BULLETIN No 221 JUIN 1982

U.R.S.I.

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OBITUARY

Nadezhda Vitalyevna Mednikova+

It is with profound sorrow that we report the death, on 8 November 1981, of Dr. N.V. Mednikova, after a long illness.

Nadezhda Vitalyevna Mednikova was one of the pioneers of ionospheric investigations in the USSR. She worked at IZMIRAN from 1941, and for a long time was the head of the Ionospheric Station and the Ionospheric Department of the Institute. N.V. Mednikova made an outstanding contribution to the creation of the Soviet ionospheric network, selecting the personnel, compiling handbooks and methodical guides, and publishing the observational results. She played an active rôle in the organisation and realisation of ionospheric observations during the International Geophysical Year and subsequent international programmes. She made a significant contribution to the organisation of ionospheric studies in Cuba, Poland, Bulgaria and Czechoslovakia.

Dr. Mednikova was one of the seven founder members of the URSI World Wide Soundings Committee (WWSC) appointed in 1955. Her great experience, common sense and judgement were invaluable in the discussions of the WWSC which resulted in the publication of its three Reports, the first documents detailing the conventions and programmes to be used world wide during the IGY.

After the dissolution of the WWSC in 1961, Dr. Mednikova helped the URSI Vertical Incidence Network Consultant (W.R. Piggott) on many controversial points. In 1969, Dr. Mednikova took part in the informal discussions which led to the formation of the Ionospheric Network Advisory Group (INAG), and has played an active part in INAG actions and discussions since its inception. In recent years, Dr. Mednikova's wisdom, particularly on policy matters, has been invaluable to INAG, and was recognised at the Washington reorganisation of INAG by making her an Honorary Member.

N.V. Mednikova will be remembered by all who knew her, as an outstanding scientist, a highly competent expert on vertical incidence soundings, a dear friend and a charming person. She will be greatly missed by those who had the privilege to know her.

Extracted from INAG Bulletin No 35 (February 1982).

THE IONOSPHERIC STATION AT DOURBES, BELGIUM: 25TH ANNIVERSARY

The ionospheric station at Dourbes, in southern Belgium, was installed 25 years ago and, in order to mark the occasion, the Institut Royal Météorologique and Professor Bossy organised a two-day symposium in Brussels, and a visit to Dourbes.

At the Opening Session on 13 May, the Director of the IRM, Prof. R. Sneyers, and Prof. Bossy welcomed the participants. The Chairman of the morning session was Prof. T.B. Jones, University of Leicester, UK, and the following papers were presented:

- The rôle of the world network of vertical-incidence stations in future research; W.R. Piggott, Chairman, Ionospheric Network Advisory Group (INAG).
- On the continuing importance of soundings for ionospheric modelling; K. Rawer, Universität Freiburg, FR Germany.
- The use of ionosondes for a knowledge of the E layer; M.Nicolet, IRM, Brussels.
- Geometric optics in absorbing media; K. Suchy, Institut für Theoretische Physik der Universität Düsseldorf, FR Germany.
- URSI, Belgium and the Ionosphere: 1882-1922; C.M. Minnis, Secretary General Emeritus of URSI, Brussels.+

Dr. W.R. Piggott was Chairman for the afternoon session, during which the following papers were presented:

- The rôle of the digital ionosonde in ionospheric physics; T.B. Jones, University of Leicester, UK.
- Improved use of ionospheric vertical sounding stations for hf radio communications; P. Dominici, Istituto Nazionale di Geofisica, Rome, Italy.
- Consideration of several reflection areas for spectrum analysed directional drift data; K. Bibl, University of Lowell, USA.
- A method based on Es parameters for the determination of aeronomical parameters; P. Bencze, Hungarian Academy of Sciences (presented by T.B. Jones).
- Lunar tidal oscillations in the mid-latitude ionosphere; G. Sethia, University of Lancaster, UK.
- Long-term relationships between sunspots, solar faculae and the ionosphere; P.A. Smith, Rutherford and Appleton Laboratories, Slough, UK.

+ This paper is reproduced on page 4 of the Bulletin.

On 14 May, the participants visited the Geophysics Centre of the Institut Royal Météorologique at Dourbes. During the morning there was a demonstration of the newly installed Digisonde 256, and the specially-designed 7-element receiving antenna.

The afternoon was devoted to a continuation of the Symposium. The session was chaired by Prof. K. Rawer, and the following papers were presented:

- On features of the Digisonde 256; K. Bibl, B. Reinisch and D. Kitrosser, University of Lowell, USA.
- Measurement of sea-state parameters; J. Delloue, Laboratoire de Physique de l'Exosphère; Université de Paris VI, France.
- The ionosonde at Kiruna; G. Gustafsson, Kiruna Geophysical Institute, Sweden.

Summing up the end of the Symposium, Prof. Rawer referred to the new types of measurement that could be made using modern ionosondes of advanced design, such as Doppler shift and polarisation observations, and the possibility of distinguishing between vertical and oblique incidence echoes. These facilities opened up a large range of new applications in studies covering the broad field of the 'dynamics of the ionosphere', which includes the earlier but more restricted studies of 'irregularities and drifts'.

However, Prof. Rawer emphasised that ionosondes of traditional design still had an important rôle to play within the world network of stations. These stations provided information that was needed for improving the mapping of ionospheric parameters, especially over oceans and in the Southern Hemisphere. The data acquired were essential also for scientific investigations, including those relating to conditions in the equatorial belt and at polar latitudes.

Finally, traditional ionosondes were needed for the production of good N-h profiles; these are required for the compilation of the International Reference Ionosphere, which is being sponsored by URSI and COSPAR, and also for aeronomic modelling. Where possible, special attention should be given to the characteristics of the valley between the E and F regions.

In conclusion, Prof. Rawer said that, on behalf of all the participants, he wished to thank the Institut Royal Météorlogique and Prof. Bossy for the invitation to come to Brussels, and to have the opportunity of visiting the Centre at Dourbes. He was sure that this had been an interesting and enjoyable

occasion for everyone. His only remaining duty was to offer congratulations to Prof. Bossy on the 25th Anniversary of the station at Dourbes, and best wishes for his future activities. Similar congratulations were offered by the representatives of URSI at the Symposium, Prof. J. Van Bladel, Secretary General, and Dr. C.M. Minnis, Secretary General Emeritus.

The meeting was attended by 40 scientists, belonging to 10 nations.

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At the Dourbes meeting, Dr. Minnis presented a paper of considerable historical interest which is reproduced below.

URSI, BELGIUM AND THE IONOSPHERE: 1882-1922

The origin of the International Union of Radio Science (URSI) can be traced back to steps taken 70 years ago this year by a Belgian scientist, Robert Goldschmidt. URSI's long-standing contacts with Belgium have never been broken and, since the Union has always been closely concerned with radio wave propagation via the ionosphere, it seems appropriate, on this special occasion, to link together URSI, Belgium and the early history of research on the ionosphere during the period 1882-1922.

Strictly speaking, the ionosphere was not discovered until 1924, when Breit and Tuve in the USA, and Appleton and Barnett in the United Kingdom obtained the first positive proof of its existence. However, a Scottish poet once remarked that "coming events cast their shadows before", and this was certainly true of the ionosphere long before 1924. Moreover, on one occasion Appleton made the comment that the ionosphere had to be invented before it could be discovered. This review will, in consequence, deal not with the discovery of the ionosphere, but rather with its invention on several occasions in the 19th and in the early years of the 20th century.

It was in about 1882 that Balfour Stewart, a Scottish geomagnetician, formulated the dynamo theory to explain the diurnal variations in the Earth's magnetic field. His theory included the hypothesis that these variations could be attributed to electric currents flowing in a conducting sheet in the upper atmosphere. A similar, but less well developed, hypothesis had been advanced about 40 years earlier in Germany

by Gauss, but he and Balfour Stewart were certainly not thinking about radio wave propagation when they invented the "geomagnetic ionosphere".

In 1901, for the first time, Marconi succeeded in transmitting radio signals across the Atlantic from England to Newfoundland. Whether or not his successful feat was expected, after the event it was certainly inexplicable, for Poincaré and others showed that the diffraction field round the spherical earth would be too small to be detected over such a large distance, and there was no known mechanism that might have been adduced to explain why the energy from the antenna did not escape into space not far from the transmitter. In the following year, Kennelly in the USA and Heaviside in the UK simultaneously suggested that radio waves could travel over long distances if there existed, in the atmosphere, a reflecting layer which would confine the radiation within the space between the ground and this layer. Thus 40 years after Balfour Stewart's conducting geomagnetic ionosphere, we have the invention of the reflecting radio ionosphere: the Kennelly-Heaviside layer; but in neither case was there any direct evidence to support the hypothesis for, even in 1902, nothing was known about the physics of the high atmosphere, or how it might become capable of conducting electric currents or reflecting radio waves.

Proof of the existence of the ionosphere came at last 22 years after the invention of the Kennelly-Heaviside layer but, in the early years of the century, a few enterprising pioneers had already begun to make use of radio waves as a practical means of long-distance communication which had the great advantage of avoiding the need for telegraph lines and submarine cables. One of these was Robert Goldschmidt, who has already been mentioned; by 1912 he had constructed an operational radio telegraph system which linked together Brussels and the Belgian Congo in Central Africa, now Zaïre. Although this system was in regular use, it is difficult to believe that Goldschmidt, as a scientist, was not aware of the need to make further progress by placing the new and imperfectly understood radio techniques on a proper scientific basis and, in particular, by trying to understand how radio waves were propagated.

It was at a meeting of the Bureau International de l'Heure in Paris in 1912 that Goldschmidt met Karl Schmidt, from the University of Halle, Germany, who was also interested in the new radio science. There are no records of what they discussed but, in the light of subsequent events, it seems very likely that they would have supported a view expressed much later by a

French radio scientist, Raymond Jouaust:

"The study of phenomena relating to the propagation of "radio waves is not one that can be carried out by a physicist "working alone in his laboratory. It is necessary for him to "have the collaboration of many research workers, and their "experiments must be conducted over an area much greater than "that of any one country in Europe".

Schmidt and Goldschmidt must have had such an idea in mind for, just a year later in 1913, Goldschmidt convened the first meeting, here in Brussels, of the International Commission on Scientific Wireless Telegraphy. The Chairman was Duddell from London, and Goldschmidt was the very active Secretary; the membership included people like Eccles, who was already interested in radio waves in plasmas, and Ferrié, who was responsible for the radio station on the Eiffel Tower in Paris, and for a great deal of radio research in France. The Commission met again in Brussels in April 1914 and was attended by members from Austria, Belgium, France, Germany, Italy, the Netherlands and the United Kingdom. One of the events on this occasion was the placing of the first rivet in the foundation of the 333-m mast which Goldschmidt intended to erect for his transmitting antenna in the grounds of the Royal Palace at Laeken in Brussels. At this meeting it was agreed to begin an international cooperative programme of radio observations of various kinds, including the recording of special series of signals to be radiated from Goldschmidt's transmitter in Brussels. Alas the outbreak of the First World War four months later prevented these plans from being carried out.

After the end of the War, the Academies of Science decided to create the International Research Council, and its first meeting was held in Brussels in 1919. It was on this occasion that the first four International Scientific Unions were formed; one of these was URSI or, as it was then known, the International Union on Scientific Radiotelegraphy, and the others were the Unions concerned with Astronomy, Geodesy and Geophysics, and Chemistry. It is worth recalling that the nucleus of the new Radio Union was the Commission that had met in Brussels in 1913 and 1914, and also that the formal proposal for the creation of URSI came from the Belgian delegation. The first President of URSI was Gustave Ferrié, who had been a member of the pre-War Commission and, bearing in mind the initiative taken by Goldschmidt in forming the Commission, it seems very appropriate that he should have been elected Secretary General of the new Union, a position that he was to hold until his

death in 1935.

The First General Assembly of URSI was held in Brussels in 1922. For obvious reasons the word 'ionosphere' does not appear in the documents, and ionospheric research can hardly be said to have begun. On the other hand there were several references to the possibility that an ionised layer might exist in the atmosphere, and that it might be the cause of several unexplained phenomena.

For example, Eccles submitted a paper in which he poses several questions relating to wave propagation. In one of these, he points out that, if the Heaviside layer really exists, then the space in which radio waves are generated must be bounded by two conducting surfaces: the ground and the ionised layer. Given the very long wavelengths in use in 1922, Eccles assumed that the distance between the two surfaces might be only two wavelengths; he concluded "that reflections "occurring at the boundaries, especially when continuous waves "are employed, must bring about a vibration of the system "constituted by the transmitting antenna and the bounded "region, which may be very different in respect of energy "propagation from that ordinarily contemplated in discussions "on the emission when the Heaviside layer is ignored. I have "talked over this problem with Dr. Langmuir and Dr.van der Pol "and I believe that the ultimate effect may be to inhibit in "some degree the free emission of energy from a transmitting "antenna".

In another paper, Mesny reported on the very large direction-finding errors, especially at night, discovered by Perot and Jouaust on both long waves (9000m - 24000m) and short waves (600m - 1000m). He adds that these are not due to local ground effects because similar errors are found in an airship flying over the df station at heights of 3000m - 1900m. In his conclusion, Mesny remarked: "The explanation "that one is tempted to give for all these phenomena must take "account of the ionisation of the atmosphere, or perhaps its "water-vapour content. These are purely qualitative explana- "tions, and it can hardly be otherwise if one considers the "lack of precision and reliable information about electricity "in the atmosphere, and about meteorology".

Work was already in hand in 1922 on the determination of the difference in longitude between two locations by the use of radio methods, and this made it necessary to obtain accurate measurements of the velocity of propagation of radio

waves. During a discussion on this subject, Abraham pointed out that he was making such measurements using pulses, emitted by spark transmitters, which could be identified and accurately timed, but he regretted the disappearance of these transmitters and their replacement by continuous-wave transmitters.

It was at the 1922 Assembly that URSI decided to set up four Commissions to deal with particular branches of radio science. One of these was the Commission on Radio Wave Propagation, and its first Chairman was L.W. Austin from Harvard, whose name will always be associated with the Austin-Cohen formula for field-strength as a function of distance. There can be no doubt about the considerable amount of attention given by URSI, from 1922 onwards, to the many problems associated with radio wave propagation, including phenomena assumed to be attributable to the Heaviside layer. Indeed, in his Presidential Address at the opening of the Second General Assembly, in Washington, D.C. in 1927, Ferrié went so far as to say:"The "study of wave propagation is certainly the most important for "our Union, at least at the present time. It has been the "starting point for a great deal of work, including the distri-"bution of documents from the Secretariat to all the National "Committees. The activity of our Union leaves nothing to be "desired in this field". When Ferrié died in 1932, it was Austin, the first Chairman of the Commission on Wave Propagation, who succeeded him as President of URSI.

It must not be forgotten that, at the time of the 1922 Assembly, international scientific meetings were quite rare events, mainly because of the time spent in travelling, especially by sea. For example, a letter was sent to Goldschmidt by Kennelly, when he was President of URSI in 1933; in it he says that he will sail from New York on 13 September on the steamship Manhattan, and that he hopes to arrive in London eight days later on 21 September.

In view of travel difficulties and of the need to keep the members of the Union informed about current research, one of the tasks given to the URSI Secretariat by the 1922 Assembly was to centralise and circulate the documents and reports referred to above by Ferrié. At the 1927 Assembly, Ferrié reported that since 1922 a total of 149 documents had been circulated. Among these there were contributions on the ionosphere and on wave propagation by people like Austin, Breit, Dellinger, and Hulbert from the USA, and by Mesny and Bureau from France. From Japan came reports by Nagaoka and Yagi, and the British names include Smith-Rose, Watson Watt, Rutherford, Eckersley and of course Appleton.

Mention has already been made of the fact that Goldschmidt remained as Secretary General of URSI from 1919 until 1935. Although he was not personally concerned with research on the ionosphere, there can be little doubt that it was his continued interest in URSI and his enthusiasm, especially during the intervals between Assemblies, that made it possible for URSI to develop as it did, to become the principal international forum for the discussion of ionospheric research, and to retain this status for half a century.

The objective of this review has been to illustrate the close links between URSI and the earliest history of ionospheric research, and to emphasise the rôle played by Belgium and, in particular, by Goldschmidt during more than 20 years while he was actively concerned with radio research and, after 1919, with the URSI Secretariat in Brussels.

WMO Commission on Atmospheric Science
Report on XIII Meeting

URSI was invited by Prof.Axel Wiin-Nielsen, General Secretary of the World Meteorological Organization, to send a representative to attend the XIII Meeting of the WMO Commission on Atmospheric Science (CAS) to be held in Melbourne, Australia, from 8 to 19 February 1982. By recommendation of Prof. Dag Gjessing, Chairman of URSI Commission F, Dr. Sture Wickerts (Sweden), former chairman of the Inter-Union Commission on Radio Meteorology (IUCRM), was appointed as non-voting observer to the meeting.

In the Working Group on Atmospheric Boundary Layer and Turbulence, it was stated that:"Concerning remote sensing for "boundary layer structure and fluxes, a stronger communication "between dynamicists,forecasters, propagation theorists, and "especially remote sensor development engineers is considered "necessary". In that connection, the URSI representative got the opportunity to inform the CAS members that IUCRM had been in existence since the late 1950's and that the Commission had arranged many colloquia with invited participants both from IUGG and URSI. All the meetings have mainly been devoted to remote sensing of the atmosphere and, since 1978, also to remote sensing of the oceans. At the last General Assembly of URSI

it was decided to explore the possibilities, in consultation with IUGG, to set up an inter-organization body to foster the research, organize and coordinate symposia in the area of remote sensing, and to suspend the Inter-Union Commission on Radio Meteorology (IUCRM) pending joint consideration of future activities by IUGG and URSI. It is expected that further action will be taken by IUGG at its General Assembly in Hamburg in August 1983, and that a final decision will be reached in consultation with URSI, the parent Union of IUCRM.

Within the WMO Commission for Atmospheric Science, there are a number of working groups and 'rapporteurs', e.g. on "Satellite Meteorology". During break discussions at the meeting in Melbourne, the URSI representative recommended that this Group should not be restricted to satellite meteorology, but should broaden its activities to include remote sensing of the atmosphere.

The URSI representative was elected corresponding 'rapporteur' in the Group on Satellite Meteorology. He will work within URSI to broaden the contacts between WMO CAS members and remote sensing specialists associated with URSI, and also to change the title of the Group of 'rapporteurs' within CAS to "Remote Sensing of the Atmosphere".

All the documents from the VIII meeting of the WMO Commission for Atmospheric Science and a more comprehensive report on the meeting are available from the URSI Secretariat.

S. Wickerts

Announcements of Meetings and Symposia

National Radio Science Meeting 1983

This open scientific meeting will be held from 5 to 7 January 1983 at the University of Colorado, Boulder, CO 80309, USA. It is sponsored by the US National Committee for the International Union of Radio Science, and held in cooperation with the IEEE Antennas and Propagation Society, IEEE Circuits and Systems Society, IEEE Electromagnetic Compatibility Society, IEEE Geoscience Electronics Society, IEEE Information Theory Group, IEEE Instrumentation and Measurement Society, IEEE Microwave Theory and Techniques Society, IEEE Nuclear Plasma Sciences Society, and the IEEE Wave Propagation Standards

Committee.

The following USNC/URSI Commissions will take part: A (Electromagnetic Metrology), B (Fields and Waves), C (Signals and Systems), D (Electronic and Optical Devices and Applications), E (Electromagnetic Noise and Interference), F (Remote Sensing and Wave Propagation - Neutral Atmosphere, Oceans, Land, Ice), G (Ionospheric Radio and Propagation), H (Waves in Plasmas) and J (Radio Astronomy).

Papers on any topic of interest to a Commission are welcome, but in addition certain topics will be emphasized as indicated in the later Call for Papers. The deadline for the receipt of abstracts is 1 October 1982.

For further information, contact the Steering Committee Chairman:

Professor S.W. Maley,
Department of Electrical Engineering,
University of Colorado,
Boulder, CO 80309, USA.

XVI International Conference on Phenomena in Ionized Gases

This Conference is organized by the University of Düsseldorf (FR of Germany) and the Plasma Physics Division of the German Physical Society. It will be held under the patronage of the Minister of Science and Research of North-Rhine Westphalia in the University of Düsseldorf from Monday 29 August to Friday 2 September 1983.

The International Scientific Committee, under the chairmanship of Dr. J. Dutton (UK), invites all scientists interested in the topics listed below to participate and to contribute papers.

Topics of ICPIG-XVI

- General plasma properties (plasma thermodynamics, kinetic plasma theory, transport phenomena, nonequilibrium fluctuations, etc.).
- Waves in plasmas (propagation of waves, nonlinear waves, shock waves, ionization fronts, plasma turbulence, etc.).
- Plasma-beam interaction (laser beam and particle beam).
- Plasmas in astrophysics.
- Physical bases of plasma chemistry.

- Nonideal plasmas (dense plasmas).
- Elementary processes in gases and plasmas.
- Electrode and surface effects (including plasma-surface interactions, surface treatment, sheaths).
- Breakdown, spark development, Townsend and corona discharges.
- Glows and arcs.
- Modelling of discharges and plasmas.
- Basic processes of laser induced discharges (gaseous and solid targets).
- Discharges for lasers.
- Generation and dynamics of plasma flows, MHD plasmas.
- Plasma spectroscopy (including radiation transport).
- Diagnostic methods related to all topics listed above.

The International Scientific Committee will invite speakers for general and topical lectures. Contributed papers will be presented in poster sessions. These papers should be a complete work previously unpublished. Proceedings containing the accepted contributed papers will be published before the date of the Conference and will be distributed at registration. The deadline for contributed papers is 8 April 1983.

The Local Organizing Committee is co-chaired by Prof. W. Bötticher and Prof. K. Suchy. Further information is available from:

Organizing Committee ICPIG-XVI,
c/o Prof. K. Suchy,
Institute for Theoretical Physics,
University of Düsseldorf,
D - 4000 Düsseldorf,
Fed. Rep. Germany.

INTERNATIONAL RADIO CONSULTATIVE COMMITTEE (CCIR)

Following the closing of the XV Plenary Assembly of the CCIR (Geneva 1982), M. M. Thué, Chairman of the URSI-CCIR-CCITT Liaison Committee, has communicated the terms of reference and names of Officers of those CCIR Study Groups of interest to URSI. These are reproduced below.

Study Group 1 (Spectrum Utilization and Monitoring)

Terms of reference:

1. To study principles and general applications relating to the efficient use of the radio frequency spectrum.
2. To study principles and to develop techniques for spectrum management, including electromagnetic compatibility (EMC) prediction models and computer aided techniques for frequency assignment, and to develop, in cooperation with the Study Groups concerned, general methods for solving sharing and interference problems.
3. To study principles for classifying emissions.
4. To develop means of specifying and measuring the characteristics of emissions and other forms of radiation including man-made radio noise from individual sources likely to give rise to harmful interference.
5. To study techniques for spectrum monitoring and for measuring at a distance the parameters of emissions and spectrum occupancy; to devise means for identifying emissions and for locating sources of harmful interference; and to improve, in collaboration with the IFRB, procedures for presenting the corresponding reports.

Chairman:	K. Olms (Fed.Rep. of Germany)
Vice-Chairmen:	M.J. Hunt (Canada)
	R.G. Struzak (Poland)

Study Group 2 (Space Research and Radio Astronomy Services)

Terms of reference:

To study questions relating to:

1. systems for the space research service, the Earth exploration satellite service, including the meteorological satellite service and their associated technologies, as well as general

principles of systems for the operation of spacecraft;

2. systems for the radioastronomy service and for radar astronomy, with particular reference to associated interference problems.

Chairman:	F. Horner (United Kingdom)
Vice-Chairman:	H.G. Kimball (United States)

Study Group 5 (Propagation in Non-ionized Media)

Terms of reference:

To study with the object of improving radiocommunication the propagation of radio waves (and the study of associated radio noise):

- at the surface of the Earth,
- through the non-ionized regions of the Earth's atmosphere,
- and in space where the effect of ionization is negligible.

Chairman:	A. Kalinin (USSR)
Vice-Chairman:	H.T. Dougherty (United States)

Study Group 6 (Propagation in Ionized Media)

Terms of reference:

To study with the object of improving radiocommunication:

1. the propagation of radio waves through the ionosphere, and through ionized regions beyond the ionosphere;

2. the characteristics of related radio noise.

Chairman:	L.W. Barclay (United Kingdom)
Vice-Chairman:	Miss G. Pillet (France)

Study Group 7 (Standard Frequencies and Time Signals)

Terms of reference:

1. To coordinate services of standard frequency and time signal dissemination on a world-wide basis.

2. To study the technical aspects of emission and reception, including the use of satellite techniques in these services, and means to improve the accuracy of measurement.

Chairman:	J. McA. Steele (United Kingdom)
Vice-Chairman:	S. Leschiutta (Italy).

Books Published by URSI Personalities

H. G. BOOKER (Honorary President of URSI):

Energy in Electromagnetism, 360 pages, Peter Peregrinus Ltd, on behalf of IEE, 1982.

P. DELOGNE (Secretary, Belgian URSI Committee):

Leaky Feeders and Subsurface Radio Communications, 320 pages IEE Electromagnetic Waves Series 14, 1982.

International Reference Ionosphere

Following the publication by URSI in 1978 of *International Reference Ionosphere 1978* (compiled by Rawer, Ramakrishnan and Bilitza), a second edition, including revisions and typical profiles, appeared in November 1981 as *Report UAG-82* in the UAG Series published by World Data Centre A, Boulder, Colorado, USA. Copies are available from:

National Geophysical and Solar-Terrestrial
Data Center,
NOAA, D63,
325 Broadway,
Boulder, Colorado 80303, USA.

The papers presented during the Workshop held in June 1980 during the COSPAR Meeting in Budapest will be published in the near future in the UAG Series.

Names and Addresses of URSI Officers and Officers of Member Committees

The amendments listed below refer to pages 32-72 of *URSI Information Bulletin* No 219 (December 1981). A full list of names and addresses will be published in the December 1982 issue. Member Committees are invited to notify the URSI Secretariat before 15 November 1982 of any amendments to the information given in Bulletin No 219 and the present Bulletin.

1. URSI Commissions

Commission A

Hungary: c/o Prof. K. Géher, Technical University of Budapest, Stoczek u.2, H-1111 Budapest.

USA: Dr. H. Hellwig, Frequency and Time Systems, Inc., 34 Tozer Road, Beverly, Mass. 01915.

Commission B

Hungary: c/o Prof. K. Géher, Technical University of Budapest, Stoczek u.2, H-1111 Budapest.

USA: Prof. Chalmers M. Butler.

Commission C

Hungary: c/o Prof. K. Géher, Technical University of Budapest, Stoczek u.2, H-1111 Budapest.

Japan: Dr. J. Nakagome, KDD, 2-3-2 Nishi-Shinjuku, Shinjuku, Tokyo 160.

USA: Dr. A.J. Viterbi.

Commission D

Hungary: c/o Prof. K. Géher, Technical University of Budapest, Stoczek u.2, H-1111 Budapest.

Switzerland: Prof. Dr. H. Melchior, Pfaffensteinstrasse 5, CH-8122 Pfaffhausen.

USA: delete Dr. K.J. Button.

Commission E

Hungary: c/o Prof. K. Géher, Technical University of Budapest, Stoczek u.2, H-1111 Budapest.

USA: Dr. A.A. Giordano.

Commission F

Hungary: c/o Prof. K. Géher, Technical University of Budapest, Stoczek u.2, H-1111 Budapest.

Japan: Dr. T. Oguchi, Radio Research Laboratories, 4-2-1 Nukui-Kitamachi, Koganei-shi, Tokyo 184.

Switzerland: Dr. J. Joss, Motto, CH-6655 Intragna.
Alternate: Dr. Ch. Mätzler, Staffelweg 30, CH-3302 Mosseedorf.

USA: Dr. E.E. Gossard.

Commission G

Hungary: c/o Prof. K. Géher, Technical University of Budapest, Stoczek u.2, H-1111 Budapest.

Japan: Dr. Y. Hakura, Radio Research Laboratories, 4-2-1 Nukui-Kitamachi, Koganei-shi, Tokyo 184.

USA: Dr. K. Davies.

Commission H

Hungary: c/o Prof. K. Géher, Technical University of Budapest, Stoczek u.2, H-1111 Budapest.

USA: Dr. R.F. Benson.

Commission J

Hungary: c/o Prof. K. Géher, Technical University of Budapest, Stoczek u.2, H-1111 Budapest.

Japan: Prof. S. Enomé, Research Institute of Atmospherics, Nagoya University, 3-13 Honohara, Toyokawa-shi 442.

Switzerland: Dr. A. Magun, Halen 66, CH-3037 Stuckishaus.

USA: Prof. M.A. Gordon.

2. URSI Member Committees

Denmark

President: Prof. J. Bach Andersen.

Ireland

President: Mr. M.O'Donnell.

Secretary: Mr. M. Sheehy, c/o Royal Irish Academy, Dawson Street 19, Dublin 2.

Japan

President: Prof. Haruo Tanaka, School of Electricity, Faculty of Engineering, Toyo University, Kawagoe-shi 350.

Secretary: Prof. M. Morimoto, Tokyo Astronomical Observatory, 2-21-1 Osawa, Mitaka-shi, Tokyo 181.

USA

President: Prof. T.B.A. Senior, Radiation Laboratory, Electrical and Computer Engineering Dept., The University of Michigan, Ann Arbor, MI 48109.

Secretary: Dr. Th.E. VanZandt, NOAA/ERL/R445, 325 Broadway, Boulder, Colorado 80303.

3. List of Addresses: Changes and Corrections

ALTSCHULER, Dr. H.M., 2250 Bluebell Ave., Boulder, Colorado 80302, USA.

GORDON, Prof. W.E., Rice University, P.O.Box 1892, Houston, Texas 77251, USA.

ISHIKAWA, Prof. H., 5-2 Hatchodori, Toyohashi-shi 440, Japan.