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COMMITTEE ON THE PEACEFUL USES OF OUTER SPACE

VERBATIM RECORD OF THE ONE HUNDRED AND FIFTY-SEVENTH MEETING

Held at Headquarters, New York,
on Monday, 21 June 1976, at 3 p.m.

Chairman: Mr. JANKOWITSCH (Austria)

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OPENING OF THE NINETEENTH SESSION

The CHAIRMAN: I declare open the nineteenth session of the Committee on the Peaceful Uses of Outer Space.

ADOPTION OF THE AGENDA (A/AC.105/L.87 and Add.1)

The agenda was adopted.

STATEMENT BY THE CHAIRMAN

The CHAIRMAN: It is the customary privilege of the Chairman to address the Committee at the outset of its work and, in proceeding to do so, I wish at the very beginning to welcome all members of the Committee to its nineteenth session. I am particularly gratified to see so many of you who have been here before and who have participated for many years together with me and my predecessors in our work on the peaceful uses of outer space. I am sure as in the past, we shall continue to conduct our deliberations in the traditional spirit of co-operation which has so often enabled us to make progress in the pursuit of our common aim.

The year under review has been one of further and sometimes spectacular advance in international co-operation in the peaceful uses of outer space. Achievements of primary importance have taken place and I should like to recall some of those with you.

The most spectacular event perhaps was the successful performance of the Apollo-Soyuz Test Project (ASTP), a joint endeavour of the United States and the Soviet Union as part of the agreement on co-operation in space signed between those two countries in May 1972, under which they agreed to develop compatible rendezvous and docking systems and to conduct a joint experimental mission to rendezvous and dock a manned Apollo spacecraft with a manned Soyuz-type spacecraft. That momentous event happened on 17 July 1975. Some of us had the privilege of being present at the launching of the Apollo spacecraft at Cape Canaveral. The two space ships docked and remained linked up for two days while the crews jointly conducted a number of scientific experiments, chiefly in the field of space applications and various fields of technology.

(The Chairman)

On 8 and 14 June 1975, the Soviet Union launched the Venera 9 and Venera 10, both of which landed on the planet Venus in October and successfully obtained photographs of the Venusian surface, the first views of that planet, which were relayed back to earth by the orbiting spacecraft of the mission. Under existing agreements, data resulting from the probes will be provided to the United Staes for its own Venus probes.

On 1 August 1975, a one year experiment called SITE -- Satellite Instructional Television Experiment -- produced by India, began to transmit instructional television programmes with the aid of the United States ATS-6 satellite to 5,000 isolated villages throughout India. The programmes stressed improved agricultural techniques, family planning and hygiene, school instruction and teacher education as well as occupational skills.

On 17 January 1976 the United States/Canadian Communications Technology Satellite (CTS) was launched. It carries the most powerful transmitter yet devised for space applications. The satellite will be used in an experimental programme to pioneer new methods of providing communications services. Such satellite systems provide the capacity for satisfying many human needs throughout the world, and their continued development can result in substantial benefits to mankind.

On 19 February 1976, the world's first commercial maritime communications satellite, Marisat I, was launched by the United States. A second is to be launched soon and will provide coverage of the area between Singapore and the United States coastline. Each will offer 14 voice channels or more than 300 data links, providing direct ship-to-shore voice communications for terminal-equipped vessels.

On the same day, 19 February 1976, the earth station for space communications placed at the disposal of the United Nations and linked to the "Symphonie" programme of France and the Federal Republic of Germany entered into service, transmitting a message from General Silaasvuo, the Co-ordinator of the United Nations forces in the Middle East to the Secretary-General at United Nations Headquarters in New York.

(The Chairman)

Those are some outstanding events among a number of other equally important space activities. They are not only impressive but they have also heightened international co-operation in this field,as each one of them has been carried out as a joint venture of two or more participating States. I should like, on behalf of the members of the Committee, to congratulate the countries concerned on the tremendous success science and human ingenuity have thus achieved through their efforts. At the same time, I should like to express the hope that such activities will continue to be carried out as collaborative efforts of the international community.

Turning now to the work before us, we can note with some satisfaction that our two Sub-Committees have again this year performed important and valuable work in the promotion, first, of the progressive development of a legal order in space, and secondly, in initiating and co-ordinating activities in the broad and still broadening field of practical applications of space technology.

In this context, I should like to extend the thanks and appreciation of the Committee to the Chairmen of the Sub-Committees, Ambassador Wyzner of Poland and Mr. Carver of Australia, for the outstanding work they have again performed during the past year.

(The Chairman)

As you are aware, the main basis for our discussions here will again be the report of our Legal and Scientific and Technical Sub-Committees, which have been distributed and are before you, and which I should like to review briefly in order to give you the background to the work which we shall have to carry out in the next few days.

Once again, I begin with the work of the Legal Sub-Committee. Members will note that in accordance with the provisions of General Assembly resolution 3388 (XXX), it gave priority at its last session to three principal areas of work: first, the draft treaty relating to the moon; secondly, the elaboration of principles governing direct broadcast satellites; and, thirdly, implications of remote sensing of the earth by satellites.

The Sub-Committee re-established its three working groups which had carried out work at the last session in those three areas respectively. The Working Group on the draft moon treaty was presided over by Professor Harazti of Hungary; the Working Group on DBS was presided over by Ambassador Mishra of India; and the Working Group on remote sensing was presided over by Ambassador Mettel of Austria. Considerable progress was made in the Working Groups, and their extensive discussions have contributed to a reconciliation of conflicting views, as well as to a narrowing of the issues involved.

Focusing now, for a moment, on the draft moon treaty, you may be aware that 21 articles, constituting its main component, had already been agreed upon at previous sessions of the Legal Sub-Committee. The main outstanding issues relate to the scope of the treaty and the status of the natural resources to be covered by the treaty, the latter being regarded by many delegations as the most important single problem, and the key to resolving the other issues.

The Working Group, in discussing the question of natural resources, based itself on the texts of article X and X bis, as elaborated during the last session, and strove to reach agreement on the words or phrases which, owing to a lack of consensus, were placed in square brackets or on alternative formulations at that session.

(The Chairman)

Several important proposals were submitted regarding the outstanding issues, and serious efforts were made in the Working Group to reach a compromise solution; but, unfortunately, it could not arrive at a successful conclusion. I might venture to mention, however, that the Working Group came fairly close to agreement, and the remaining issues have again been narrowed down. The gap separating various views on the issues is indeed a very narrow one, and perhaps I might be allowed to echo here the hope expressed by several delegations in the Legal Sub Committee that we might perhaps be able to resolve the difficulties during the current session of this Committee, or at least achieve further progress. A serious effort in the next few days, in our customary spirit of compromise and conciliation, could perhaps help us to achieve a final compromise on the remaining outstanding issues.

On the question of the elaboration of principles governing the use by States of artificial earth satellites for direct television broadcasting, draft texts of a complete set of principles, were worked out at the previous session of the Legal Sub-Committee in 1975. However, each of the texts, as you are aware, included a certain number of elements on which agreement had not yet been achieved, and which again appear in square brackets. This year, the Legal Sub-Committee concentrated mainly on removing such square brackets and on the words or phrases placed within them, and also tried to eliminate the alternative formulations which had survived.

The Legal Sub-Committee, through a working group, was successful in eliminating the square brackets and alternative formulations and finalizing the texts of the following nine principles: purposes and objectives, applicability of international law, rights and benefits, international co-operation, States' responsibility, duty and right to consult, peaceful settlement of disputes, copyright and neighbouring rights, and notification of the United Nations. You might also notice that, in view of the progress reached in related areas, the Working Group decided there was no further need to formulate principles on spill-over and disruption.

(The Chairman)

The remaining principal points of contention relate to the differing positions held with regard to the principles of freedom of information and the sovereighty of States, which form the basis of the remaining three articles, relating to consent and participation, programme content and unlawful broadcasts -- matters on which only an exchange of views took place.

Now that the Sub-Committee has completed the work on all other items, it is possible to give full attention to this central issue. Several compromise proposals, aiming towards a compromise on these issues, have been made to the Legal Sub-Committee, as well as to the General Assembly, and I hope this Committee will be able to undertake a serious discussion with a view to clarifying the outstanding issues and reaching an agreement on them, particularly as the issues are very few and fairly distinct, although, as we all realize, of paramount importance.

The third matter before the Sub-Committee was the consideration of the legal implications of the earth resources survey by remote sensing satellites, which had begun during the previous session of the Legal Sub-Committee. At this session the Sub-Committee was able to complete, through its Working Group on Remote Sensing, the texts of five draft principles which were worked out on the basis of the "common elements" identified at the last session from various proposals put forward by Member States. These five principles relate to the objectives of remote sensing, to the applicability of international law, to international co-operation and participation, to the protection of the natural environment, and to the provision of technical assistance. Some of the words and phrases in these five principles still appear in square brackets, indicating that consensus is still lacking. The Working Group was also successful in identifying three further important "common elements" in the proposals before it concerning (a) the role of the United Nations and other international organizations in the co-ordination of activities and the provision of technical assistance in this field; (b) the provision of information concerning impending natural disasters; and (c) kthe prohibition of the use of data and information to the detriment of other States.

(The Chairman)

The Working Group has also defined the term "data" and the term "information" as these terms are to be understood in the context of the principles being drafted. In its deliberations the Working Group also recognized the need for defining the subject-matter of remote sensing activities which should be included within the framework of the draft principles.

The main outstanding issues in this respect would appear to relate to the question of whether or not prior consent is required for a launching State to conduct remote sensing over the territory of another State and to dispose of information to third parties. Certain aspects of this issue were also touched upon in the deliberations of the Scientific and Technical Sub-Committee. In this connexion, a new approach was suggested by the Soviet Union at the last session of the Scientific and Technical Sub-Committee, providing certain scientific criteria on which to develop the necessary international regulation, as referred to in paragraphs 65 to 67 of the report of the Scientific and Technical Sub-Committee.

In the Legal Sub-Committee, several other proposals have been made, and I am confident that these and the other views hitherto expressed on this subject will provide the necessary impetus for successfully negotiating this delicate issue. I am hopeful, therefore, that we may conduct a useful discussion here that will provide the Legal Sub-Committee with the necessary guidelines to resolve these oustanding issues at its forthcoming session in 1977.

Finally, with respect to the work of the Legal Sub-Committee, it should be noted that a brief discussion took place relating to the question of definition and/or delimitation of outer space and outer space activities which stressed the renewed importance of the subject.

Turning now to the work of the Scientific and Technical Sub-Committee, we note that that Sub-Committee gave primary consideration to remote sensing by satellites and to the co-ordinating role to be played by the United Nations in the further development of remote sensing activities. To serve as a basis for discussion, the Sub-Committee had before it four reports prepared by our diligent Secretariat, and the comments thereon made by the specialized agencies.

(The Chairman)

As on previous occasions, the Sub-Committee considered both the current pre-operational/experimental phase of remote sensing and possible future global/international operational remote sensing system or systems. It affirmed the value of keeping in mind the distinction between those two phases with, inter alia, technical, organizational and financial aspects likely to be the major different elements between them.

The Sub-Committee has found that satellite remote sensing systems will one day, like weather and communications systems, become an integral part of the planning and production of national economies and that international co-operation will be essential at that stage as the only cost-effective approach for the majority of countries. it was noted by the Sub-Committee, however, that a wide variety of practical problems needed to be solved and that there were various possibilities for the operation of a future international space segment. With regard to the ground facilities for the receiving, pre-processing and dissemination of data, the Sub-Committee indicated that, in the operational phase, they would in all likelihood be financed, owned or operated by individual users or associations of users. A possible alternative to a world network of ground stations might, in the view of the Sub-Committee, be a system whereby remote sensing data would be relayed to a central processing facility via communications satellite and from there to regional centres for further processing and dissemination. Such a system, however, the Sub-Committee felt, would be more costly.

With regard to the co-ordinating role to be played by the United Nations in this field, the Sub-Committee has emphasized that the United Nations role here would be different in a future operational phase, and it was unable to define it at this time. It felt, however, that the United Nations could fulfil a co-ordinating function, even in the current pre-operational and experimental phase of the activity. The Sub-Committee saw that role as being carried out under the auspices of this Committee and it has recommended in paragraph 80 of its report (A/AC.105/170) that this Committee might make a choice among the following possible options in determining the form of the United Nations involvement in this field: (a) the establishment of a working group on remote sensing under

(The Chairman)

the Outer Space Committee covering all aspects of the activities; (b) the establishment of a panel or ad hoc body of experts appointed by the Sub-Committee itself, and concerned particularly with the needs of the developing countries; or (c) the full exercise by the Outer Space Committee and its two sub-committees of their existing mandates without the necessity of creating additional bodies.

Members may wish to take note of the view of the Sub-Committee that the selection of any one of these three options concerning the involvement of the United Nations in remote sensing would, of course, inevitably effect its own role.

In this connexion, it is important to note that the Sub-Committee has expressed the view that under the Outer Space Committee, as the focal point for outer space matters within the United Nations system, the Sub-Committee was already exercising a certain co-ordinating function over the current activities in remote sensing, and that that role was likely to become greater in the possible future global operational phase.

The Sub-Committee, reiterating its view that further study of organizational, technical and financial matters should progress together with the consideration of the legal aspects of remote sensing, has recommended to this Committee, in paragraph 82 of its report, that the Secretariat should be requested to submit several further studies for consideration by the Sub-Committee at its next session.

Finally, with regard to remote sensing, the Sub-Committee has also brought to our attention that wide dissemination of information on the technical characteristics of present and future hardware for remote sensing and emphasis on training and education, especially on on-site training for a developing country, are essential if the developing countries are to be certain to get the full benefits from this technology.

Moving on now to the Sub-Committee's consideration of the United Nations programme on space applications, the Committee will note that the Sub-Committee has expressed its appreciation of the many panels, seminars and training workshops that have been organized in most regions of the world with the participation of the specialized agencies of the United Nations system -- in

(The Chairman)

particular the Food and Agriculture Organization of the United Nations, the International Telecommunication Union, United Nations Educational, Scientific and Cultural Organization, World Meteorological Organization, as well as the United Nations Development Programme, International Astronautical Federation, and the Committee on Space Research and the European Space Agency. Individual Governments have acted as host to these activities and the Sub-Committee has expressed its appreciation -- which I should like to echo -- in particular, to the Governments of Canada, Indonesia, India, Kenya and Mexico for having received such panels or seminars. At the same time it has expressed its appreciation to the Governments of the United Kingdom, Federal Republic of Germany, Pakistan and the Soviet Union for agreeing to act as hosts to further panels or seminars in the forthcoming 1976-1977 period. The Sub-Committee has also expressed its appreciation to several Governments, particularly Austria, Belgium, India, Italy, the United Kingdom and the United States of America for training experts in various fields of practical applications of space technology.

Having reviewed the space applications programme for 1977, the Sub-Committee has approved the programme as proposed by the Expert on Space Applications, with the financial implications set out in paragraph 3 of document A/AC.105/C.1/L.74, which is before the Committee. It has also noted that a number of delegations expressed the view that the United Nations space applications programme should be expanded as regards both its content and its scope, and that it should receive greater financial support.

Having considered the question of convening a United Nations conference on space matters, which was another priority on the Sub-Committee's agenda, the Sub-Committee noted that the majority of Member States had not yet expressed their views in response to the questionnaire directed to them on this issue by the Secretary-General; that those that were in favour of convening a conference would make it contingent upon a clear definition of the objective to be achieved; and that others, while not opposed in principle, seemed to maintain some reservations.

After considering the comments and views thus expressed by Member States, the Sub-Committee has recommended to this Committee in paragraph 103 of its report that the Secretariat be asked to study this matter further so that the Sub-Committee could have more detailed information for its consideration at its next session.

(The Chairman)

Turning to a matter of common interest to both the Scientific and Technical and the Legal Sub-Committee, members here will recall that the Scientific and Technical Sub-Committee was asked by this Committee last year to assist in the work of the Legal Sub-Committee by reviewing, at an appropriate time, the criteria connected with the definition and/or delimitation of outer space and the scientific and technical criteria for defining the notion of "natural resources of the moon and other celestial bodies", and possible ways, means and time-limits for their exploitation.

(The Chairman)

In this connexion, in paragraphs 109-111 of its report the Sub-Committee has expressed the view that to consider the request of the Committee thoroughly it would require more specific guidance regarding the purpose for which these criteria are to be reviewed. Bearing in mind the views of the Legal Sub-Committee on these questions, the Committee might therefore wish to consider this matter further and provide the necessary guidance to the Scientific and Technical Sub-Committee for its consideration at its next session.

Members will also note that the Sub-Committee has expressed its satisfaction concerning the work carried out at the Thumba Equatorial Rocket Station of the Vikram Sarabhai Space Centre in India and the CELPA Mar del Plata Rocket Launching Station in Argentina and has recommended that the United Nations should continue to grant sponsorship to those ranges.

Among the other matters studied by the Sub-Committee were questions relating to the exchange of information and the strengthening of the Outer Space Affairs Division. The views of the Sub-Committee concerning these questions are to be found in paragraphs 117-128 and 114-116 respectively.

In reviewing its future work, the Sub-Committee, reiterating the significance of the questions concerning remote sensing, has unanimously recommended that they should once again have high priority in its future work. The consideration of other items, especially the United Nations programme on space applications and the question of convening a United Nations conference on outer space matters, should be continued, also on a priority basis.

Now that I have thus reviewed the work carried out by our two Sub-Committees, members will, I hope, agree with me that they have indeed performed most useful work and have discharged their responsibilities in an examplary manner. Having had such outstanding assistance, I have no doubt our work here will be greatly facilitated, but members will note that, at the same time, the two Sub-Committees have left large responsibilities for this Committee by referring to it for decision several matters to which I have already made reference. In addition we shall as usual, have to give further guidance for the work of the two Sub-Committees for the next year. Members of the Committee will note that there are several other matters that the Committee will have to consider during our session this year. I should like to make brief reference to them, as members already have full details before them, and reference to them has been made also in the annotated agenda.

(The Chairman)

Members will note that the Committee has before it an information paper submitted by India offering facilities for the setting up of a regional ground station in India and requesting that this offer be placed before the Committee. The information paper submitted by India in this connexion refers to the high degree of consensus that had developed in the discussions of the Scientific and Technical Sub-Committee in favour of the establishment of regional ground stations for direct reception of remote-sensing data from satellites. Members will no doubt want to give most serious attention to this offer, which has been circulated in document A/AC.105/174.

Members will also remember that at our last session we requested the Secretary-General to submit to the Committee a paper outlining the ways and means by which the United Nations system might implement a full-scale programme of public information on the peaceful uses of outer space, particularly on those aspects of space applications which have special reference to the problems being faced by developing countries. In response to that request, the Secretary-General has now submitted for the Committee's consideration at this session a report (A/AC.105/172) outlining the information programme that could be undertaken through the existing means of public information at the disposal of the United Nations.

Members will also recall that in my opening statement to the Committee last year I made reference to the obligations incumbent upon the Committee as the focal point of the United Nations for all space-related matters and, in this connexion, pointed out to the Committee the growing importance of the possibility of finding future sources of energy in outer space, citing solar energy as a possible example. I then quoted to the Committee a paper on this matter prepared by Professor William E. Heronemus of the School of Engineering at the University of Massachusetts, which contained a most pertinent evaluation of some uses of solar energy for international systems. Those remarks are to be found in my statement annexed to last year's report of the Committee (A/10020). A paper on this matter has now been circulated to Committee members in document A/AC.105/(XIX)CRP.1, reviewing the present state of development of solar energy and the prospects of its generation in outer space. The paper comments that while some applications of solar energy, including space heating

(The Chairman)

and hot water supply, are already in widespread use, others, such as the generating of electricity, require substantial research and development before they will be economical for large-scale use. It notes that solar cells for direct conversion of solar radiation electricity are used as the power supply for most spacecraft and that proposals have been made for a large array of solar cells to be placed in geosynchronous orbit to transmit power to the ground by microwaves, but that the present cost will have to be reduced by a substantial factor if they are to be competitive for commercial power production.

Another working paper, entitled "International problems arising from the exploration of solar and other related energies" has been ciruclated separately in document A/AC.105/L.91. This working paper, submitted by Argentina, discusses the international problems, particularly the legal implications that might arise in this field. As members will note from the report of the Legal Sub-Committee, it was first circulated informally to the members of the Legal Sub-Committee in Geneva but its Chairman felt that this was a matter that should be discussed in the main Committee, and, in response to a suggestion made by him, the paper has now been submitted to this Committee. I have no doubt that these papers will give sufficient material for an interesting and useful discussion on this question here in this Committee.

Moving on, finally, to two decisions the Committee must take in the procedural area, members will note that the Committee has received a letter from the Chairman of the Committee on Conferences, which has been circulated to members in document A/AC.105/L.88, suggesting that our Committee, as a subsidiary body of the General Assembly, consider meeting bi-annually. The letter informs us that the Committee on Conferences did not wish to make such suggestions to the General Assembly if they were incompatible with the requirements of bodies such as ours and has therefore requested the comments of our Committee and its two Sub-Committees as well as any additional or alternative suggestions we might wish to make in this connexion. No doubt the Committee will want to review this matter and make the appropriate recommendations to the Committee on Conferences and, ultimately, to the General Assembly.

The other matter I should like to mention relates to a request received by me, and circulated to members in document A/AC.105/L.90, from the International Astronautical Federation (IAF) for observer status with this Committee.

(The Chairman)

Members will note that the document before them outlines the very useful work the IAF has carried out in co-operation with this Committee or its Sub-Committees and gives details of the fruitful co-operation we have had in the past. Members are, of course, aware that the IAF has been accorded observer status with the Scientific and Technical Sub-Committee, and it is now up to the Committee to decide on the new request. If there is no objection, it is my intention to give this matter early consideration so that the representatives of the IAF could participate as observers to the present session of our Committee should we arrive at a positive decision on this matter.

(The Chairman)

I should now like to make a few concluding remarks.

I note that our Committee is approaching its twentieth session. Since this marks some kind of anniversary, it might be appropriate to review some of our past achievements, while at the same time assessing future developments in the technological field, as well as the role this body is likely to assume in the future.

A wealth of studies, some completed only recently, forecast massive space technology for the years 1980 to 2000. Some of these studies suggest that human activity in outer space, as well as the uses of space technology, will continue to grow. With the growth of such activities in the last decades of this century, the importance and the relevance of our own work will increase.

Earth-oriented space activities seem to be among those that will have the greatest chance of being developed in a substantial manner, both qualitatively and quantitatively. Their impact, for instance, on the exploration, production and management of resources, including energy, on the prediction and protection of the environment, and on the development of communications is likely to remain of vital significance.

Extraterrestrial activities might help to answer such important questions as these: How are changes brought about by man's increasing dominance of nature affecting the global climate? Has the change in the chemistry of the atmosphere already altered the solar radiation reaching the surface? If the amount of atmospheric pollution keeps increasing at the present rate for, say, the next 25 years, will we trigger a new ice age or initiate the melting of the polar ice? Broadly speaking, space activities of an extraterrestrial orientation might bring a solution to such fundamental issues as the nature of the universe, the origins and fate of matter, the evolution of the solar system, and the origins and future of life itself. Space-related technology, such as in the field of automated intelligence, management of energy, environment and matter, will also be increasing rapidly.

I have referred to those questions because dealing with matters of outer space is dealing with something which a generation ago would have been described as purely utopian. But it still seems highly legitimate and useful in our specific field of work to inject a small element of utopia into our designs,

(The Chairman)

which, more than in other fields of human activity, need to precede the spread of new ideas, of new technology, rather than trailing behind them timidly.

For, indeed, few fields of human endeavour have been so successful at inspiring the creative imagination of the human mind as this one. The continued search for extraterrestrial life is just one example of the creative phantasies which can be engendered by the conquest of outer space. I read, for instance, in a recent article in a large newspaper that a sociologist at Palm Beach Junior College is already teaching a course on how to handle meetings with extraterrestrial life. At the United Nations, however, scientific utopia must be married with political realism. I am confident that their offspring, which we are called upon to produce, will be able to meet the requirements of the coming age, that the results of our work, if undertaken in the right spirit, will stand up not only to the test of our own world, but also -- if I may for one moment pursue the ideas of our sociologist from Palm Beach Junior College -- to the challenges of the other world to which our work is directed.

APPLICATION FOR OBSERVER STATUS BY THE INTERNATIONAL ASTRONAUTICAL FEDERATION (A/AC.105/L.90)

The CHAIRMAN: As I mentioned in my opening statement, we have received an application for observer status from the International Astronautical Federation (IAF). That application is contained in document A/AC.105/L.90.

If no one raises any objections or reservations to that application, I shall take it that the Committee agrees to grant observer status to the International Astronautical Federation.

It was so decided.

The CHAIRMAN: I congratulate the International Astronautical Federation on its new status, and I invite its representative to take the place reserved for IAF at the rear of this chamber.

GENERAL DEBATE

The CHAIRMAN: It appears that no member of the Committee wishes to speak in the general debate today. I understand, however, that the representative of the Committee on Space Research (COSPAR) is prepared to address us now. I shall therefore call on him as the first speaker in our general debate.

Mr. de JAGER (Committee on Space Research (COSPAR)): I should like to thank you, Sir, for this privilege of addressing the Committee today, under your able chairmanship. I should like also to thank you very sincerely for the interesting opening statement you made, to which I listened with great attention and which contained so many ideas for our future consideration. I would also express our great appreciation for your personal interest in COSPAR. The continued good co-operation with the Outer Space Affairs Division, headed so efficiently by Mr. Lubos Perek, is also a source of great satisfaction to our organization.

There are a number of subjects which are dealt with by this Committee that are of interest to COSPAR also. With your permission, Mr. Chairman, I should like to submit these topics to a brief review.

I shall refer first to the relation between energy and space.

It is a well-known fact that the terrestrial energy sources are limited. The question how the decreasing amount of terrestrial energy can be replaced by other sources of energy has repeatedly been asked in scientific and other circles. The question has also been asked whether energy can be derived from sources or scientific experiments in space.

The answer to that question has two aspects. First, scientific observations made during the last decade, partly by satellites studying explosive phenomena on the sun and also by very recent observations of highly energetic phenomena in space, such as the giant bursts of x-ray energy observed to occur in clusters of old stars, have shown that in natural gaseous plasmas very special conditions can apparently arise. In those conditions a relatively small amount of gas -- speaking, of course, in cosmic dimensions -- can accumulate a very large amount

(Mr. de Jager, COSPAR)

of energy, which thereafter is released, often in a short time. It is fascinati that continued investigations of that kind may in the long run help to solve the problem of establishing that kind of terrestrial laboratory conditions that woul help man to solve the problem of fusion reactions for the creation of energy out of a hydrogen plasma. It is well known that the solution of the latter problem would be the key to the solution of the terrestrial energy problem.

I should like to remark, inter alia, that the discovery of gigantic explosions in clusters of old stars, a discovery made with a satellite developed and built in a small country -- the Netherlands Astronomical Satellite -- shows that nowadays small countries can contribute fundamentally to decisive breakthroughs in space science.

To revert to the problem of terrestrial energy, the second question one may ask is whether energy could be derived directly from space. The answer is that the only kind of energy that is abundant in near-earth space is the solar radiation flux. The cheapest way to utilize this flux is by means of collectors on earth -- as is already done experimentally at several places. Projects to collect solar energy in space and to transport it to earth, either by means of intense beams of optical radiation or by using microwaves, are still in a preliminary phase, but their development has to be watched very carefully, for such systems appear to have a great potential for future use.

(Mr. de Jager, COSPAR)

The next question, the question of the lower boundary of outer space, where it should be placed, and whether it should be defined in legal terms, has repeatedly been discussed in this Committee, without a final decision having yet been reached. At the request of the Scientific and Technical Sub-Committee of this Committee, an ad hoc working party of COSPAR has investigated what is the lowest altitude at which artificial satellites could still move freely without rapidly being forced down to earth by air-drag. For satellites in circular orbits this height is found at approximately 130 kilometres -- with some variation, dependent on the weight-size ratio of the satellite -- but for satellites in very elongated elliptic orbits this height is lower, at approximately 100 kilometres, with an uncertainty of approximately 10 kilometres. Hence, if the lower boundary of outer space should be defined on the basis of satellite motion, which seems logical since the Outer Space Treaty in its definition of outer space mentions specifically the motion of satellites, then our suggestion would be to place this lower boundary of outer space at an altitude of 100 kilometres.

I now go on to another subject. Under consideration in the Committee at this time is the draft treaty on the moon. Some of the present discussions concern the scope of the treaty and its extension to other celestial bodies; the exploration and exploitation of natural resources on the Moon, if ever discovered; and how such exploration or exploitation should be regulated internationally.

It seems to us that no formal difficulties arise if the treaty, which states among other things that the Moon is the common heritage of mankind, is extended to other bodies of our planetary system, provided that none of these is inhabited by intelligent beings, because that would then lead to an unacceptable form of colonization. Its extension to celestial bodies beyond the planetary system would perhaps not be advisable since the circumstances and the habitability of possible planets of the stars are not known, and also because the possibility of reaching such bodies by manned space travel is still very remote, to put it mildly.

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The matter of commercial exploration and/or exploitation of the natural resources of the Moon is closely linked to its scientific exploration, since the former activity may adversely affect the conditions of the latter. COSPAR is aware of the importance of the scientific study of the Moon, as a unique object, for the study of the origin and the ancient history of the earth, and of the planetary system. COSPAR therefore hopes that no action would ever be undertaken that would reduce the value of the Moon for scientific research.

Another question currently under discussion by this Committee concerns direct broadcasting satellites. As an organization for scientific research, COSPAR has no direct activities in this field. I should, however, like to use this opportunity, to tell members how deeply I am impressed by the Indian Satellite Instructional Television Experiment (SITE) project for educational television broadcasting, a project which I was shown during my recent visit to India. The SITE project is a wonderful example of how space technology can be used for the benefit of a large population. The SITE project is expected to end on 31 July but it is to be hoped that India will find the means to continue and enlarge this experiment.

This, then, brings me to the involvement of developing countries in space research. Space research is expensive, but it is at the same time of great importance for developing countries to participate in this work, because basic science is vital to their future. In addition, the challenge of space research, which places high demands on intellectual capacities, is an excellent means for creating a cadre of advanced scientists that may form a nucleus for a larger number of scientists and engineers participating in the applied sciences.

Furthermore, what is expensive in space research is not the scientific payload but rather the spacecraft: the rockets, satellites and space probes. Therefore, it is worth mentioning that the International Council of Scientific Unions (ICSU), the mother-organization of COSPAR, has recently, in September 1975, extended the terms of reference of COSPAR to include the area of scientific ballooning. Balloons are much cheaper than satellites, yet they can be very useful for certain aspects of space research. At the recent COSPAR meeting in Philadelphia on Friday of last week, a one-day session on scientific experiments with balloons was held.

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We expect that the outcome of that meeting will also be of importance to developing countries by assisting them to make a start in experimental space research.

It may therefore be useful to draw the attention of representatives to some of the newer developments in scientific ballooning. These developments, on the one hand, make these vehicles very attractive for some kinds of work but, on the other hand, will require some new channels of international co-operation.

The technique of constructing balloons that are able to remain at high altitudes -- about 30 kilometres -- for days and even many weeks has been highly developed and successfully tested in the last decade. At certain latitudes, these balloons carry their scientific payloads to altitudes where the stratospheric winds blow persistently in one general direction, eastward or westward, for long periods of time. Thus, the stratospheric balloons orbit the earth, sometimes making many circumnavigations. It is also often possible to command the balloon by telemetry to release its payload over suitable territory for recovery, after descent by parachute. This technique has been successfully tested in the Southern Hemisphere for obtaining detailed information about meteorological and other atmospheric data at high altitudes. Balloons floating over oceanic expanses can be interrogated from satellites, thus adding to the direct meteorological knowledge available from such remote locations. Similar balloons are now planned for other scientific experiments: for example, for the collection of cosmic dust particles that slowly descend to earth after having been captured from interplanetary space. Many other scientific applications of such long-lived, earth-orbiting balloons can be foreseen.

It is clear that such balloons, while drifting around the earth, at altitudes well above those of aircraft, will pass through the air-territory of many different countries. International agreements have been reached for tests and experimental flights of such balloons in the Southern Hemisphere. More extensive use of these balloons in the future, also in the other Hemisphere, will require additional agreements among the countries concerned.

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In order further to improve its involvement in matters related to the increase and the application of scientific research in developing countries, COSPAR established three years ago an Ad Hoc Group on Space Research and Developing Countries, under the chairmanship of Professor Sahade of Argentina. The Group co-operates closely with COSTED -- which is an acronym for the Committee for Science and Technology in Developing Countries -- and with the ICSU organization for science and technology in developing countries. The Ad Hoc Group of COSPAR met during the annual meeting of COSPAR in Philadelphia, United States of America. The main decisions taken were the following:

First of all, to request that COSTED draw up and distribute to appropriate institutions and individual scientists from developing countries a list of scientists who are able and willing to make stop-overs in specific developing countries during scientific missions;

Secondly, to recommend that a fund be created in order to facilitate the participation of scientists, particularly from developing countries, in space research;

Thirdly, to investigate the need for international and/or regional balloon-launching sites.

Another activity that may prove of use to developing nations is the preparation by COSPAR of two instruction manuals to assist scientists in the use of earth survey data with modest investment in equipment and training. The first manual concerns the production of multicoloured prints using the inexpensive diazo process. Such prints are valuable in interpreting the multispectral images obtained from spacecraft. A second manual, nearing its final phase of production, describes the establishment of a low-cost photo-interpretation laboratory, with specific examples of possible equipment. Other manuals of this type are planned or in preparation.

In the sphere of publications, the nineteenth plenary meeting of COSPAR, held last week in Philadelphia, has decided to publish annually a popular book on recent highlights of space research. Each volume of this book would be written by about a half dozen of the world's best specialists, and in such a

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style and at such a level as would appeal to a very large audience. The book, therefore, could presumably be fairly cheap. It is envisaged that the book will be published in the English, French, Spanish and Russian languages, and in perhaps still others if this is commercially possible.

A next topic of importance for the discussions in your Committee, Mr. Chairman, and also of great importance to COSPAR, is that of remote sensing by satellites. It has not been realized in the past that remote sensing of the Earth from satellites could be of considerable use for detecting mineral resources, but it has recently been shown by various specialists that this is the case.

In the strict sense, satellites cannot detect matter below the earth's surface, because even radio waves can penetrate only a few millimeters into the ground, depending on the wavelength of the waves. But man has developed techniques to deduce, from the spectral response of the geological formations as seen from satellites, information related to the existence of mineral resources in deeper layers of the earth. It is appropriate to note that a co-operative international project, entitled Remote Sensing of Mineral Resources was recently approved by the International Geological Correlation Programme (IGCP) of the International Union of Geological Sciences, in which over 50 countries are already participating. Others are expected as the project becomes known. It goes without saying that any organization which has developed the powerful technique of remote sensing has in its hand the possibility of discovering new mineral wealth, a matter of special interest to regions where the inhabitants have not previously been able to detect such wealth. This applies applies in particular to developing countries.

Stronger arguments, but of the same kind, apply to agriculture. The technique of deriving data on crops and crop development through observations taken from earth-sensing satellites is rapidly improving. Gradually, scientists are mastering the interpretation of these data in such a way that it will soon be possible to observe the development of crops on a world-wide scale, from planting to harvest. It may in the long run even be possible to predict the magnitude of the world's harvest.

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This brings me to space activities related to the conservation of the environment. These are particularly discussed in COSPAR's Working Group 6, on the application of space techniques to earth surveys. It has been shown in the past few years that large polluted air masses could be observed with space techniques, and their source traced. A dramatic achievement of this kind was the detection of a large polluted mass of air originating in the industrial regions near Pittsburgh, Pennsylvania, that drifted south-eastward towards the Washington-Baltimore area. This mass was neither noticed nor reported by conventional ground-based monitoring stations. Other information derived through space instruments concerns the detection of waste dumps in rivers, lakes and near-shore oceanic regions. Future trends include the development of more advanced satellites with improved sensors to give greater accuracy, improved resolution, and more useful spectral coverage.

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Of importance to the proper control of our physical environment is the study of motions in, and forces acting on, the upper atmospheric layers, the stratosphere and the mesophere. The study of circulation patterns in those regions should enable scientists to understand better the relative importance of anthropogenic effects, such as the possible ozone decrease as a result of using chlorofluoromethanes and also as a result of the vastly increased use of nitrogen fertilizers.

The question of potentially harmful experiments in space received attention in the early years of spacecraft. Nowadays, with the increased number of so-called "active experiments in space" as well as with the increased number of launchings of large space vehicles foreseen for the coming years, the danger of polluting the upper atmosphere and outer space is becoming greater than previously. COSPAR is aware of that danger and intends to take the required measures when they appear needed.

Finally, a few words on the large international scientific projects going on in, or in co-operation with, the various organizations of the International Council of Scientific Unions (ICSU). This year saw the start of the International Magnetospheric Survey, a truly gigantic undertaking in which many countries and organizations are involved. The study aims at a better understanding of the terrestrial magnetosphere, which is the region around the earth where the ionized gas is carried along by the earth's magnetic field. By means of a number of geostationary satellites, many other satellites inside as well as outside the magnetosphere, and ground-based instrumentation, it is planned to obtain more information about the structure and, in particular, the dynamics of the magnetosphere and its interaction with somewhat lower layers of the gaseous sphere around the earth.

Another programme for getting information about the lowest layers of the earth's atmosphere is GARP, the Global Atmospheric Research Programme. GARP is a co-operative project between the International Council of Scientific Unions and the World Meteorological Organization, and is, beyond any doubt, the largest common scientific undertaking ever made by man in this respect. Briefly, GARP is concerned with obtaining better information about the development of

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weather, which it is hoped will help to improve man's capacity for weather prediction. Several subprogrammes have been set up or will start, such as the GARP Atlantic Tropical Experiment (GATE) and, particularly, the First GARP Global Experiment (FGGE), scheduled for 1978-1979. For this latter experiment, a number of geostationary satellites, earth-orbiting satellites, aeroplanes, seaborne vessels and ground-based observation stations will also co-operate to obtain coherent information about weather and weather development. It is expected that FGGE will be finished in 1979, as far as the experiments are concerned. The evaluation of the data will probably take some years.

It can be expected that FGGE will be followed by a second global effort for which the first bases have already been laid. This work, which may take a few decades and even extend into the twenty-first century, will be directed towards obtaining an understanding of the fundamental processes that control climate and climatic developments, with special emphasis on subjects like the development of continent-wide droughts and global temperature changes. There is even some expectation that in the long run the results of this enterprise will help mankind to understand how we may inadvertently modify climate and lay the groundwork for any possible future consideration of deliberate modification. However, climate has no national boundaries, and, before man even contemplates attempting to modify it, it will be of the highest importance to set up international regulations to ensure that such modifications are only for the benefit of mankind and that they are applied with the consent and co-operation of all involved persons, organizations and nations.

Still in a preparatory phase is the International Solar System Programme, a world-wide scientific co-operative project for the study of the planetary system, its origin, structure and development. At the recent COSPAR meeting in Philadelphia, a proposal for this project was discussed after a few years of preparation. It was decided to propose to ICSU that the objectives of the International Solar System Programme (ISSP) be accepted in principle and that the organizational structure of the ISSP be incorporated in the COSPAR structure. This proposal will be further discussed next October, during the general assembly of ICSU in Washington, D.C.

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In terminating this report, I should like to stress once again that COSPAR is grateful for the opportunity to co-operate with this Committee, and we shall be happy to offer our further assistance, if necessary, in the future.

ORGANIZATION OF WORK

The CHAIRMAN: I should like to make an urgent appeal to delegations to inscribe their names on the list of speakers. As the Committee is probably aware from the schedule before it, four meetings have been tentatively reserved this week for the general debate -- for tomorrow and the day after tomorrow. It is my hope that many delegations will avail themselves of the opportunity to address the Committee during these two days, but we should welcome a number of speakers at an early moment as there seems to be a certain reluctance to come forward. I would be most reluctant to cancel meetings because of the lack of time. On the other hand, if there are not enough speakers it might be better, in view of the cost of holding meetings, to have just one meeting tomorrow. I therefore appeal to delegations, which have already put down the names of their speakers for tomorrow afternoon, to be ready eventually to speak tomorrow morning.

The meeting rose at 4.50 p.m.