**URSI - from 1922 until today**
**by Dr. Pierre Bauer, former President of URSI**

Speech presented at the occasion of the 75th Anniversary Symposium in Brussels (1995)

I have been entrusted with the task of describing the work of URSI since its first General Assembly in 1922 up to the present time. It will be appreciated that, given the multiplicity and the very rapid developments of subjects, it seems almost impossible to cover all the aspects of radio science and to do justice to the ingenuity and skill of all those who, over the years, contributed to the growth and reputation of our Union. However, I shall try to refer to the most striking features of the scientific life of URSI, leaving aside the administrative aspects as far as possible.
To apprehend the incredibly fast advances achieved over the past 75 years in our domain of investigations, it seems worthwhile referring in some detail to the programme of the first two General Assemblies. As stated by J.H. DELLINGER in 1963 : «The history of our Union is one of steady growth and of effort to coordinate the international scientific foundations of the fantastically extending roles of radio and electronic applications. Our domain extends over the Earth, throughout the solar system, and out among the galaxies. We can be sure of one thing : when man reaches the outermost limits of the observable Universe, he will materially be assisted by means of radio for communications navigation and control using the electromagnetic waves envisaged by the genius of Maxwell a hundred years ago».
The first General Assembly of the Union was held in July 1922 in Brussels. At that time, only four National Committees had been formed officially, Belgium, France, United Kingdom and the USA. However, the following new Committees adhered to the Union during the same year: Australia, Spain, Italy, Japan and the Netherlands. We find that, although only as observers, two scientists from Norway participated actively in the work of the Assembly.

The Agenda of that first Assembly had been drawn up by General FERRIE and Prof. GOLDSCHMIDT, to be elected later as President and Secretary General of the Union respectively. Among the topics to be considered by the Commissions, General FERRIE quoted : - measurements of the electromagnetic field and its variations - study of variations in radio goniometrical measurements - study of «statics» and disturbances in general-measurements.
It was considered that it would not be desirable for URSI to cover «tubes» since this might have implied a more industrial character, which had to be excluded.
The scientific Commissions formed in 1922 were as follows:- Measurements methods and standardisation- Radio propagation, with two Sub-commissions on the electromagnetic field and on radio goniometry respectively- Atmospheric disturbances - Liaison with operators, «practitioners» and amateurs. The latter was to be abolished in 1948.
It is interesting to quote the following comment from the Minutes of that first meeting : «In view of the moral and technical importance of the Commission on Measurement methods and standardisation, as well as of the usefulness of its work for the public at large, the Commission should be numbered ONE since it might draw governmental subsidies».
The second General Assembly was held in 1927 in Washington in conjunction with the International Radio Conference, which may be called the first truly modern conference on telecommunications. Among the participants, we quote the names of DELLINGER, VAN DER POL, MESNY, BUREAU, APPLETON, SMITH-ROSE, KOGA, YAGI, AUSTIN and KENNELLY.
At the meeting of Commission I, it was generally agreed that the unit of frequency was identical with the unit of time interval, and that no independent definition should be given. It was further agreed that although frequency was measured in terms of the astronomical unit of time, it was nevertheless important to compare the national frequency standards in order to check the measurement techniques. And indeed URSI has been instrumental in arranging many series of comparison by both physical transport of standards and by the simultaneous measurement of the frequency of radio transmissions.
On the other side, much attention was devoted to radio propagation problems. Between 1922 and 1927, the subject of ionospheric radio had developed rapidly. Indeed, in 1925 Breit and Tuve in the USA and Appleton and Barnett in the UK had showed for the first time that radio waves could be reflected from the ionized portion of the atmosphere. From then onwards, scientists began to realise that, on the one hand, radio provided them with a powerful tool for exploring the upper atmosphere and, on the other hand, that the study of the upper atmospheric physics would help them to understand the propagation of radio

waves. May I remind that Edward APPLETON had been President of URSI for more than 10 years, and that he was awarded the Nobel Prize for Physics in 1947. As for TUVE, he developed the pulse echo method, which was in fact the first pulsed radar in the world.
It was during that second Assembly in 1927 that Prof. Van der Pol called attention to the need for a separate Commission for such subjects as the general theory of triodes, new developments in the general theory of complex functions, modulation theory and the theory of oscillations of linear and non-linear systems. Each of these topics was to become of foremost importance in the ensuing five years. The formation of a new Commission - on Radio Physics - in accordance with Prof. Van der Pol's recommendation certainly contributed to the growth of interest and research in those fields.
It is also in the Minutes of this second Assembly that the first mention of possible effects of the troposphere on radio propagation is to be found, as well as direct correlations between weather conditions and the reception of short waves.
Another striking development in the subsequent years was the emergence of radio astronomy. The beginning of this new science was reported first at a meeting of the US URSI Committee in 1932 by Karl Jansky. During an investigation on atmospheric interference on communication systems, he recognised that noise-like signals were being emitted from the plane of our galaxy, their strength being greatest from the galactic centre.
Needless to remind that, during the dark years 1939-1945, URSI's work was reduced to a strict minimum and, indeed, it is thanks to the staff of the headquarters in Brussels, in particular Colonel Ernest Herbays, that we owe the fact that URSI did not die. Nevertheless this period stimulated great advances in the application of radio waves, which played doubtless a key role in the war itself.
Much of this work accompanied the development of the radar at wavelengths reaching down into the centimetric waveband. In this connection, may I remind that Watson Watt, whose name is associated with the radar, had been a regular participant in URSI meetings

Also during that period, it was realised how important was a detailed knowledge of the ionosphere for radio communications, and also the establishment of networks of ionospheric stations. One should at this point mention the important ionospheric research activity which developed in Lindau under the leadership of one of our Honorary Presidents, Prof. DIEMINGER.
Thus it is clear that, during that period, URSI's primary objective was research on the propagation of electromagnetic waves over ever widening wavelength ranges from very long waves in 1919 to decimetric waves in 1948.
By 1948, it had become clear that there existed a bright future for a new field of solid-state electronics which might have important effects on radio science. At that time, the ground work had been laid for the transistor and the many developments in solid-state circuits.
At the reconvening of URSI in Paris in 1946, the Commission on Radio Physics had displayed an interest in the new area of information and communication theory. In 1948 it was decided to divide the Commission into two : one on Waves and Circuits, and the other on Electronics.
In 1950, the new Commission on Waves and Circuits organised a programme of sessions devoted to information theory, linear circuits, non-linear circuits and applied electromagnetic theory. At the following Assembly, in 1952, the lines seemed to be drawn rather sharply between those interested in information and communication theory, those specializing in circuit theory and networks, and those specializing in electromagnetic theory. Consequently, the Commission was broken into three Sub-Commissions, one for each of the afore mentioned areas. These developments are shown on TABLE I.
At Sydney also, in 1952, there came into being the Electromagnetic Wave Theory Symposium, which is still one of the major and most successful activities of the present Commission on Fields and Waves and which attracts the best experts in the field.
The new Commission on Electronics met for the first time in 1950 in Zurich. In its opinion, the purpose was the discussion of fundamentals rather than devices and, to this end, it included in its programme : fundamentals of vacuum tubes, fundamentals of gaz discharge, fundamentals of semiconductors with application to radio physics, microwave spectroscopy, including magnetic resonance absorption. In 1957, it was felt that the Commission had matured and the meeting took place in an atmosphere of great scientific interest : the maser had been conceived a few years earlier and promised to be a device that could revolutionize measurements. During its short life, up to 1960, many phenomena were

studied which were to be used as the basis of devices in every day use in radio measurements.
Quantum electronics, developed by the Nobel Prize Winners for Physics, TOWNES, BASSOV, PROKHOROV - a Vice-President of URSI from 1960 to 1966 - and KASTLER provided another device, the laser, related, insofar as general principles are concerned, to the maser, but operating in the optical and near-infrared regions; The laser extended the spectrum of coherent radiation to the optical regions, thus extending the frequency domain of all forms of communication.
In 1969, referring to this new device, Prof. SILVER, in his presidential address, stated : «The implications of the new techniques are far-reaching. By pulsing lasers one obtains the counterpart of a radar system by which distances can be measured with phenomenal accuracy. I am sure that all of you now know of the laser experiment being conducted between terrestrial astronomical observatories and the retrodirective reflectors placed on the moon by the astronauts, Armstrong and Aldrin, to determine the Earth-to-moon distance more accurately».
In the 1950's, metrologists wondered whether it was possible to overshoot the precision of quartz clocks, which were used to define the time. Quantum electronics provided a positive response in offering new natural clocks.
One major impact on radio science was the inauguration of the space age in 1957. It is perhaps not irrelevant here to note that three years before, URSI was the first international scientific body to adopt a resolution emphasizing the scientific value of Earth-satellite projects. At its Assembly in London in 1960, URSI formed a Special Committee on Space Radio Research, which provided a focal point for the interests of URSI Commissions, in space science, as well as a link with the ICSU Committee on Space Research (COSPAR). The lectures to be delivered at this gathering will provide a perfect illustration of the close association between space research and radio science.
I already mentioned the creation in 1948 of the Commission on Radio Astronomy. The period 1950-60 saw the development of many different kinds of radio telescopes to meet the specific requirements of various aspects of radio astronomy. At this stage, may I produce a photograph taken during the 1952 General Assembly in Sydney. It shows Prof. CHRISTIANSEN (now one of our Honorary Presidents) explaining the details of his famous 32-element grating interferometer at Potts Hill ; the two visitors are BALTHASAR VAN DER POL AND EDWARD APPLETON. The availability of electronic computers gave rise to new concepts in the design of radio telescopes, and the years 1960-70 marked a golden age in radio astronomy. Positions and intensities of several thousand radio galaxies were determined, thus enabling cosmological studies to be made. Some of the major landmarks in this period are the discovery of quasars in 1963, the discovery of the cosmic microwave background radiation in 1965 by PENZIAS and WILSON (Nobel prize Winners for Physics in 1978), and the discovery of a new type of celestial object, the pulsar, in 1967 by HEWISH (Nobel Prize Winner for Physics in 1974).
On the other hand, very long baseline interferometry was successfully put in operation early in 1967. I won't expand on VLBI from space since you will hear more on this subject during our meeting.
At the end of the 1950's, a very important application of scattering came into being. Prof. W.E. GORDON predicted, from theoretical considerations, that it should be possible to collect the very small amount of energy scattered by individual electrons in the ionosphere, even at altitudes above the maximum F Layer, which are inaccessible to ground-based ionospheric sounders. This was verified afterwards by BOWLES using a high-power radar. In 1966, our Honorary President, Prof. GORDON, was awarded the Balthasar van der Pol Gold Medal in recognition of his outstanding work on the conception of the Arecibo Ionospheric Observatory. The fine instrument in Arecibo was completed by 1963. Although built with a view to studying the ionosphere, it has also important applications in radar studies of the objects in the solar system and in radio astronomical studies of the Universe. At the same 1966 General Assembly, Dr. J.H. CHAPMAN was awarded the John Howard Dellinger Gold Medal for his magnificent achievement of the Alouette I topside ionosphere sounder. While referring to the incoherent scatter radar technique, I should mention the important European Incoherent Scatter facility - EISCAT - , which was opened in North Scandinavia in the 1980's. This most powerful ground-based tool, along with other incoherent scatter

radars in the world, still provides a wealth of information on the upper atmosphere, the ionosphere, and aurora.
Coming back to 1963, it was recognised at that time that serious attention should be given to the question of the overlapping of topics dealt with by URSI, the Astronomical Union and the Union of Geodesy and Geophysics. From then on and until 1975, there has been a long-standing debate on the proper role and place of URSI within the International Council of Scientific Unions. With a clear vision of the future, Professors Silver and Booker, and Monsieur Voge, made suggestions which played a key role in the discussions. I would like to quote, at this point, some comments made in 1975 by Dr. MINNIS, then Secretary General, whose devoted services contributed greatly to the present strong position of URSI.
«The past contributions of URSI scientists to research in astronomy and in the physics of the upper and lower atmosphere have been very important. However, it is essential to remember that these had their origin in research on the more fundamental aspects of radio science : generation, propagation and detection of electromagnetic waves, theory and design of antennas, development of new electronic devices, etc... The vitality of URSI depends on the emergence of new ideas in basic radio science, which may be later applied either in disciplines that are the concern of the other Unions (astronomy, biology, geophysics, etc...) or in communication science which has been the concern of URSI since its foundation ... URSI must create a milieu that provides all workers in telecommunications science with the forum that they need for international scientific discussions. Access to this forum must be available also to the younger telecommunications scientists, and to those in the developing countries».
Indeed at the General Assembly in Lima in 1975, the URSI Council adopted a resolution on the reorganisation of the Union. The terms of reference were expanded so as to include : «the scientific aspects of telecommunications using electromagnetic waves, guided and non-guided». In this way cables, waveguides and optical fibers were clearly included in the field of research, and the prime interest of URSI was oriented towards telecommunications in the broadest sense. Let me add at once that, in 1990, the terms of reference were further expanded so as to include : «the generation and detection of these waves, and the processing of the signals embedded in them».
An extensive list of recommended topics was also approved in 1975, and the titles of the Commissions were revised. The particular subjects with which URSI is concerned vary in accordance with current progress in the field of radio science. For example, as soon as 1981, the Commission on Physical Electronics and Devices had agreed that optical frequency techniques and devices should be part of the URSI domain, which is reflected in the new title adopted in 1990.
At the Assembly in 1978, the question came up of whether URSI should form a separate Commission to deal with remote sensing of the earth using radio waves. It was then decided to rename Commission F «Wave propagation and Remote Sensing». The Commission was instructed to achieve coordination both inside URSI and with other organisations. Starting with 1988, URSI has been a sponsor, jointly with the IEEE Geoscience and Remote Sensing Society, of the annual IGARSS Conferences.
Our Commission on Electromagnetic Noise and Interference deals, among others, with terrestrial and planetary noise of natural origin and man-made, the composite noise environment, the effects of noise and system performance and the scientific basis of noise and interference control. Ever since 1975, the Commission participates actively in the planning and organisation of the very successful series of international symposia on Electromagnetic Compatibility, which are held alternately in Wroclaw and in Zurich. According to our Honorary President, Professor STUMPERS : «EMC is really a multidimensional field of research and, in our highly technological civilization, an indispensable one».
In 1987, a special conference on URSI's future was convened at the initiative of Dr. MITRA, Prof. GORDON and Prof. VAN BLADEL, in response to the increasing feeling that the functions and goals of the Union needed to be reassessed, and that its links with telecommunications organizations needed to be reinforced. Indeed, it was felt that, in the years ahead, the combination of satellite links, television, fiber optics, and high-speed information transmission had an enormous future potential, and that radio science, including electronics, informatics and opto-electronics, would play a predominant role.

I shall mention here only one of the initiatives taken at that time. It was agreed that greater emphasis should be put on telecommunications and, to this end, it was decided to launch a series of International Symposia on Signals, Systems and Electronics (ISSSE). The aim is to cover the whole range of topics in the area, and to promote the exchange of experience and results between scientists and engineers working in these multidisciplinary domains. The third Symposium in the series will take place this year in the United States.
We have seen that URSI, although primarily concerned with radio communication science, often played a pioneering role in the development of tools in other fields of science. The most recent example is the suggestion, made as early as 1972, that URSI should take an interest in the subject of interaction of electromagnetic fields with biological systems. The Working Group created in 1975 to deal with the subject gave birth in 1990 to the new Commission K on «Electromagnetics in Biology and Medicine». This met for the first time in Kyoto in 1993 with extremely successful sessions. The programme of this afternoon includes a lecture on «Mobile communication systems and biological effects on their users » by Prof. STUCHLY, past chairman of the Commission, who was largely instrumental in the setting up of that body.
At the General Assembly in Kyoto in 1993, Prof. HELLIWELL gave a Tutorial lecture entitled : «Forty years of Whistlers». The phenomenon known as «whistlers» had already been observed at the end of the past century in Austria, but modern work on the subject dates from about 1930. An important contribution was the announcement, at the Sydney General Assembly in 1952, of STOREY's theory that the long ionospheric paths followed the lines of the Earth's magnetic field to large distances from the Earth, and back again to the conjugate magnetic point. The mode of propagation which enabled the low frequency energy to penetrate the regular ionospheric layers was formulated mathematically and became known as the «whistler mode».
To facilitate interdisciplinary cooperation, inter-Union bodies were formed over the years under the auspices of the International Council of Scientific Unions. URSI has participated most actively in the international cooperative scientific programmes launched by ICSU. Examples are the Second Polar year 1932-33; the International Geophysical Year 1957-58; the so-called International Geophysical Cooperation 1959 and the International Quiet Sun Year 1964-65 in which Sir Granville Beynon played a key role on behalf of URSI. Currently, the Union is represented on the International Geosphere-Biosphere Programme, and a special Committee is keeping contact with that major enterprise.
The astronomical and geophysical services, which were grouped together in a Federation (FAGS) in 1956, provide the scientific community with long series of observational data, some of them going back to 1800. URSI is at present represented by two Services : the Sunspot Index Data Centre and the International Ursigram and World Day Service. The latter aims to provide information rapidly to the world scientific community to assist in the planning, coordination and conduct of scientific work in disciplines affected by the sun-earth environment. Special mention should be made of the Inter-Union Commission on Frequency Allocations for Radio Astronomy and Space Science. The need to have radio frequency bands available for scientists to use at various parts of the spectrum was discussed in URSI, starting with 1950. It was the fairly new science of radio astronomy which made the matter urgent. Action was taken, in consultation with the Astronomical Union, in order to formulate the scientific requirements for the protection of radio frequency bands throughout the spectrum.
This leads us naturally to an important feature in the life of our Union : its relations with the International Telecommunications Unions, and its technical advisory bodies. It is of course not possible to enter here into the details of the collaboration mechanisms set up over the 70 years elapsed.
In 1990 a Scientific Committee on Tele-communications was created under the chairmanship of Prof. L. BARCLAY, with the objective of facilitating the cooperation between the Commissions of URSI, and also the cooperation of these with consultative groups of ITU (CCIR and CCITT) for the study of scientific aspects of the telecommunications problems.
In his address at the Opening meeting of the General Assembly in Kyoto in 1993, Dr. Richard KIRBY, Director of CCIR, referred to the new re-structuring of ITU and pointed out : «URSI remains ITU's main scientific connection. Many URSI scientists are deeply involved in telecommunications and the «renaissance of wireless». The new ITU-R «Science services»

Study Groups can strengthen the voice of science in international recommendations and agreements, for use and protection of their applications in the radio frequency spectrum». In this talk, it was just not possible to present even and adequate summary of all that has taken place over the years in URSI. Any worthwhile survey of the vast field of radio science and of what was discussed in our Commissions would call for a long series of lectures.

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The following text briefly describes the founding of URSI and its present activities and was presented by Dr. P. Bauer in the presence of His Majesty King Albert II.

Sire, Messieurs les Ministres, Messieurs les Présidents des Académies, Chers Collègues, Mesdames, Messieurs
L'Union Radio-Scientifique Internationale, connue dans toutes les langues sous l'appellation U R S I, est l'une des 23 Unions affiliées au Conseil International des Unions Scientifiques. Elle fut créée à Bruxelles en 1919, lors de l'Assemblée constitutive de ce Conseil, et en même temps que les Unions Internationales d'Astronomie, de Géodésie et de Géophysique et de Chimie Pure et Appliquée.
Mais avant d'exposer les buts et activités de l'URSI, telle que nous la connaissons actuellement, quelques mots concernant ses origines me semblent être de rigueur.
En 1907, à la demande du Roi des Belges, Léopold II, des expériences de télégraphie sans fil avaient été effectuées par la firme Marconi près de l'embouchure du Fleuve Congo - actuellement Zaïre - en Afrique. Celles-ci s'étant avérées décevantes, le Roi pria Robert GOLDSCHMIDT, un des pionniers de l'étude de la propagation des ondes électromagnétiques et le futur premier secrétaire général de l'URSI, de se pencher sur le problème des radiocommunications équatoriales. Trois ans plus tard, le Roi Albert Ier reprit cette initiative et trouva un collaborateur idéal en la personne de Robert GOLDSCHMIDT. Dès 1912, une douzaine de stations équipées d'émetteurs de 5kW étaient installées le long du fleuve Congo, permettant une liaison radiotélégraphique sur une distance supérieure à 2 500 km. Simultanément, GOLDSCHMIDT installait dans l'enceinte du parc royal de Laeken une école de télégraphie sans fil, ainsi qu'un émetteur de 300 kW destiné à la liaison Belgique-Congo.
Bien entendu des expériences similaires se développaient ailleurs dans le monde, mais c'est bien ici, à Bruxelles, que germa l'idée de la création de notre Union.
Lors de la Conférence Internationale de l'Heure à Paris en 1912, Robert GOLDSCHMIDT, de concert avec des chercheurs d'autres pays, proposa de fonder un organisme central ayant pour but d'effectuer des recherches sur la propagation des ondes électromagnétiques, ainsi que des mesures de radiotélégraphie. GOLDSCHMIDT mettait à la disposition de cet organisme la station et les laboratoires de Laeken, ainsi qu'une somme de 50 000 francs belges.
En octobre 1913 eut lieu à Bruxelles la première réunoin de la Commission Internationale de Télégraphie sans Fil, à laquelle participaient des scientifiques de sept pays. La réunion suivante se tint en 1914, à Bruxelles également. Des Comités nationaux avaient été créés entretemps dans plusieurs pays et la Commission put dès lors procéder à l'élaboration de ses Statuts et de programmes d'observations. Le Roi Albert Ier avait bien voulu témoigner son intérêt en acceptant de devenir le Président d'honneur de la Commission. Mais la guerre allait éclater en août de la même année, et la station de Laeken fut détruite sur ordre du Roi lorsqu'il fallut abandonner Bruxelles.
En 1919 la Commission fondée en 1913 se transforma tout naturellement en l'Union dont nous fêtons aujourd'hui le 75e anniversaire. Cela se passait dans le bâtiment où nous nous trouvons réunis aujour'hui.
Le but initial de cet organisme était d'encourager les études scientifiques de radiotélégraphie, et surtout celles d'entre elles qui exigeaient une collaboration internationale. Depuis lors, évidemment, la radiotélégraphie a cessé d'être la seule méthode disponible pour la transmission de l'information au moyen des ondes radioélectriques. Les progrès pour ainsi dire fulgurants réalisés au cours des décennies écoulées ont entraîné l'expansion du domaine d'intérêt de l'URSI . Celui-ci couvre actuellement «tous les aspects scientifiques des télécommunications utilisant les ondes électromagnétiques guidées et non

guidées, la production et la détection de ces ondes, ainsi que le traitement des données dont elles sont porteuses».
Le but premier de l'URSI est donc de stimuler et de coordonner, au niveau international, les études scientifiques en radioélectricité, en télécommunications et en électronique. pour ce faire, des Commissions scientifiques ont été formées au fil des années au fur et à mesure de l'apparition de sujets nouveaux. A l'heure actuelle, elles sont au nombre de dix : Métrologie électromagnétique, Ondes et champs, Signaux et systèmes, Electronique et photonique, Bruits et brouillages électromagnétiques, Propagation des ondes et télédétection, Radioélectricité ionosphérique et propagation, Ondes dans les plasmas, Radioastronomie et Electromagnétisme en biologie et en médecine.
Par ailleurs, les membres de l'Union - actuellement au nombre de 32 - sont les Comités formés par les Académies des sciences ou autres institutions analogues. Ces Comités versent une contribution annuelle. Leurs représentants siègent au sein de chacune des Commissions scientifiques et au sein du Conseil de l'Union.
Toutes les décisions importantes concernant les activités de l'Union sont prises par le Conseil, qui siège pendant l'Assemblée générale. Dans l'intervalle des Assemblées, la gestion des affaires est assurée par le Bureau, dont les membres sont élus par le Conseil. Les affaires courantes sont expédiées par un Secrétariat permanent, sous la direction du Secrétaire général. Depuis la création de l'URSI, ce Secrétariat a toujours été situé en Belgique.
L'URSI se réunit en Assemblée générale tous les trois ans pour faire le point de l'état d'avancement des recherches et pour établir les programmes des études futures. Mais aussi, elle constitue un forum de prédilection qui permet aux chercheurs du monde entier et, en particulier, aux jeunes scientifiques, de présenter les résultats de leurs études. La politique de l'URSI tend à favoriser la participation à ses réunions de jeunes scientifiques, en général et, plus spécialement, de ceux venant de pays en développement. Les Assemblées générales se tiennent dans différents pays, à l'invitation des Comités Membres.
L'union organise aussi, en collaboration avec l'un ou l'autre de ses Comités Membres ou d'autres organisations, des colloques internationaux consacrés à des sujets plus spécialisés. Ces conférences offrent le très grand avantage de permettre aux participants de nouer des relations directes avec leurs collègues étrangers, et d'échanger avec eux idées et expériences. Il convient de souligner que les réunions de l'URSI sont des lieux de rencontre entre scientifiques radioélectriciens et ingénieurs. C'est ainsi que, dans de nombreux cas, des connaissances résultant de la recherche fondamentale stimulent de nouveaux efforts dans le domaine des technologies, lesquelles affectent directement notre société et notre vie quotidienne. L'URSI reconnaît dès lors la nécessité de maintenir des contacts avec les ingénieurs de l'Union internationale des Télécommunications, l'agence spécialisée des Nations Unies, qui assure la coordination centrale des systèmes mondiaux de télécommunications. Elle communique à cet organisme les résultats des études scientifiques les plus récentes, qui permettent à celui-ci de se prononcer sur nombre de problèmes pratiques. Mais en sens inverse, l'UIT soumet à l'URSI des questions de nature scientifique stimulant ainsi de nouvelles études.
Dans le cadre du Conseil International des Unions Scientifiques, l'URSI entretient des relations étroites de coopération avec d'autres Unions et des Comités scientifiques ayant des intérêts communs. Elle prend une part active aux grands programmes pluridisciplinaires internationaux lancés par le Conseil, tels que, l'Année Géophysique Internationale et l'Année Internationale du Soleil Calme, dans le passé, et l'important programme Géosphère-Biosphère à l'heure actuelle.
Pour conclure, je voudrais souligner le rôle joué par notre Union dans l'approfondissement des connaissances relatives à d'autres disciplines scientifiques. Le terme «radiocommunications» peut être considéré comme englobant non seulement la transmission de l'information d'un émetteur à un récepteur par ondes radioélectriques, mais aussi l'acquisition des données les plus diverses sur les milieux naturels - géographique, géophysique, astronomique et même biologique - par détection de leur rayonnement propre ou part télésondage mettant en oeuvre des techniques dérivées de celles du radar. C'est ainsi qu'ont pu être découverts et étudiés de façon approfondie l'ionosphère, la magnétosphère et, grâce à la radioastronomie, de nombreux corps célestes et composants du milieu interstellaire. Par ailleurs, les applications des techniques radioélectriques ont joué un rôle essentiel dans la rapide évolution de la recherche spatiale en particulier en ce qui

concerne l'observation de la terre. Plus récemment, une attention accrue s'est portée sur les interactions entre les champs électromagnétiques et les systèmes biologiques.
Plusieurs parmi les scientifiques associés aux travaux de l'URSI se sont vu décerner le prix Nobel de Physique. Les travaux qui leur ont valu cette consécration permettent de juger de la variété des sujets abordés : ionosphère et propagation des ondes, découvertes du transistor et du laser, théorie de l'information et holographie, physique du solide, radioastronomie.
Notre Union souhaite également que les retombées de ses activités bénéficient aussi concrètement que possible à tous ceux qui voient dans les télécommunications l'un des facteurs de leur développement économique et social, en même temps que l'instrument privilégié de relations harmonieuses entre les peuples et, partant, de la paix dans le monde.