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COMMITTEE ON THE PEACEFUL USES OF OUTER SPACE

VERBATIM RECORD OF THE ONE HUNDRED AND SEVENTIETH MEETING

Held in Vienna, Austria,
on Tuesday, 21 June 1977, at 3 p.m.

Chairman: Mr. JANKOWITSCH (Austria)

General debate (continued)

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The meeting was called to order at 3.10 p.m.

GENERAL DEBATE (continued)

Mr. BOYD (Canada): It is a distinct pleasure for me to take the floor for the first time in this forum on this special occasion, the twentieth session of the Committee on the Peaceful Uses of Outer Space. May I, first of all, express the appreciation of the Canadian delegation for the generous invitation extended this Committee by the Austrian Government to hold its anniversary session in Vienna, and in this particular building and magnificent setting. I should also like to express our appreciation for the signal honour paid this Committee by the President of the Federal Republic of Austria in opening this session and in general for the extraordinary welcome accorded the Committee by the Austrian Government and the various Ministers and Ministries thereof.

The Canadian delegation, Mr. Chairman, is also especially pleased that the work of this session will be accomplished under your wise and experienced leadership. We can testify to your eloquence, which was so amply demonstrated yesterday, and we are aware of the competent manner in which you are continuing the tradition of leadership which always has been assumed by Austria through its Permanent Representative in New York.

At this time I should also like to pay tribute to the contributions made to this Committee over a number of years by the Chairman of the Scientific and Technical Sub-Committee, Professor Carver of Australia, whom we are glad to see here with us, and by the Chairman of the Legal Sub-Committee, Ambassador Wyzner of Poland.

Last, but by no means least, I should like to express the Canadian delegation's gratitude for the devoted service rendered us year after year by the members of the Outer Space Affairs Division and other sections of the United Nations Secretariat: without their help nothing could have been done.

Much has been accomplished in the geographically limitless field of outer space during the last 20 years. This Committee was established as man first began to place objects in orbit around the earth, now man has walked on the moon and probes the secrets of the planets of his solar system. Parallel with

(Mr. Boyd, Canada)

these remarkable scientific activities in outer space, hard work has been done on earth by this Committee in codifying -- indeed in pioneering -- international law in this new domain. Debate in the Committee has produced treaties and agreements which reduce the potential for conflict and help put meaning in that over-worked phrase "international co-operation". Achievements of this nature are fully consonant with the Charter of the United Nations, which suggests that the Organization to which we all belong should be a centre for "harmonization". For all this we can, I think, be justifiably proud.

The Canadian space programme also has matured since this Committee first began its deliberations. While balloons were first used as launch vehicles for scientific payloads in the early 1920s, it was just 20 years ago that Canada launched its first sounding rocket into the upper atmosphere in support of scientific programmes. A few years later, Canada became the third nation to place a satellite in orbit, with the launch of Alouette I, which was designed and built in Canada. Subsequent Canadian achievements in space science research, telecommunications, remote sensing and other areas of space application have been reported previously to this Committee, and I need not repeat them now.

What I should like to emphasize is that Canada will continue, not only to seek to develop its own space programmes, but also to seek to co-operate in the development of new technologies and new programmes with other countries. Since last we reported to this Committee, for example, Canada has held exploratory discussions with the European Space Agency with a view to upgrading its present observer status within that Agency. In addition, the Canada Centre for Remote Sensing has signed agreements to exchange information and personnel and to pursue mutually agreed programmes in the field of remote sensing with the European Space Agency and with the Centre Nationale d'Etudes Spatiales of France. Finally, talks recently have been held at a senior level with the appropriate Japanese authorities, and we look forward to exchanging information and identifying practical areas for co-operation.

(Mr. Boyd, Canada)

I have said that this Committee has accomplished much, and so we believe it has. Nevertheless, there remains much to be done. You, Mr. Chairman, outlined to us some imaginative proposals in five separate areas which could form part of this Committee's future work programme. However, I am sure you will agree that, before launching ourselves into new areas of activity, we should endeavour to reach agreement on those items of business now before us. In this connexion may I perhaps mention that it is no accident that the item on outer space is consigned each year to the First, or Political, Committee of the United Nations General Assembly. We are all aware of the real ideological differences on earth which have found their echo in outer space. Perhaps at this anniversary session the Committee will find the necessary political will to overcome some of these continuing differences which have affected our work in the past.

During the thirty-first session of the General Assembly the Canadian delegation placed on record its belief that our debates will be overtaken both by technological developments and by expectations of people around the world, unless greater progress is made. My delegation believes that there are two areas in particular in which progress is necessary and in which progress can and should be made during this session. The first of these is the question of direct broadcasting by satellite.

Since the nineteenth session of the United Nations Committee on the Peaceful Uses of Outer Space important developments have occurred in this field. Of particular relevance to the work of the Legal Sub-Committee was the World Administrative Radio Conference (WARC), held at Geneva from 10 January to 13 February 1977. This Conference developed detailed plans for the broadcasting satellite service in the 12 GHz-band for Europe, Africa, Asia and the South Pacific. Countries of the Americas are expected to conclude a similar detailed plan in 1982. The basis for these plans is Regulation 428 A of the Radio Regulations of the International Telecommunication Union (ITU), which states:

In devising the characteristics of a space station, in the broadcasting satellite service, all technical means available shall be used to reduce, to the maximum extent practicable, the radiation over the territory of other countries, unless an agreement has been previously reached with such countries

(Mr. Boyd, Canada)

but somewhat differently, the technical framework of WARC was based on the principle that intentional coverage of another country requires the agreement of that country.

At the sixteenth session of the Legal Sub-Committee, the Swedish and Canadian delegations jointly introduced two working papers. The first paper was a revised draft principle on consultation and agreements. The second was a draft preamble. The third element of this so-called package was the replacement of the already-formulated principle on the duty and right to consult, which is covered, *inter alia*, in the revised text on consultation and agreements as well as in the Radio Regulations of ITU. The Canadian delegation was particularly pleased at the significant measure of progress which was achieved at the last session of the Legal Sub-Committee on the development of a compromise text which would represent a responsible and workable balance between facilitating the orderly development of an important new area of technology and protecting the sovereign right of States to regulate their communications systems. With respect to the first paragraph of the draft text on consultation and agreements, it is the view of Sweden and Canada that this principle should apply only to the establishment of a direct television broadcasting service. Such an application is entirely consistent with the requirements which exist in any of our countries for the establishment of a domestic television broadcasting service. It is important to note, however, that, once an agreement has been reached on the parameters of the service to be established, the question of undesirable screening or censorship of individual programmes and illegal or inadmissible broadcasts does not arise. It is clear, therefore, that the compromise text put forward by Sweden and Canada is entirely consistent with the principle of free flow of information as enshrined in the Universal Declaration of Human Rights.

As a result of a spirit of compromise within the Legal Sub-Committee, considerable progress was made in developing texts which represent a balance between divergent points of view. While there are important issues which remain to be resolved, my delegation believes that, with the spirit which characterized our deliberations in New York, the completion of a set of draft principles on direct television broadcasting satellites could be within reach. The Canadian

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delegation is prepared for substantive and, we would hope, decisive negotiations at this session of the parent Committee on the basis of the compromise text.

A second area of particular Canadian interest is remote sensing. With respect to the legal implications of remote sensing of the earth from space, my delegation would like to express its satisfaction at the progress which was achieved at the sixteenth session of the Legal Sub-Committee. The adoption of six draft principles, three on the basis of common elements identified at last year's session, will provide a basis for consideration of the complex issues still to be resolved. In the Canadian view, the legal framework which is established to govern remote sensing of the earth from space should reflect a balance between the need to ensure the greatest possible benefits to the world community through remote sensing activities consonant with the need to safeguard legitimate national interests.

The complexity of the issues involved in a legal analysis of remote sensing, together with rapidly advancing technology, make it difficult to foresee the precise manner in which States could, in the future, be adversely affected by remote sensing activities. For this reason, the Canadian delegation, at the last session of the Legal Sub-Committee, introduced an informal working paper containing a draft text of a possible review clause for inclusion in the draft principles. Canada suggested that such a clause might constitute a useful safeguard in the draft principles whereby the Outer Space Committee or the General Assembly would periodically, or on demand of a specified number of Member States, review the adequacy of the guiding principles on remote sensing. Such a clause would provide an element of flexibility to the draft principles and would also provide a form of protection against possible problems or unforeseen detrimental effects of remote sensing activities. My delegation would suggest that this question might be considered in greater detail at future sessions of the Legal Sub-Committee.

My delegation is pleased to note that some progress was also made during the last session of the Scientific and Technical Sub-Committee in regard to the technical definition of terms connected with remote sensing, including "data" and "information". Unfortunately, the Legal Sub-Committee was unable to make use

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of them in its efforts to agree on a legal régime to govern remote sensing. This illustrates the continuing lack of co-ordination between the two Sub-Committees which has been impeding progress. We would hope that in the future each Sub-Committee would take more note of, and benefit from, the efforts of the other.

(Mr. Boyd, Canada)

Yesterday, Mr. Chairman, you reminded us that this Committee is the focal point for international co-operation in the peaceful uses of outer space and that recommendations made here can be implemented on an international scale. It is in the context of that reminder of the global significance of our deliberations that my delegation would like to place on record its particular concern, which I believe it shares with some other delegations, at the lack of co-ordination that currently exists in the field of remote sensing. As more and more countries become actively engaged in the various aspects of this field, the problem of unco-ordinated activity will inevitably become more acute. For this reason my delegation is pleased that in its report the Scientific and Technical Sub-Committee encouraged members when establishing pre-operational remote sensing systems, to consider their compatibility and complementarity with existing systems. Canada believes that it is important to move further in the consideration of this issue if remote sensing is to be utilized effectively for the benefit of all people in all parts of the world. We believe, therefore, that it would be useful if this Committee were to request a group of qualified experts to make a study of the possibilities for improving co-ordination on a global scale of remote sensing systems. We intend to elaborate on this suggestion during the debate on the report of the Scientific and Technical Sub-Committee.

I should like to turn now to the question of holding a United Nations conference on outer space. This issue was considered carefully at the fourteenth session of the Scientific and Technical Sub-Committee. It is the view of my delegation that this Committee should accept the Sub-Committee's recommendation to establish a task force charged with the responsibility of looking further into all the practical issues involved and of exploring in a thorough, deliberate and systematic way the feasibility and usefulness of holding, eventually, a United Nations conference on outer space. This would represent an advance in the consideration of this question but would not preclude the holding of any such conference - and in this respect, my delegation welcomes the suggestion made by our American colleague this morning.

(Mr. Boyd, Canada)

In conclusion I should like to reiterate briefly the two main themes of this statement, namely, the importance of agreement on principles regulating direct broadcasting by satellites, and the need for more co-ordination in the field of remote sensing. In the resolution adopted by the General Assembly at its thirty first session it was noted that delegations were conscious of the importance of international co-operation in extending to States the benefits derived from the exploration and use of outer space for peaceful purposes. It is my delegation's firm belief that the opportunity is open to us at this session to give meaning to the sentiments expressed in that resolution. It is in this expectation that Canada looks forward to participating in the work of our Committee at this session.

Mr. KOMAREK (Czechoslovakia). First of all, I should like to thank the Government of the Republic of Austria for inviting the Committee to hold its anniversary session in Vienna, where the best of conditions have been established for our work.

The Czechoslovak Socialist Republic highly appreciates the active role played by the United Nations in promoting and intensifying international co-operation in the field of the peaceful exploration and use of outer space. The outer space activities of States have a direct bearing on the interests of all mankind and are of particular importance for the maintenance of international peace and security. From the very outset of the cosmic era, the Czechoslovak Socialist Republic has actively promoted broad international co-operation in the peaceful exploration and use of outer space, since Czechoslovakia regards the struggle for peace and co-operation in outer space as a continuation of a consistent struggle for peace and peaceful co-operation among States with different social systems.

For the whole world, 1977 is a year of important anniversaries in a sphere that was, at the beginning of this century, a topic for science-fiction only. It is no coincidence that 40 years after the Great October Socialist Revolution in the first socialist state of the world the first satellite was launched in the Soviet Union heralding the beginning of an

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era of peaceful exploration and use of outer space. During the 20 years of outer space activities conducted by States, we have witnessed the progress from the first satellite, the first cosmonaut and the first interplanetary station to a manned space laboratory, the Lunokhod vehicle, the conquest of the Moon by man and the joint Soviet United States Soyuz-Apollo project. People will always remember the names of the Soviet and United States spacecraft scientists and designers who have opened up outer space for mankind.

The development and application of space technology makes possible the solution of important scientific and technological problems as well as the settlement of legal questions arising in this connexion. These objective factors have also resulted in the establishment of our Committee, whose 20 years of existence represent a period of fruitful international co-operation in dealing with matters related to the peaceful exploration and use of outer space. The Czechoslovak Socialist Republic views with favour the role played by the United Nations Committee on the Peaceful Uses of Outer Space. During its existence, the Committee has recorded a number of achievements, in both the scientific and technical and the legal fields. Suffice it to recall the historical significance of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies which entered into force 10 years ago and established the rule of law in this new field of human activity. The results which the Committee has thus far achieved show clearly that it plays a leading role in the scientific, technical and legal regulation of the activities conducted by States in exploring outer space and that it is a centre of international co-operation in the exploration and use of outer space for peaceful purposes.

(Mr. Komarek, Czechoslovakia)

The creative and business-like atmosphere in the Committee is aided by continuously expanding co-operation between the Soviet Union and the United States, as evidenced by an agreement between the two States concluded on 18 May of this year on co-operation in exploring and using outer space for peaceful purposes. That confirms the existing successful co-operation between the Soviet Union and the United States in this field as well as the trend towards intensified peaceful co-operation among States with different social systems.

Mr. Chairman, I should like to express my delegation's satisfaction at the fact that the current anniversary session of the Committee on the Peaceful Uses of Outer Space is held under your highly experienced guidance and to thank you as well for your opening statement on the reports of the Scientific and Technical Sub-Committee and the Legal Sub-Committee.

The work of our Committee is effectively assisted by the Outer Space Affairs Division of the United Nations Secretariat. It is gratifying for my delegation that the Division is headed by a Czechoslovak scientist, Mr. Lubov Perok, under whose guidance a number of valuable papers have been prepared.

Czechoslovakia supports broad and active international co-operation in conquering outer space, based on United Nations purposes and on the observance of treaties adopted within the United Nations. The creative work of the Czechoslovak people has brought certain important achievements in the field of scientific research of outer space and the application of space technology. The participation of Czechoslovak scientists in exploring outer space within the INTERCOSMOS programme of the socialist countries is of long tradition. The Czechoslovak Socialist Republic has participated in all the launchings that have thus far been carried out within the framework of INTERCOSMOS by preparing scientific or telemetric instruments and by evaluating information obtained from satellites. In 1976, Czechoslovakia participated in the programme of the Intercosmos-15 technological satellite and the Intercosmos-16 solar satellite. Czechoslovakia has traditionally specialized in such fields of science as the study of the sun spectrum, radiobiology, biomedicine and recently also in the remote sensing of the earth. In 1976, Czechoslovakia also participated in the

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Prognoz-5 satellite programme and the programme of the Vertical 4 sounding rocket. Czechoslovakia is taking part in the design and construction of certain SPOC laser radars. One of them was put in operation in the Arab Republic of Egypt, the second is in operation at La Paz in Bolivia and the third has been installed in India.

Opportunities provided to Czechoslovak scientists by the Union of Soviet Socialist Republics within the INTERCOSMOS programme enable Czechoslovak research workers to utilize the modern methods applied in exploring outer space, particularly in astronomy, geophysics, experimental physics, geodesy, meteorology and also to some extent in biology and medicine.

On 13 July 1976, a multilateral governmental agreement on co-operation in the exploration and peaceful uses of outer space was signed in Moscow upon the initiative of the Soviet Union, the parties to which are all INTERCOSMOS States, including the Czechoslovak Socialist Republic. That agreement gives contractual status to the situation that has developed in this field over the years and reflects the process of a deepening integration among the socialist States in the peaceful use of outer space. Through its participation in the INTERCOSMOS programme, the Czechoslovak Socialist Republic has secured access to the results of this programme, which will be of practical importance for a number of branches of its national economy.

Within the INTERCOSMOS programme, the first Czechoslovak candidates are undergoing training at the Gagarin centre for cosmonauts in the Soviet Union. Between 1978 and 1983, citizens of all the socialist countries will participate in space flights within that programme.

With regard to the results achieved in the work of the Legal Sub-Committee, we are of the view that the treaty relating to the moon, the text of which has been finished in substance, should be completed and adopted as soon as possible, since it is an international legal regulatory instrument of paramount importance. The small steps needed to complete it can be taken, given sufficient determination and goodwill on the part of all interested countries. A problem as yet unresolved is regulation of the legal status of the

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natural resources of the moon. The Czechoslovak delegation supports the idea advanced by the Soviet Union that the questions of the legal status of the afore-mentioned resources could be covered in the optional protocol to the treaty and that after a period of time, depending on the progress reached in exploring the moon and its resources, provisions of this protocol might be considered with a view to specifying or complementing them and to working out generally binding principles. Deliberations on the treaty relating to the moon should remain a priority in next year's work of the Legal Sub-Committee, and until then possibilities of a compromise solution, as envisaged in the Soviet proposal, might be further examined.

My delegation appreciates the progress achieved in elaborating the principles governing the use by States of artificial earth satellites for direct television broadcasting. The results of the sixteenth session of the Legal Sub-Committee justify hopes that the work on the legal principles can be completed during the current session of the Committee so that the principles may be adopted at the thirty-second session of the United Nations General Assembly.

The work of the Legal Sub-Committee in this regard has been positively influenced by the outcome of the session of the World Administrative Radio Conference held at Geneva at the beginning of this year. The documents adopted at the Conference limiting international broadcasting have enabled the Legal Sub-Committee to take a new approach towards unresolved problems and to formulate a new principle of "consultation and agreements between States" which, given the fact that international direct television broadcasting by satellites is based on the strict observance of the sovereign rights of States and non-interference in their internal affairs and that it serves peace and friendship among peoples, might be a basis for reaching a compromise.

(Mr. Komarek, Czechoslovakia)

My delegation maintains that the nine principles for direct television broadcasting elaborated prior to the sixteenth session of the Legal Sub-Committee together with the texts of the principle of consultation and agreements between States and a draft preamble elaborated at the sixteenth session might form a completed draft to be submitted to the United Nations General Assembly at its thirty-second session, if we succeed in defining certain formulations more precisely.

The results achieved by the Legal Sub-Committee on the question of remote sensing of the earth are satisfactory too. My delegation is, however, of the view that the relatively tangible progress achieved in the work of the principles governing the remote sensing of the earth does not mean that fundamental questions have yet been resolved, among them the question of regulating the legal régime of the dissemination and distribution of the data from remote sensing satellites as well as the question of the prior consent of States for the sensing of their territory. With regard to the question of the legal régime for the distribution of the data from remote sensing, our delegation supports the proposal made by the USSR at the last session of the Scientific and Technical Sub-Committee that certain information which is of a global or regional character should not be subject to limitations as distinct from information the contents of which pertain to the sovereignty of States. A criterion between these two categories of information should be the spatial resolution up to 50 metres.

The fourteenth session of the Scientific and Technical Sub-Committee demonstrates that it has focused in its work on the question of remote sensing. The deliberations on this question have undoubtedly been positively influenced by the proposal of the Soviet Government to make data from the present remote sensing system available to any State which will so require. Because of the existence of another remote sensing system and the fact that India and the European Space Agency are planning other remote sensing systems, we are of the opinion that at the present time the co-ordinating role of the United Nations in remote sensing has become clearly evident, even now in the pre-operational phase preceding the operational phase.

We are of the opinion that the question of the possible utility of convening a United Nations conference on outer space matters should be considered by the

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task force whose establishment within the framework of the Scientific and Technical Sub-Committee is being proposed.

Scientific and technological progress in the field of outer space research is moving ahead fast. Although some results have been achieved by the Legal Sub-Committee, activities regulating the peaceful exploration of outer space in international law should not be allowed to lag behind such progress wherever international legal regulation is feasible.

The United Nations Committee on the Peaceful Uses of Outer Space has undoubtedly accomplished much during its 20 years of existence, and the solution of certain important questions is at hand. However, a number of new questions which arise along with scientific and technological progress await to be dealt with. We could quote, for example, a number of problems related to the study and protection of the living environment or the plans to utilize solar energy. In this connexion a number of questions have to be solved -- for example, the question of large satellites in geostationary orbit, that of mutual interference of large space structures in synchronous motion with the earth's rotation, and so on. We should not forget various topical problems of outer space technology and a number of questions relating to physical relations between the sun and the earth which may be dealt with by space technology, particularly with regard to their influence on meteorology and climate, certain biological processes, the transmission of radio signals and a number of processes in the magnetosphere, the ionosphere and the lower layers of the atmosphere or directly on the earth's surface. These are intricate problems which may be solved only through the broad co-operation of States and international organizations.

Lately, the scientific institutions of various countries engaged in intensive research into the peaceful uses of outer space have conducted experiments with the reception and transmission of signals in order to find a trace of the existence of extraterrestrial intelligence. Experiments to establish radi contact with extraterrestrial intelligence have been performed by scientific institutions in the USSR by the Radiophysical Institute in Gorky and the Astrophysical Observatory in Kazan, in the United States by the United States National Aeronautics and Space Administration and the

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Observatory in Green Bank, and in Canada by the Radioastronomical Centre in Algonquin Park, and so on. The question of extraterrestrial intelligence is dealt with by the Committee on Extraterrestrial Intelligence of the International Academy of Aeronautics, in which Czechoslovakia is represented by one of the world experts in this field, Professor Pesek. The question of extraterrestrial intelligence is the subject of the works of many scientists studying outer space. There certainly will arise the question of what future steps we should take in this field.

My delegation welcomes everything that assists co-operation and peaceful development. It is our belief that our deliberations will be fruitful and that we shall all contribute to the success of this session in the ancient city of Vienna.

Mr. PARRETT (United Kingdom). First I should like to thank the Government of Austria on behalf of the United Kingdom delegation for its invitation to the Committee on the Peaceful Uses of Outer Space to meet in Vienna and for the magnificent arrangements they have made. It was a privilege to be welcomed yesterday by the President of Austria.

A number of preceding speakers, including you, Mr. Chairman, have dwelt on the significance of 1977 as the year of the twentieth anniversary of man's first venture into outer space and the tenth anniversary of the entry into force of the Treaty on the Peaceful Uses of Outer Space. I do not intend to cover the same ground again but I wish simply to note that anniversaries provide an opportunity to look forward. This one in particular enables us all to renew our commitment to using the United Nations to the utmost to bring the fruits of international co-operation in the exploration and use of outer space down to earth. To this end, in the first place, the Committee should persist in its efforts to reconcile the differences between strongly held national points of view on the legal aspects of our work. The principle of working by consensus may mean that progress is slow but it ensures that our achievements are well founded. Secondly, it is right for the Committee as a focal point for co-operation to be in the forefront of discussion of future international collaboration, including the establishment of appropriate institutions, to ensure the widest and most beneficial use of space technology, to the particular advantage of developing countries. I agree with you, Mr. Chairman, that we should not hesitate to look beyond our traditional agenda.

The United Kingdom will continue to participate actively in the work of your Committee, using as a basis our own experience in space science and applications, which includes an extensive national programme, full participation in the programmes of the European Space Agency (ESA) and various bilateral programmes. One of the highlights of the activities of the European Space Agency in the past year was the launching of the GEOS satellite, whose prime contractor was the British Aircraft Corporation, for investigation of electro-magnetic processes in the magnetosphere. Unfortunately, a launch failure resulted in the satellite's being put into a highly elliptical orbit, and as a result considerably less data are being acquired than was planned. Three British experiments are, however, on board. Development of the international ultra violet explorer, a joint ESA/NASA/ United Kingdom programme, and two other scientific satellites,

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the international sun-earth explorer and Exosat, are proceeding according to plan. The launching of two European Space Agency applications satellites -- Meteosat for meteorology and OTS for communications -- has been postponed until later in 1977. Meanwhile development of the maritime satellite Marots, the European launch vehicle Ariane and Spacelab is proceeding according to schedule. To date 9 British experiments have been chosen for the first Spacelab flight in 1980 in the fields of life sciences, astronomy and materials science. Evaluation of a further 12 proposed experiments using the metric camera and microwave sensors on Spacelab is in progress. In Britain, as elsewhere in Europe, there has been a good response to the announcement of the opportunity to be the first Western European scientist in space.

Telecommunication satellites are by now a standard feature of international life, and the United Kingdom has been a pioneer user of them. The Post Office's terminal at Goonhilly is the world's first triple-aerial earth terminal capable of operating commercially to nearly all parts of the globe. This it does through the satellites of the Intelsat telecommunication system, in which the United Kingdom is the second largest shareholder and user. In this connexion, we hope to see an early extension of international space telecommunications to maritime uses through INMARSAT, which should come into existence in 1979. Prominent in our purely national activities in the past year have been the construction of the scientific satellite UK 6, the continued analysis of the data from the Ariel-5 X ray astronomy satellite, and a busy programme of sounding rocket launches. British scientists are also active in remote sensing using material from Landsat-2, and preparations are in hand for experiments with several future NASA satellites.

I should now like to turn to the Committee's agenda. We will explain our views in detail and as necessary during the discussion of the reports of the two Sub Committees. Once again it has not proved possible to reach agreement on the moon treaty. The United Kingdom attitude is a flexible one, and we do not foresee difficulty in going along with any formulation which meets general acceptance provided that the provisions about sharing the benefits of the resources of the moon are fair and reasonable to all countries. Efforts to resolve the outstanding problems with the moon treaty should continue, but it is not surprising that direct television broadcasting by satellite and remote sensing take

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up a high proportion of the annual effort of the Committee and its subsidiary bodies. The United Kingdom would therefore like to emphasize two themes which we believe should guide this effort. First, the Committee should pay due regard to the interrelation between scientific and technical criteria and matters of law. Our work will fall to the ground if not firmly based on facts. Secondly, in elaborating international legal principles to cover the new technologies of remote sensing and satellite broadcasting we should not be blinded by the fact that they are new. In the first instance we should seek to apply well established principles of international law and international practice.

The United Kingdom continues to support the unrestricted dissemination of the data and information resulting from remote sensing activities. Not only is this in accordance with the international law of which I have spoken but it also provides the best safeguard to all countries that a single sensing country or a small group of countries will not be in a position to use the information obtained to the detriment of the sensed country. We also consider it essential, in the interest of such important matters as warning of certain natural disasters such as floods and the monitoring of pollution of the environment, that data and information should be freely disseminable. As the same data are used for many different purposes, we could foresee great difficulty in a restriction which allows data to be used for some purposes and not for others. The practical reality of five years of open dissemination of data and information from United States satellites has not thrown up a single instance where the objectives of the Treaty on the Peaceful Uses of Outer Space have been jeopardized. Further progress of remote sensing requires a pragmatic attitude to the alleviation of any problems which may arise, rather than over-hasty restrictions which risk hindering and postponing beneficial applications. We recognize, of course, that there is a real and legitimate interest of the international community in remote sensing activities and in the way they are carried out; and we understand the concerns of those countries which foresee some adverse economic uses of information obtained by remote sensing. Guidelines or principles could be helpful, therefore, in relation both to the remote sensing activities themselves and to the handling of the information which has been acquired through them in order to protect the interests of sensed States.

(Mr. Barrett, United Kingdom)

The two themes I have mentioned -- respect for existing international law, on the one hand, and recognition of the facts of the situations we are attempting to regulate on the other -- are particularly relevant to direct television broadcasting by satellite. The United Kingdom adheres to the view that the basic human right of the freedom of the individual to receive and impart information and ideas regardless of frontiers must be preserved. Any draft principle requiring the prior consent of the receiving State to a transmission from outside its borders continues to cause us considerable difficulty. We do not think we can simply set aside international instruments, including the Universal Declaration of Human Rights and the United Nations Covenant on Civil and Political Rights, which enshrine freedom of information and the rights of individuals.

We shall continue to insist, therefore, that due regard be given to the nature of the technology involved in State-to-State direct television broadcasting and of the binding World Agreement and Associated Plan for its use, agreed upon in January and February this year at Geneva by the World Administrative Radio Conference of ITU. At the sixteenth session of the Legal Sub-Committee we submitted a working paper on the implications of this Conference for the work of the Committee. It appears as an annex to the report of the Sub-Committee.

As previous speakers have said, the World Agreement and Associated Plan for regions 1 and 3 -- that is, the whole world except the Americas, which was agreed in Geneva, together with the prospect of a similar world agreement and plan for region 2 -- the Americas, which will be considered at a conference not later than 1982 -- have established binding restrictions flowing from technical considerations which will prevent deliberate State-to-State broadcasting in all but a few cases of countries which have agreed or will agree to the common use of orbital positions and frequencies.

Although these constraints have resulted from technical considerations they are nevertheless restrictions, and they will provide the framework within which direct television broadcasting by satellite will operate. The ITU Conference was a plenipotentiary Conference of Governments, and the Treaty which it concluded cannot be ignored here.

We appreciate that our reasoning was assessed by the Legal Sub-Committee and the weight which it was given in the Sub-Committee's report. We recognize that it was hard for some delegations to accept. However, we maintain our view

(Mr. Barrett, United Kingdom)

that a principle embodying prior consent is not necessary. Nevertheless we are willing to continue to explore the possibility of reconciling differences between delegations on the basis of the work done at the Legal Sub-Committee. At the same time, we will seek clarification from those delegations which continue to insist on certain elements in the drafts which emerged.

It has become clear that intentional State-to-State direct television broadcasting by satellite will be in breach of treaty obligations, except in the case of those few countries for which provision has been made in the ITU plan, with the agreement of all countries that participated in the Geneva Conference. It is also clear that the fear that powerful countries could establish direct television broadcasting by satellite to other countries and broadcast to them, whether the receiving country wished it or not, is illusory. There is thus no possibility of intervention in the domestic affairs of States on the part of those few countries which in the past have been sometimes widely suspected of wishing to flood the skies with their own broadcasting, whether the recipients wished it or not.

But my delegation hopes that other countries will recognize that in the technical framework in which the ITU has now established that direct television broadcasting by satellite must operate, legal principles in the form which they favour, particularly with regard to unavoidable spillover, would result in the national domestic broadcasting services of States being open to objection by neighbouring States, and that this would constitute a significant infringement of State sovereignty.

I have limited my remarks at this stage to some of the principal items with which this Committee will be dealing. We shall, of course, have more to say on these and on the other items in due course.

Mr. PASZKOWSKI (Poland): Mr. Chairman, may I say first of all that it was with great pleasure that my delegation learned that this anniversary session of our Committee would be held in the capital of Austria. Yesterday it was a great honour and privilege for us to hear the opening address delivered by the Federal President of the Republic of Austria, Dr. Rudolph Kirschlaefer. I know, both from historical precedents and from my personal experience, that Vienna is a good place for international gatherings. We are convinced that under your able and

(Mr. Paszkowski, Poland)

competent guidance this Committee will succeed, during the course of the coming session, in adding a new chapter to the growing volume of United Nations achievements in promoting international co-operation in matters which are not as remote from contemporary terrestrial problems as they sometimes may seem.

As has already been pointed out by a number of speakers, the present twentieth session of the United Nations Committee on the Peaceful Uses of Outer Space coincides with the twentieth anniversary of the space era. This era which started with the successful launching of the first Soviet satellite, "Sputnik", in 1957, has been marked by many outstanding achievements, such as the landing on the moon, or the most spectacular completion of the joint APOLLO-SOYUZ programme. It is gratifying to note that many other States have also made their contribution to the exploration and peaceful uses of outer space.

My country, Poland, is especially interested and involved in the implementation of space application programmes related to remote sensing of the earth and satellite communications. These programmes are being carried out mainly within the framework of two organizations of Socialist countries -- namely, INTERCOSMOS and INTERSPUTNIK. Some research activities are also being carried out on a bilateral basis, in co-operation, inter alia, with the United States, France and Austria. Our national scientific space programme is concentrated in particular on space physics, satellite geodesy, space biology and medicine.

(Mr. Paszkowski, Poland)

The twentieth session of our Committee is a special occasion for reflection on United Nations activities and achievements in the field of exploration and exploitation of outer space. There are many important developments which may be singled out. It was through the United Nations that the rule of law was extended to cover new dimensions. The United Nations has provided an appropriate forum for scientific discussion and exchange of information. It has reaffirmed the common interest of mankind in furthering exploration and uses of outer space for exclusively peaceful purposes. The United Nations has thus become a true centre for "harmonizing the actions of nations" in this new and promising field of human endeavour.

We highly appreciate the fact that all of the most important instruments of outer space law were elaborated within the framework of this Committee. We expect that the tenth anniversary of the entry into force of the Outer Space Treaty, which will be celebrated on 10 October this year, will be marked by new ratifications and accessions.

There is now a great need for new instruments to regulate human activities in some specific areas related to the peaceful uses of outer space. The General Assembly of the United Nations has recently recommended once more that high priority be given to a number of items on our agenda.

Being familiar with the complexities and difficulties which are usually encountered in drafting legal texts by means of consensus, we understand that our Committee cannot produce a new legal instrument every year. But, having in mind the progress made during the sixteenth session of the Legal Sub-Committee, we hope that it will be possible for us during this session to adopt the main principles governing the use by States of artificial earth satellites for direct television broadcasting.

So far as the second item of high priority is concerned, namely, the draft treaty relating to the moon, we are certainly aware of the complexity of the problems pertaining to the scope of the treaty, information to be furnished on missions to the moon and the status of natural resources of the moon. Nevertheless, we should like to reiterate our view that it is high time to complete the drafting of this treaty as well.

(Mr. Paszkowski, Poland)

I should also like to say a word or two with regard to the third item of major importance, namely, remote sensing of the earth from space. This is a problem with far-reaching political, legal and economic implications. We noted with interest the progress made in this respect by both the Legal and the Scientific and Technical Sub-Committee during their most recent sessions. I have in mind in particular, the proposed definition of "data" in remote sensing.

That is all I wished to say at this stage. My delegation may wish to offer additional comments later, when we take up items 5 and 6 of our agenda relating to the report of the Legal Sub-Committee and the report of the Scientific and Technical Sub-Committee, respectively. However, I feel I should be failing to do my duty if I did not mention now that we are greatly indebted to the members of the two Sub-Committees, and especially to their respective Chairmen Professor Carver of Australia and Ambassador Wzner of Poland, for the admirable work which they have accomplished.

I have already mentioned a number of anniversaries in my statement. But there is yet another anniversary which has not escaped our attention. I have in mind the anniversary mentioned in paragraph 14 of the report of the Legal Sub-Committee. It was a particular pleasure for my delegation that the resolution contained in paragraph 14 of the Legal Sub-Committee report was adopted unanimously, by acclamation.

Finally I should like to say that I shall not fail to convey to Ambassador Wzner the words of appreciation which have been addressed to him by the representative of the United States and others.

The CHAIRMAN: I now call on the representative of the World Meteorological Organization.

Mr. LJUBIĆ (World Meteorological Organization (WMO)) (interpretation from Russian) I should like first of all to thank the Committee for the great honour of taking part in such an outstanding gathering which has been so well organized with the excellent facilities made available by the Government of Austria.

I understand that the problems included directly in the agenda of this gathering do not completely touch upon the utilization of outer space for the purposes of meteorology and that this is not the main subject of this particular gathering. However, as members of the Committee are aware, meteorology is one of the first sciences -- indeed, perhaps the first science -- to make use experimentally and operationally of artificial earth satellites, and it is due to the extensive experience of the World Meteorological Organization in this matter over a number of years will be useful for the development also of other directions in the peaceful uses of outer space.

I can state that the World Meteorological Organization is now using an operational system of meteorological satellites as one of the operational observation subsystems of the World Weather Watch (WWW). The experimental meteorological satellites in the World Weather Watch system are also being used and plans are being made for their further use.

In many countries of the world -- and 147 countries and Territories are now members of the World Meteorological Organization -- automatic land stations are being used for the reception of information from satellites. The planned meteorological satellite systems for future years include both satellites in polar orbits and satellites in geostationary orbits.

The World Meteorological Organization has conducted and is planning a number of seminars and symposia for the training of personnel and the organization of educational programmes in the sphere of the use of meteorological satellites and their data.

(Mr. Aljukin, WMO)

The World Meteorological Organization has published more than 10 scientific and technical publications setting out the results achieved during these past decades and plans for the future. Those publications can be obtained from our organization and we shall be happy to make them available to all those who may be interested in them. Thus, the World Meteorological Organization has been and still is in favour of close international co-operation in this sphere, and our information is regularly channelled to the Committee as well as placed in various publications as I have indicated. Accordingly, the possibility exists for the further development and utilization of those data and the utilization of space technology for peaceful purposes in the sphere of meteorology.

The CHAIRMAN. I now call on the representative of the Centre for Natural Resources, Energy and Transport of the United Nations Secretariat.

Mr. AKOMILCKI (Centre for Natural Resources, Energy and Transport (CNRET)) I wish to thank you, Mr. Chairman, for giving me this opportunity to address the Committee on behalf of the Centre for Natural Resources, Energy and Transport (CNRET), a substantive office within the Department of Economic and Social Affairs.

We at the Centre were much encouraged by the recommendation made by your Scientific and Technical Sub Committee for the establishment of a satellite remote sensing facility within CNRET to assist operational development projects, other United Nations bodies and Member States in the effective utilization of remote sensing from satellites in the disciplines not already covered by the existing facility of the Food and Agriculture Organization of the United Nations (FAO).

It may be of interest to you, Mr. Chairman and to the other members of the Committee that this initiative by your Scientific and Technical Sub Committee was welcomed by the United Nations Committee on Natural Resources at its fifth session held in Geneva last month. A number of delegations expressed their wish to receive periodic reports on the latest developments in exploration techniques including remote sensing from satellites, and the Director of CNRET assured them that the new facility would be in a position to contribute substantively to such reports.

(Mr. de Jager, ICSSU)

May I add a few words on the manner in which ICSSU proposes to approach the tasks envisaged in the recommendation of your Scientific and Technical Sub Committee. On the basis of our long experience in various fields and of the experience of our task force on remote sensing from satellites we firmly believe that the most effective and practical use of any new technology can be made not by a specialist in that particular technology but only by a specialist in the discipline in which that technology is to be used as one of the many available and complementary tools. We also believe that remote sensing from satellites is a very important and powerful new tool.

The Centre for Natural Resources, Energy and Transport will undertake its responsibilities in this field with confidence, since its professional staff includes experienced specialists in such disciplines as mineral exploration, energy in its various forms, transport, ground water resources and cartography. The Centre is affiliated with the Office of Ocean Economics and Technology and works with specialists in development planning, demography and land use planning and others in other substantive offices of UNCTAD to say nothing of the Outer Space Affairs Division as and when needed.

If this Committee at its present session decides to accept the recommendation of the Sub Committee for the establishment of a remote sensing facility within CNRET and if a suitable draft resolution is submitted to and adopted by the General Assembly, the facility will be operational in January next year with a full-time expert in space technology to work closely within and outside CNRET.

The CHAIRMAN. I call on the representative of the Committee on Space Research.

Mr. de JAGER (Committee on Space Research (COSPAR)) Once again I have the honour and pleasure of addressing this Committee as the representative of the Committee on Space Research (COSPAR) of the International Council of Scientific Unions (ICSU).

(Mr. de Jager, COSPAR)

I am happy, Mr. Chairman, that this session is taking place again under your very able chairmanship. I should like to mention the good co-operation that we have always enjoyed with the Chief of the Outer Space Affairs Division, Mr. Lubos Perek, and his staff, and particularly with the United Nations Expert on Space Application, Mr. Murthy.

It is with deep sorrow that the space science community has learned of the recent death of Dr. Wernher von Braun. Although his name is also linked to one of the instruments of mass destruction developed during the Second World War, he will be remembered primarily as one of the most important men among those who, after the pioneering period of Ziolkovski, Goddard and Oberth, brought space flight from a dream to a reality.

COSPAR follows with great attention and interest the discussions that take place at the various meetings of the United Nations Committee on the Peaceful Uses of Outer Space and its Sub Committees. Reciprocally, several items that were discussed during the recent twentieth session of COSPAR in Tel Aviv, from 7 to 17 June, might be of interest to this Committee. I wish to give an account here of a few of those items. Before doing so, I would just briefly mention that a general review of the scientific highlights of the preceding year was presented by me at the opening meeting of that session, it will be published in the records of the proceedings of that session.

(Mr. de Jager, COSPAR)

Turning to topics of interest to this Committee, I should like to mention the symposium entitled "The Contribution of Space Observations to Global Food Information Systems". It was organized by COSPAR together with the International Association of Meteorology and Atmospheric Physics (IAMAP) of the International Union for Geodesy and Geophysics, the Food and Agriculture Organization of the United Nations and the World Meteorological Organization. The topics included food information systems, crop observations and their growing conditions, the influence of climatic change on crop production, range monitoring and management and marine food resources. The symposium was designed to bring together the people who need better information systems and the technologists who believe space technology can contribute to those systems.

The keynote address by Mr. George Borgstrom gave a broad overview of the world food situation which provided the background for the following sessions. The first paper of each session was an overview paper, given by an authority on the problems associated with the session topic. At a final panel session the keynote and overview speakers discussed the extent to which technology was being directed towards meeting real needs.

The remarks made by various specialists implied that space technology could make a contribution by monitoring the environment, especially the encroachment of urbanization on agricultural land. There is too little co-ordination in this area and a tendency to confuse means and goals. Symposia which bring together people who are aware of the goals and those who have the technological means to contribute to meeting them are valuable. Developments at present indicate more a promise for the future rather than a reality for today. Emphasis should therefore be put on applications and pilot studies. One should be optimistic about the potential of space technology in agrometeorology. Recommendations were made to guide future work, which included the setting up of a pilot project to demonstrate the feasibility and value of integrating space techniques into systems designed for the early warning of food supply shortage. The prediction of weather is important. There is no theoretical reason why the mean weather could not be predicted a month ahead, though it will be rather difficult to meet this goal. Such

(Mr. de Jager, COSPAR)

predictions would be of great value to agriculture. Present forecasting systems have been developed for aviation and much more could be done in the analysis of data at present available to make them more useful to agriculture. However, the area of seasonal forecasting has received little attention and, furthermore, ice caps, ocean temperature and other parameters which vary slowly and can be monitored may have influence on the following season's weather.

The symposium concluded that we have excellent technology and must proceed with the development of this technology even though the awareness of the research manager is lagging behind. An important factor about marine resources is that most nations do not have a national information system. Space observation may provide the stimulus needed to initiate the development of such systems.

The symposium was dedicated to the memory of Mr. William Nordberg.

Another topic, the remote sensing by satellites, was extensively discussed by COSPAR's Working Group 6 on Meteorology and Earth Surveys by Satellites during the recent meeting.

Since the first remote sensing experiments from balloons and aircraft to explore the possible applications of earth survey data, COSPAR has scheduled informal discussions of national programmes. Much of the discussion centred on ground remote sensing comparisons, the so-called ground truth, resolution requirements, the optimum spectral intervals for specific applications and various methods of data presentation and interpretation. This resulted in an exchange of knowledge that helped stimulate interest among countries in which it had previously been held that earth survey observations would not be of wide practical interest.

Topics reported on at scientific sessions of COSPAR included water resources, agricultural production, agricultural problems -- disease, water stress and so forth -- geological and tectonic questions, oceanography and rangeland management.

The United Nations Outer Space Affairs Division recently requested COSPAR to provide it with a study relating to a technical definition of spatial resolution and the applications of remote sounding measurements. This study is now being prepared by an ad hoc group appointed by COSPAR and consisting of Mr. L. S. Walter of the United States of America, Mr. J. Otterman of Israel,

(Mr. de Jager, COSPAR)

and Mr. N. K. Vinnichenko of the Union of Soviet Socialist Republics. One of the items under discussion is sensor capabilities. These should be limited to those sensors which have been tested aboard spacecraft or those which have been tested on aircraft preparatory to spacecraft flight. The study should be submitted to the United Nations by the end of July 1977. We hope that this study will be useful in the deliberations of the United Nations.

A third item which evoked wide interest at COSPAR's recent session was the first meeting of the COSPAR Panel on Potentially Environmentally Detrimental Activities in Space, which was established in 1976 at COSPAR's Philadelphia session. Under the experienced and energetic chairmanship of Mr. Karl Rauer of the Federal Republic of Germany, the panel will resume the activities in this area which were started in somewhat different form as early as 1962. From that year onwards, until 1972, a Consultative Group on the Potentially Harmful Effects of Space Experiments existed within the framework of COSPAR, under the chairmanship of the late Mr. V. Sarabhai of India, as did a Panel on Planetary Quarantine. The Consultative Group dealt especially with the problem of how to avoid contamination of the earth by extraterrestrial material that might possibly be brought to earth by spacecraft following visits to other celestial bodies. The Group believed that the reverse also applied and that it was imperative that all precautions should be taken to prevent terrestrial contaminating material from doing harm by any means to any other planet within or outside our solar system. In 1972 the Group was temporarily disbanded, and later the Panel was set up in the context of COSPAR's Working Group 5 on Space Biology, which also has members representing the International Union of Biological Sciences and the International Union of Pure and Applied Biology.

The 1977 Panel defined its first task as follows: to establish a report on the different facets of the problem which, after due circulation among COSPAR specialists and ICSU-Union representatives, should be handed to COSPAR. COSPAR may thereupon wish to submit it for consideration to the United Nations Committee on the Peaceful Uses of Outer Space. Subjects of interest, probably corresponding to chapters of the report, were identified and potential writers were designated as members of the panel.

(Mr. de Jager, COSPAR)

Next, I should like to mention our relations with the developing countries. During the COSPAR session at Tel Aviv it was decided that the 1979 session of COSPAR would take place at Bangalore, India. Now being considered is the organization during that session of a symposium on "The Application of Space Observations to Water Resources Management" as a sister meeting to the Food Systems Symposium which was held last week.

During the annual COSPAR Congress the ad hoc Advisory Party on Matters Pertaining to Developing Countries met, as it had done at Tel Aviv. It suggested that workshops and seminars on balloon techniques for the benefit of developing countries should be organized on a regional or subregional basis in order to minimize travel costs and to take care more efficiently of similar types of problems. The Party also suggested, following a recommendation made at the recent Seminar on Physical Marine Resources held by the Committee for Science and Technology in Developing Countries (COSTED), the organization, in co-operation with COSTED, of a Latin American workshop on the utilization of space techniques for the detection and evaluation of marine resources.

(Mr. de Jager, COSPAR)

The forthcoming United Nations Conference on Science and Technology for Development was also considered by the COSPAR Advisory Party on Matters pertaining to Developing Countries and, as a result, a document will be prepared by COSPAR describing the possible contributions of space observations to tackling the problems of space food production, climate and environment, and suggesting mechanisms to train scientists from developing countries and to ensure that the benefit of space research reaches the less developed countries.

Also in the wider context of remote sensing activities in these countries, COSPAR actively contributes to national development of them. An example is the publishing of technical manuals as part of the COSPAR Manual Series, which is given wide distribution.

May I recall the statement I made before this Committee on 21 June 1976 concerning balloons that are able to remain at high altitudes -- approximately 30 kilometres or more -- for quite some duration. These balloons can carry scientific payloads to altitudes where the stratospheric winds blow persistently in one general direction.

During the last meeting of COSPAR, the Scientific Ballooning and Radiation Monitoring Organization (SBARMO) Steering Committee held a one-day session. SBARMO is an international institution with member institutes from various countries.

After COSPAR widened its field at Varna in 1975 so as to include space research conducted by means of balloons, besides rockets, satellites and space probes, close co-operation with SBARMO was envisaged and was later formalized at the 1976 COSPAR meeting at Philadelphia. In the framework of this co-operation SBARMO will pay special attention to the needs of the scientific community and will offer the expertise of its member institutes. The use of balloons is a relatively inexpensive method of conducting space research or related research and should therefore be of particular importance to developing nations. It is one of the aims of SBARMO to identify the various fields of science in which balloons can successfully be used.

In 1976, at the Philadelphia COSPAR session, a symposium on balloon problems was organized with contributions from scientists with interests in all COSPAR working groups. Encouraged by that meeting, a similar symposium, but on a broader scale, will be take place at our next meeting, which will be held in this country, in Innsbruck, in 1978. Topics from all working groups will be

(Mr. de Jager, COSPAR)

COSPAR has also considered the discussions relevant to a possible United Nations conference on space. If such a conference were held, COSPAR would certainly be happy to assist in its preparation.

In regard to the draft treaty relating to the moon, COSPAR understands that the problems preventing the completion of this draft treaty are threefold: in the first place, the scope of the treaty is still open; secondly, the question of the information to be furnished on missions to the moon has to be resolved; and, finally, the definition of the term "natural resources of the moon" is still open. Referring to the last of these three items, COSPAR made a suggestion for such a definition during the session of the Legal Sub-Committee as follows:

"everything on the surface of the moon or under it, or on or under the surface of other celestial bodies of our planetary system, which by their origin, nature and/or their composition serves mankind".

This would include those materials that, while not having commercial value in the strict sense, are of scientific interest to mankind -- which is, we feel, a useful extension of the definition. The inclusion of the space above a planet's surface accounts for the remote possibility of exploiting the huge amounts of energy contained in the atmospheres of certain planets, like Jupiter.

The meeting rose at 4.55 p.m.