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President: Mr. Foss SHANAHAN (New Zealand).

Present:

Representatives of the following States: Afghanistan, Brazil, Bulgaria, Denmark, El Salvador, Ethiopia, France, Italy, Japan, Jordan, New Zealand, Poland, Spain, Union of Soviet Socialist Republics, United Kingdom of Great Britain and Northern Ireland, United States of America, Uruguay, Venezuela.

Observers for the following Member States: Australia, Austria, Chile, Colombia, Czechoslovakia, Ghana, Indonesia, Iraq, Ireland, Portugal, Romania, Tunisia.

Observers for the following non-member States: Federal Republic of Germany, Holy See, Switzerland.

Representatives of the following specialized agencies: International Labour Organisation, United Nations Educational, Scientific and Cultural Organization, International Bank for Reconstruction and Development, International Monetary Fund, World Health Organization, World Meteorological Organization.

The representative of the International Atomic Energy Agency.

AGENDA ITEM 14

Questions relating to science and technology

(a) Main trends of inquiry in the field of natural sciences, the dissemination of scientific knowledge and the application of such knowledge for peaceful ends (E/3362/Rev.1, E/3469, E/3488 and Add.1, E/3505 and Add.1-3 and Add.1/Corr.1) (continued)

(b) Development of scientific and technical co-operation and exchange of experiences (E/3510, E/3515)

1. Mr. RODERICK (United Nations Educational, Scientific and Cultural Organization) said that, stimulated by the survey on the main trends of inquiry in the field of natural sciences and by its recommendations (E/3362/Rev.1), UNESCO had produced a ten-year natural sciences programme with three main aims.

2. The first was to develop science where international means were required — as, for example, in the exchange of scientific information. The second was to aid the

development of certain fundamental scientific activities which could be foreseen to be directly related to the future welfare and economic progress of mankind, such as oceanography and the earth sciences. The third was aid to the development of the economy of the under-developed nations by the application of science — for example, in training and in applied research to meet specific problems.

3. For the achievement of those aims there were three main lines of action. First came the international co-ordination of science. His organization was planning to develop mechanisms for the improvement of the exchange of scientific information among nations, particularly because the appearance of some 100,000 scientific publications each year made it difficult for scientists to obtain desired information from such a mass of material.

4. In that connexion, UNESCO was planning a large-scale attack on those problems, including a special office for scientific information to develop proper machinery, both governmental and non-governmental, to obtain agreements on a world-wide scale necessary for the improvement of scientific documentation and the flow of scientific information. In addition, UNESCO would continue to support non-governmental organizations in their exchange of information in the field of fundamental sciences.

5. Second would come the scientific exploration of the earth on, above, and below the surface for the study of man's inheritance — the source of his existing and future wealth. In that connexion, UNESCO intended to help in the preparation of international world-wide maps on soil, geology, tectonics and oceanography as an essential basis for the exploitation of natural resources; it also planned to develop co-operation in regional problems dealing with scientific questions concerned with the arid, humid, sub-arctic and mountainous regions.

6. Third, UNESCO would help in the training of scientists and engineers, and would help under-developed countries to plan their educational and scientific development and their national administration of science; it would also, by using special funds, set up engineering schools and help to establish applied research centres. In addition, there was a need for highly skilled post-graduate specialists in under-developed countries. Schools had already been established in developed countries — at Upsala in Sweden, for example — and it might be possible to set up five such schools in the following three or four years for various subjects, such as geological research, cartography, engineering in rubber and metallurgical research.

7. But what could really be expected from such a ten-year programme? There were between perhaps 300,000 and 3 million people concerned with science, depending on the level of competence covered by those figures. The total funds spent on fundamental science might be \$1 or 2,000 million annually, and total expenditure on applied research might be ten times higher. The resources of UNESCO as a co-ordinating agency in science were less than \$2 million a year, which was approximately 0.1 per cent of the total national efforts. Similarly, in applied science, the total funds of the various United Nations agencies might amount to \$20 million — which was the same percentage of the total effort. Could it be expected that that small amount of money would effectively co-ordinate world-wide efforts? If the nations wished seriously to talk of international co-operation in science — pure and applied — they would have to increase perhaps tenfold their financial support of the international machinery.

8. The heart of the problem for the Council was the question of the relationship between a nation's scientific effort and its economic development. That relationship was not known. What was known, however, was that by and large the developed countries were 10 times richer in income per head of population than the under-developed countries, and 100 times richer in scientists per head of population. The implications of those facts were not clear; it might or might not be that the under-developed countries would have to train scientists at a rate 10 times faster than that of their economic growth.

9. Furthermore, it was known that the largest group of scientists in the under-developed countries were engaged in medical research, while in the developed countries chemistry claimed the largest number. Should the training of chemists be encouraged at a moment when there was no work for them? It was quite clear that the relation of scientific effort to economic growth must be studied if those questions were to be answered and help provided for the efficient economic development of the less developed countries.

10. With regard to the proposal by the Scientific Advisory Committee for the calling of a conference, the difficulties of transfer of techniques, referred to in the section "Theme and agenda of the conference" of document E/3510, was a point that needed amplification, because if the conference was to have practical meaning for the under-developed countries, due regard must be had for economic and social factors governing the application of science and technology to economic development.

11. In that connexion, UNESCO drew attention to item 2.2 in the same section of the document and hoped that too narrow a definition of the word "practical" would not be adopted. In a practical approach, stress should be laid on the importance of:

(a) Economic features of various under-developed nations, such as surplus labour, sparse population, and different stages of economic development;

(b) Relevant sociological and economic factors involved in the transfer of science and technology to less developed areas;

(c) The great value of the concept of economic and sociological returns on investment in science and technology.

12. His organization would be glad to prepare papers for the conference, and had recently established an economic development analysis unit to make studies in depth of the relation between national scientific and technological growth and national economic development.

13. Finally, UNESCO appreciated the opportunity given to it by the United Nations to co-operate in that early stage of the conference, and was confident that that co-operation would outlive the occasion which had engendered it.

14. Mr. THOMSON (Observer for Australia) recalled that General Assembly resolution 1260 (XIII) had been the immediate result of Australia's initiative at the thirteenth session of the Assembly. The Australian observer had already made some general comments on the survey at the Co-ordination Committee's 205th meeting, since when the whole document, and particularly part III, had been under further study by his government, whose additional comments would be circulated to the Council. They took account of the UNESCO comments (E/3469), with most of which his country was in general agreement; those of other agencies were still under study. His government considered that the survey could be more widely disseminated. He supported the proposal by the Scientific Advisory Committee that a conference be convened on the application of science and technology, which he believed to be the first proposal for an international project of such scope. He hoped that subsequently a series of small specialized conferences could be held at regular intervals to study one subject at a time as the most practical way of obtaining the maximum results from the 1962 conference.

15. Mr. DUPRAZ (France) said that he would outline his delegation's position on agenda item 14 (a) when the Council had decided on the procedure it would follow in dealing with it.

16. With regard to agenda item 14 (b), his delegation was most interested in the idea of a United Nations conference on the application of science and technology for the benefit of the less developed areas. However, the recommendations of the Scientific Advisory Committee in document E/3510 presented a number of difficulties. In the first place, August 1962 appeared to be too early. Very thorough preparations were essential to the success of a conference of that type, and it was surely not feasible to assemble in less than a year sufficiently detailed material to ensure the success of the conference. Secondly, the proposed conference would be an expensive undertaking, and governments would perhaps be less inclined to support financially a conference convened in haste than one for which careful preparations had been made. It would be useful if the Secretary-General could give an estimate of the approximate costs

involved. Thirdly, the specialized agencies had apparently decided to take part in the conference. It was, however, necessary to know precisely what form each agency's participation would take and, in particular, what proportion of the costs each was prepared to bear.

17. If the Council would not consider deferring the conference to 1963, the work could perhaps be staggered. The conference in August 1962 might deal mainly with methods and programmes, defining the problems and providing guidance for future work and subsequently special conferences might be convened to consider each of the items on the conference agenda.

18. Mr. KAKITSUBO (Japan) said that his country appreciated the value of the survey (E/3362/Rev.1) and acknowledged the need for the co-ordination of scientific knowledge in order to avoid duplication and waste of effort. It believed, however, that the appropriate institutions in each country should study methods of implementing the recommendations made in the survey in the light of local conditions, within the framework of existing regional systems of training and education. There was no need to set up any new international organization. His delegation agreed with the French representative's suggestion (1151st meeting) for convening an *ad hoc* committee to study item 14 (a), but, lacking a competent specialist among its members, considered that the matter should be dealt with by UNESCO rather than by the Council. With regard to item 14 (b), Japan was not convinced of the need for the new conference proposed by the Scientific Advisory Committee. Since, however, the work of the conference was expected to be of a stock-taking character, his delegation was prepared to agree to its being held, but considered that its programme should be limited to a narrower field.

19. Mr. CHOBANOV (Bulgaria) said that the past ten years had seen major developments in science, including atomic energy and the exploration of outer space. The survey before the Council gave a general picture of the possible developments and applications of the natural sciences and made a number of recommendations which merited consideration. One result of recent scientific research was the development of atomic weapons representing a danger to hundreds of thousands of men, women and children. It was, however, essential that scientific knowledge should be used for the good of mankind. Bulgaria, believing in the usefulness of future co-operation and exchange of scientific knowledge and development, supported the proposal of the Scientific Advisory Committee for a conference on the application of science and technology to meet the needs of less developed areas. It hoped that the conference would be attended by all States and would consider the application of science to promote the growth of industrialization and agricultural progress in the under-developed countries. His delegation could not endorse the French representative's suggestion to spread the work of the conference over a period of time, as that would not be conducive to the fulfilment of its task.

20. Bulgaria favoured the establishment of contacts with other countries. In the past sixteen years it had

achieved a genuine revolution in scientific training. In 1949 it had had only five higher institutes of learning, whereas in 1961 it had twenty, attended by hundreds of foreign students, mainly from under-developed countries. The survey made it clear how much remained to be done in establishing scientific collaboration in the exchange of experience and documentation. It therefore welcomed the attention UNESCO had given to the matter at its tenth and eleventh general conferences.]

21. His delegation had no objection in principle to the French representative's suggestion to set up an *ad hoc* committee for the detailed study of the survey, but such a committee should be composed of ten or twelve States at least.

22. Mr. WADE (New Zealand) said that New Zealand had been able to develop a highly efficient form of pastoral farming by concentrated research over a long period on the nature of soils, plants and animals. That research had been carried out largely in New Zealand and by New Zealanders, but his country was fully aware that science was international. The welding together of contributions from many sources into a single body of scientific knowledge had been made possible historically by the free interchange of information and ideas and, in spite of all the limitations placed upon scientific freedom, international co-operation still flourished among scientists.

23. It was, however, sometimes difficult for small countries to follow in detail developments in all the numerous branches of science and technology. New Zealand had therefore supported the Australian proposal at the thirteenth session of the General Assembly for a survey of the main trends of scientific inquiry and the arrangements for international scientific co-operation. The New Zealand authorities had studied closely the survey, which, despite the formidable difficulties, represented a very substantial achievement. If in some respects it fell short of what had been hoped, the reason was the magnitude of the task itself rather than any inadequacy on the part of its author, Professor Auger. The report gave a very comprehensive picture of the main trends of current scientific activities, but failed to some extent to grapple with the problem of concentrating effort on the lines of inquiry which appeared most promising. The recommendations, however constructive in themselves, did not indicate priorities to be followed in future work. However difficult that task might have been, it had surely not been an impossible one, but the report had not attempted it and treated the wide range of subjects covered on a single level.

24. His delegation on the whole agreed with the comments made by UNESCO (E/3469) on the general recommendations put forward by Professor Auger on pages 220-224 of his survey and strongly supported the view that before consideration was given to setting up new international machinery for scientific co-operation, the possibilities should be fully explored of using and developing existing institutions and procedures. It was interesting to note that that view was shared by other delegations which had spoken in the debate.

25. The second recommendation, dealing with the application of scientific and technical knowledge for economic and social development, was readily acceptable, but it was doubtful whether any additional international machinery was required for the purpose. The concept "technology" was too all-embracing to be isolated as a field for international co-operation without raising serious jurisdictional problems with existing organizations. Although the New Zealand delegation would not wish to exclude the possibility of setting up an appropriate service within the United Nations family itself, it would not be able to support the establishment of a new organization in that field.

26. The third recommendation, on regional scientific and technical training of students, was useful, applying as it did to countries whose resources were at present inadequate to support institutions of their own. In many branches of science the best forms of training might be those available in industrialized countries, but local training was usually cheaper, more convenient for short courses and no less effective. It went without saying that full use should be made of existing facilities, but additional ones might be needed, particularly in the ECAFE region.

27. Without going fully into the special recommendation on pages 224 to 229, he believed that more attention might usefully have been devoted to the agricultural and related sciences. His delegation entirely agreed, however, with the emphasis placed on the need for increased research into energy storage, and welcomed the proposal to establish a large astronomical observatory in the middle latitudes of the southern hemisphere.

28. The New Zealand authorities had studied with interest the proposal submitted by the Scientific Advisory Committee for the calling of a United Nations conference on the application of science and technology for the benefit of the less developed areas. The subject proposed for consideration by the conference was, of course, of major significance, but the document, perhaps owing to its brevity, left some doubt about the precise purpose which a conference on the scale suggested might usefully serve. The list of items deserving emphasis read very much like a recital of the normal functions of the United Nations and the specialized agencies, and it was not clear what the proposed conference would add to the work which they were already doing in their respective fields to adapt modern science and technology to the needs of the less developed countries. The New Zealand delegation would, however, support the proposal if it proved acceptable to the Council, because of the importance of the subject matter, and would be glad to help in preparing for the conference.

29. The success of the conference would depend very largely on the care with which the preparations were made. The Scientific Advisory Committee fully recognized that fact, but went on to suggest that the conference should be held in August 1962, barely a year ahead. Undoubtedly, the Advisory Committee was better able than his delegation to judge of the matter, but it was doubtful whether all the necessary preparatory work could be satisfactorily completed in such a short time.

On the other hand, his delegation was not convinced that postponement until 1963 would, in fact, give rise to the difficulties mentioned by the Advisory Committee. It welcomed the French representative's comments and would suggest that the question of timing be considered separately and in rather more detail before a decision was taken.

30. With regard to the question of procedure raised by the French representative at the 1151st meeting, there might be some advantage in dealing with the detailed questions arising out of the survey and the problems relating to the proposed conference in a committee of the Council rather than at a plenary meeting. The best solution might be to refer them to the Co-ordination Committee, which had dealt with the item in 1960, rather than to an *ad hoc* committee, especially as the Council's agenda was very heavy and the Secretariat would probably find that it could not service additional meetings.

31. Miss SALT (United Kingdom) observed that the debate so far could have left no room for doubt that the major industrialized countries attached great importance to the dissemination of scientific knowledge and its application for peaceful ends. One of the major factors in raising standards of living was the fruitful application to developing countries of the results of scientific advance. The United Kingdom had consistently supported, in the Economic and Social Council and in the General Assembly, the constructive consideration of Professor Auger's report which, after an informative exposition, concluded with certain general recommendations, mainly of an institutional and organizational nature, and some highly scientific special recommendations. Many of the suggestions concerned individual governments and required no further endorsement by an international organization. The survey was to be welcomed, since it provided a valuable pointer to directions in which further collaboration would be useful and would be likely to prevent waste of resources. The section on page 213 on dissemination of results made clear the immense difficulties encountered by scientists and researchers merely in discovering what the latest contributions to knowledge were, owing to the fact that the material was scattered through tens of thousands of scientific journals. The report was therefore a timely effort to bring that situation to the notice of the United Nations and to suggest ways in which international action might help to ease the efficient application of science to the world's real needs.

32. The report's great merit was that the recommendations made in it were important and practical and had far-reaching implications for scientific policy. The way in which the Council dealt with them would therefore have lasting effects not only on the development of scientific collaboration throughout the world, but also on the future living standards of people in the developing countries.

33. The Council must therefore immediately decide on the procedure for examining and analysing the recommendations and determine which of them it was competent to handle. Those latter could include the questions

of international scientific conferences and agreements and conventions relating to international scientific co-operation (pp. 220-224). It would strain the capacity of many delegations to consider constructively the special recommendations on pages 224 to 229. The Council's main task was to decide how to make the report most valuable for the economic development of the less developed countries.

34. The United Kingdom Government had already communicated its comments on the conclusions in the report (E/3505). Other governments had similarly sent in their comments, as had the specialized agencies. The comments were naturally not always immediately reconcilable. The Council might therefore request that a synthesis of the general recommendations in the report and the comments be compiled to enable it to decide on a clear and generally agreed course for practical action in the future.

35. One method might be that suggested by the French representative at the 1151st meeting, namely, to set up an *ad hoc* committee of the Council. She fully endorsed the aim the French representative had in mind, and agreed that it would be difficult to give the discussion of the subject the weight it deserved in two or three plenary meetings. But in view of the heavy agenda, any additional meetings, either in plenary or committee, would be at the expense of other items, and it would be undesirable to give one item on the agenda such priority over other items. She would therefore tentatively suggest that the Council request either the Secretary-General, or an independent expert, or a rapporteur appointed from among the members of the Council, or even a small group of members to prepare the synthesis of the comments on the general recommendations to which she had referred. The timing would depend on the work involved. If the rapporteur could be found immediately, the synthesis might be ready for submission, possibly in conjunction with the Council's own report, to the General Assembly at its forthcoming session. It might even result in a generally agreed plan for the execution of the general recommendations which would cover both international collaboration and also serve as an authoritative guide to governments in determining their own national scientific policies. If the suggestion were generally acceptable, the United Kingdom delegation would be glad to collaborate with any other interested delegations in submitting a draft resolution for consideration by the Council. It would also be glad to discuss the suggestion, either formally or informally, with any other interested delegations.

36. In regard to item 14 (b) of the agenda, the United Kingdom delegation welcomed the proposals by the Scientific Advisory Committee for a United Nations conference on the application of science and technology

for the benefit of less developed areas. The original suggestion had come from Sir John Cockcroft. The agenda proposed by the Advisory Committee was well thought out and reasonably well-balanced. She shared the hope expressed by the Advisory Committee that the general theme of the conference, the acceleration of development through the application of the latest advances in science and technology, would be interpreted in as practical a way as possible.

37. The proposal that the conference should be held in August 1962 certainly left little time for preparation, but there were real difficulties in postponing it until 1963, and, on balance, the sooner it was held, the more help it would be to the less technically advanced countries. Her delegation was therefore prepared to endorse the Advisory Committee's suggestion for the date and agenda of the conference.

38. Since the discussions of the conference should be conducted at a practical and expert level, the participants should have the experience and knowledge that might be of use to the less developed countries; it was therefore to be hoped that invitations would be extended not only to scientists, but also to civil servants responsible for formulating and implementing development programmes. As the Advisory Committee had stated, the success of the conference would depend on large-scale participation by the less developed countries. That meant that the learning and experience of the scientists, technicians and administrators from such countries would provide the conference with much valuable material and that the more advanced, and expensive, techniques demonstrated by their colleagues elsewhere, invaluable though they might be, should not be allowed to predominate.

39. Mr. CERULLI-IRELLI (Italy) supported the French delegation's suggestion to refer agenda item 14 (a) to an *ad hoc* committee. No argument had been put forward against the idea, which had common sense to commend it. The suggestions made by the United Kingdom delegation were not in contradiction with it; they merely clarified the composition of the *ad hoc* committee. Some delegations had no competent scientific experts who were qualified to give advice.

40. He also shared the French delegation's views on the date of the proposed conference. A year seemed a very short time to arrange a conference whose success depended on intensive preparation.

41. The PRESIDENT said that the debate on items 14 (a) and 14 (b) was not closed. Pending resumption, delegations might seek to come to an agreement on the various suggestions that had been made so that a decision could be taken on the procedure to be followed.

The meeting rose at 12.40 p.m.