDC are defined as follows:

   (a) Determination and prompt monthly distribution of the "Provisional Sunspot Number" to international institutions and services being in need of these data.

   (b) Determination and distribution of the "Predictions of the Smoothed Monthly Sunspot Numbers".

   (c) Determination and annual distribution of the "International Definitive Wolf Numbers R".

   (d) Research work leading to a better definition of the characteristic indices of solar activity.

3. A Working Group of the principal collaborators in the sunspot patrol will assist the SIDC. The main objective of this group will be to guarantee continuity and assure homogeneity between the series of Wolf numbers published by SIDC and the previously published numbers.

4. To maintain the homogeneity of the series the provisional sunspot numbers will be based primarily on observations obtained at the station in Locarno (Specola Solare). A phone or telex connection between Locarno and Brussels will assure that the observations for a whole month will be available at the last day of each month. The provisional numbers would also be partially based on observations in Zürich in the case that an observing station would remain there. The data will be evaluated by SIDC in the same way as Zürich has done it. R_Z will be renamed R_I (international relative number.)

5. The monthly circulars giving the provisional numbers will be printed in a format similar to the Zürich Sunspot Bulletin and be distributed before the 5th of the succeeding month.

6. The definitive Wolf numbers will be published during the first quarter of the succeeding year as Zürich has done since 1956 and according to the scheme of

Dr. A. Zelenka for 1979.

7. If requested SIDC will also determine the relative sunspot numbers for the central zone of the sun and distribute the data in the form of circulars adapted to the particular needs.

8. Until the end of 1981 the working group will consider the problem of how further sunspot statistics - as given in "Astronomische Mitteilungen der Eidgenössischen Sternwarte Zürich" No 375 ('Die Sonnenaktivität im Jahre 1978') - could eventually be published. Specola Solare will also study whether some of the other information that has been included in the above mentioned report could be determined in future.

9. As concerns the "Heliographic Maps of the Photosphere", we intend to pursue the following procedure:

   (a) The Section de Physique Solaire of the Observatoire Royal de Belgique will send the tables of "Evolution of Sunspot Groups" to Locarno, where they will be complemented by the observations of the Specola Solare. The exchange of copies of solar photospheric drawings to cover gaps in the observations will be continued in the same way as it is presently done.

   (b) Whether the "Heliographic Maps" will continue to appear will depend on the resources of the Specola Solare in Locarno.

   (c) The possibility of publishing the two documents mentioned under (a) and (b) will be examined by the Specola Solare. In case of a negative result, the tables mentioned under (a) will be incorporated in the annual reports of the station in Uccle.

10. As the International Astronomical Union will hold its General Assembly in 1982, the following temporary actions have been foreseen for the period 1980 to 1982:

   (a) The activity of the SIDC will be limited to the period September 1, 1980, to January 31, 1983. If recommended by the IAU it could be continued after that date.

   (b) The archives of the International World Data Center in Zürich will be transferred to the main library of the Swiss Federal Institute of Technology or to

Locarno (Specola Solare) after they have been copied to microfiches or microfilms. One set of copies will be transferred to SIDC covering the documents of the last 40 years.

(c) SIDC will contact the Scientific Unions interested in the distribution of Wolf numbers to obtain advice on the optimum presentation and distribution of the sunspot circulars.

(d) Zürich will remain responsible for the "Provisional Sunspot Numbers" until December 31, 1980.

(e) Beginning September 1980, SIDC will as an experiment independently determine a provisional sunspot number, without publishing it. This determination will employ the same methods and the same information as in Zürich.

(f) For this purpose a circular will be sent out around July 1, 1980, to all collaborating observatories and private observers inviting them to address their reports at the same time to Zürich and to the SIDC during the months from August to December 1980. From January 1, 1981, all observations should be sent to the address of SIDC only: "Sunspot Index Data Center, c/o Dr. A. Koeckelenbergh, 3 avenue Circulaire, B-1180 Brussels, Belgium".

(g) In September 1980 the cooperating observatories and the interested international unions will be informed officially by a circular letter of the transfer of the activities from the Zürich center to SIDC-Brussels.

(h) The SIDC - in agreement with the working group - will prepare a memorandum by October 1, 1981, giving details of its activities. At the same time a proposal will be made for a resolution or recommendation to be submitted to the International Astronomical Union in 1982. This proposal should first be submitted to the National Astronomical Committees of Switzerland and Belgium, and they should jointly recommend it to IAU Commission 10 and/or to the General Assembly of the IAU in 1982.

+ + + + +

TOTAL ELECTRON CONTENT DIGITAL DATA

World Data Center A for Solar-Terrestrial Physics (WDC-A for STP) has created a computer compatible data base for ionospheric total electron content holdings. The file at this time contains 338 station months of data. However, it is expected that 75 station years of data from Australia and New Zealand and a number of other station years from North America will be added in the near future.

The data base is formatted in accordance with the recommendations of URSI and the World Data Centers for the exchange of ionospheric parameters. The format is based on an 80-character punched card image. All data points are assigned a three-character location on the card image. All values are expressed as coefficients of the power of ten to the 15th with no decimal point. After each data point there are two character locations for descriptive letters. Each card also shows station code, date, subionospheric point and time of measurement.

The data are archived on magnetic tapes blocked at 2000 characters per block; that is, 25 card images per block. This construction allows the data to be supplied easily in three forms: punched cards, tabular printouts, or magnetic tapes. Magnetic tapes can be supplied in a number of ways: BCD, ASCII, or EBCDIC coded; 556 or 800 bpi for 7 track; and 800, 1600, or 6250 bpi for 9 track. Blocking for a magnetic tape is at discretion of the customer and is only limited to some integral number of 80-character lines.

Requests and enquiries should be addressed to:

R.O. Conkright,
NOAA/EDIS, D632,
325 Broadway,
Boulder, CO 80303,
USA.

+ + + + +

XX GENERAL ASSEMBLY OF URSI
Washington, 10-19 August 1981

Scientific Programme

1. Open Symposia

In chronological order:

Open Symposium on Remote Sensing (10-12 Aug)

Image processing; Remote sensing of the atmosphere; Remote sensing of the oceans; Remote sensing of atmosphere/oceans; Remote sensing of the land; Poster session.

Open Symposium on mm and sub-mm Waves (13-14 Aug)

Free electron maser and gyrotron: Radio astronomy; Measurements of power and noise power; Ultra-low noise mm wave receivers; Complex dielectric properties of solids and liquids; Methods of measurement.

Open Symposium on Mathematical Models in Radio Propagation (17-18 Aug)

Guided wave theory; Multiple and particulate scattering; Volume scattering and polarization effects; Terrain effects and sub-surface; General propagation theory.

2. Series on Interaction of RF EM Waves and Biological Systems (13-14 Aug)

Tutorials; Workshop on RF EM fields: implications for humans; Workshop on dosimetry, mechanisms and standards.

3. Scientific Sessions of the Commissions

Commission A - Electromagnetic Metrology

Time and frequency; Application of optical fiber to measurements; Cryogenic measurements.

Commission B - Fields and Waves

Singularity-free field tracking; Scattering and diffraction; Antennas; A critique of high-frequency diffraction techniques; Open waveguide structures; Transient fields; Inverse scattering; Random media; Numerical methods.

Commission C - Signals and Systems

Random processes and optimum coding; Telecommunications and digital signal processing; Spread spectrum communications; Computer communication networks; Satellite communications; Optical communications.

Commission D - Physical Electronics

Optical systems and components.

Commission E - Electromagnetic Noise and Interference

Man-made noise; Natural noise; working group meetings.

Commission F - Wave Phenomena in Non-Ionized Media

Optical propagation; Earth-satellite propagation: attenuation and depolarization impairments to communications systems; Earth-satellite propagation: radio meteorology aspects of attenuation modelling; Interference problems due to propagation and efficient use of the radio frequency spectrum; Earth-satellite propagation: site diversity improvement to attenuation impairments, tropospheric scintillation and other effects on the slant path; Special topics (poster session); Reports on inter-Assembly Symposia.

Commission G - Ionospheric Radio and Propagation

Aeronomic studies using digital ionospheric sounders; Influence of the ionosphere on radio systems.

Commission H - Waves in Plasmas

Terrestrial kilometric radiation; VLF and ELF wave/particle interaction; Remote determination of plasma wave spectra; Computer-aided plasma wave analysis.

Commission J - Radio Astronomy

History of radio astronomy, celebrating 50th anniversary of Jansky's discovery; New developments in observatories and laboratories.

4. Joint Scientific Sessions of the Commissions

Commissions A and E: Signal and noise measurements (11 Aug)

Commissions A, B and J: Surface tolerance of large precision antennas (11 Aug)

Commissions C and D: Microelectronic circuits and systems (11 Aug)

Commissions C, D and J: Hardware for very fast signal processing (12 Aug)

Commissions C and E: Effects of non-gaussian noise on communications systems (18 Aug)

Commissions E and H: Interaction of natural and man-made disturbances with the ionosphere and magnetosphere (13 Aug)

Commissions F and G: Scattering mechanisms of radio waves in middle atmosphere (11 Aug)

Commissions G and H: Equatorial ionospheric irregularities (11, 12, 13 Aug)

Ionospheric modification (13 Aug)

Radio investigations of high latitude ionosphere, including first results of EISCAT (17, 18 Aug).

5. General Lectures

Radio science and oceanography, Prof. E.D.R.Shearman (12 Aug)

Solar power satellite and telecommunications, Prof. W.E. Gordon (17 Aug)

High energy astronomy, Dr. H. Friedman (19 Aug).