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CONTENTS

Chairman: **Mr. Francisco URRUTIA (Colombia).**

AGENDA ITEM 67

International co-operation in developing the peaceful uses of atomic energy: report of the United States of America (A/2734, A/2738, A/C.1/L.105) (*continued*)

1. Mr. PROTITCH (Secretary of the Committee) said that the Secretary-General had authorized him to inform the Committee that the verbatim records of meetings on agenda item 67 would be distributed to all members of the Committee, in addition to the summary records, which remained the sole official records of the Main Committees of the General Assembly.

2. Mr. LODGE (United States of America) said that the joint draft resolution he had mentioned at the previous meeting would be distributed as document A/C.1/L.105.

3. Mr. MOCH (France) said he wished first to express France's gratitude to the United States for the efforts it had made to further the development of the peaceful uses of atomic energy. France supported the programme; it hoped to benefit, with other States, from the activities of an atomic agency while making its own contribution to the common task. The United States move was the logical outcome of the formal proposal made in the General Assembly on 8 December 1953 (470th meeting) by President Eisenhower.

4. The First Committee was now required to enter a field which still lay essentially within the realm of science. The science in question was eminently the result of international and collective effort. The existing laws of atomic science were based on work that had been begun sixty years before.

5. Between 1895 and 1918, scientists had discovered the two spontaneous phenomena of the radio-activity of certain natural substances and the transmutation of those substances into others. In 1895, Roentgen had observed the emission of certain types of radiation, which he had called X-rays. In 1896, Becquerel had discovered other types of radiation of the same nature. In 1898, Marie and Pierre Curie had isolated two new highly radio-active elements, which they had called polonium and radium. At the same time, but particularly between 1903 and 1907, Ramsay, Rutherford and others had studied self-transmutation of uranium to radium and lead.

6. During the next stage, between 1919 and 1939, such phenomena had been produced and multiplied by science. In 1919, Rutherford had successfully carried out the first artificial transmutation. New elementary particles had been discovered. In 1934, Frédéric and Irène Joliot-Curie had produced phenomena of radio-activity; however, even where more energy had been released than had been consumed in the initial bombardment, the radio-activity had not propagated itself from one nucleus to another. François Perrin had calculated the conditions for such experiments long before they were carried out, while his father, Jean Perrin, had studied the charge of cathode rays and predicted thermonuclear phenomena. During the same period, Louis de Broglie had elaborated the theory of wave mechanics, which had made vast progress possible, particularly in atomic science.

7. The third stage had begun in 1939. It had been discovered that under certain conditions the bombardment of uranium gave rise to two fragments, each having a mass about half that of uranium, with an emission of neutrons, accompanied by the disappearance of a small fraction of the original mass and the release of a very large amount of energy. That was the phenomenon of nuclear fission, the origin of atomic science. The next step necessary had been to bridge the gap between limited reaction, which ceased spontaneously, and chain reaction, which, once set off, accelerated. International events had been such that military requirements had received priority study. Hundreds of physicists from every country had gone to America and worked in close collaboration with their United States and Canadian colleagues. In 1942, with the first atomic pile, the problem of the chain reaction had been solved by their common labours. In 1943, huge factories had been built for the large-scale production of fissile materials for use in bombs. The first explosions had taken place in 1945.

8. The fourth stage had begun in January 1950, when President Truman ordered the study of the thermonuclear bomb, which was based on the fusion of light nuclei (hydrogen, deuterium, tritium or lithium) at a temperature of several million degrees, produced by an atomic explosion. That second series of experiments, which had been initiated in 1952, had done much more than the first series to revolutionize ideas of war, and had confronted mankind with a threat a thousand times more terrifying. So far, there seemed to be no possibility of using thermonuclear fusion for peaceful purposes. It was not without interest to note that, during the four stages, eight Nobel prizes had been conferred upon French scientists who had contributed to the growth of knowledge on fission and fusion reactions.

9. The French atomic organization was the Commissariat de l'énergie atomique, which was directly responsible to the Prime Minister. The Commissariat had begun its work in 1946, and had been able to carry

out its tasks with the use of national resources: its uranium, for example, came from ores mined and processed in France. Heavy water would shortly be produced in France, and graphite for atomic piles was also produced in the country. The nuclear piles and processes used had been devised by French physicists, some of whom had been among those who refused to bow before the occupying Power and had carried on the scientific struggle side by side with their American and Canadian colleagues.

10. Thanks to its mineral resources, the French Union would be in a position to make its contribution to the task of international co-operation. It was expected that, if mining continued in 1955 at the current rate, it would carry stocks beyond France's present needs. Moreover, the known reserves in metropolitan France were sufficient to feed existing or planned reactors for nearly twenty years. There were hopes of even greater things in the overseas territories. In Madagascar, a very extensive area of mineral deposits had recently been discovered, containing ores rich in uranium and thorium, the thorium deposits, apparently, being among the largest at present known.

11. France had two reactors in operation; a third was now being completed and a fourth was planned. The first two were experimental. The third would have a capacity of 40,000 kilowatts, and the capacity of the fourth would be considerably greater. France might well soon be the fourth largest producer of plutonium in the world, coming after the United States, the USSR and the United Kingdom. In addition, France's equipment included an extraction plant and concentration plants under construction, and cyclotrons. An extremely powerful synchrocyclotron was shortly to be added.

12. For the past two years, the Commissariat, in co-operation with the science school of the University of Paris, had been conducting courses in physics and nuclear techniques; these were already being visited by foreign students. The Commissariat had already been able to supply radio-active isotopes and uranium to various foreign States, and it intended to expand such exports.

13. Thus the purposes of the French atomic effort, which was of course modest in comparison with the Anglo-American and Soviet achievements, were at present exclusively peaceful; and it was to be hoped that progress in disarmament would permit that state of affairs to continue. In any event, France was amply supplied with scientists and experts, equipment, raw materials already inventoried, and mineral wealth to be explored.

14. Problems of atomic energy inevitably involved the problem of the world's power resources. In the last analysis, technical progress must be measured by the amount of power available.

15. The first thing to be noted, in that connexion, was that there had been an increase in total power *per capita*. In the United States, Canada and France, for example, *per capita* power had roughly doubled in the first third of the twentieth century. But while the power supply in the industrialized countries amounted to about 0.5 horsepower *per capita*, the figure for the most under-developed territories of Asia, Africa and America was 400 times lower. The figure for the world as a whole was only one-sixth of the United States total. It appeared, therefore, that if material well-being was to be achieved in the under-developed two-thirds of the world, total power consumption would have to be increased six times.

16. The increase in the demand for power was accompanied by a change in the nature of power. The nineteenth century had been the century of steam and factories, and of the concentration of proletarians. In the twentieth century, electricity and gasoline had brought about an increase in the number of small, relatively economical, engines, and consequently, to some extent, a rebirth of small-scale production.

17. According to statistical data, an American consumed the power equivalent of 8 tons of coal per annum, a European the equivalent of 2.2 tons and an inhabitant of the most under-developed areas of the world the equivalent of 200 kg. (nearly 441 lb.). The total world power consumption amounted to the equivalent of 2,500 million tons of coal — or an equivalent fuel — per annum; and if American industrialization were available to all mankind, the figure would be 15,000 million tons.

18. The resources available were unequally distributed among the peoples of the world; they were being exhausted at a more or less rapid rate or remained limited. The coal reserve of the United States would be sufficient for only five to six hundred years. The United Kingdom had enough coal for a hundred years, after which it would face a final century of very dear coal. For some of France's deposits, the period of rising prices had already begun.

19. The situation with regard to oil was even more serious. Although new resources were being discovered every year, the present known reserves in the United States would cover only fourteen years of consumption.

20. Resources of water-power, while inexhaustible, were limited.

21. Prime costs, moreover, were rising in proportion as it became necessary to tap sources of power that were less and less accessible; increased production, therefore, was accompanied by a rise in the price of power which adversely affected the progress of industrialization and material well-being.

22. Clearly, therefore, new sources of power needed to be developed in the near future. Theoretically, atomic energy could offer a solution to the problem of replacing power resources. According to Einstein's equation, the total destruction of a gramme of matter would release energy roughly equal to the combustion of 20 million tons of coal. That meant that the current needs of the entire world could be met by the annual destruction of 130 kg. (approximately 287 lb.) of matter.

23. However, complete destruction was not possible at the present stage of scientific knowledge. The process of fission destroyed less than a thousandth part of the matter involved, while that of fusion, if it could be produced in a slower form, would destroy less than a hundredth. Assuming that industrial fission could be achieved within a number of years with an efficiency of about 50 per cent, some 300 tons of matter annually would meet the current power needs of the world.

24. The benefits of atomic energy would be most apparent in the under-developed areas. Instead of the 5,000 million tons of coal now used, some 60,000 tons of ore — a figure eighty thousand times lower — would suffice. Atomic energy thus appeared to be easily dispersable and transportable to areas lacking other re-

sources. That fact, by making atomic energy available to peoples throughout the world, would no doubt constitute the great social advance of the future. The portable reactors already being built in the United States under the expressive name of "power packages" were a very interesting precursor of that trend.

25. There remained the problem of prime costs. In the United States, power produced from coal cost about 0.5 cents per kilowatt-hour. It was hoped, however, to bring the price of atomic energy down to about the same level in the fairly near future. Atomic energy could thus be expected to compete soon with conventional power even in countries where the latter was produced at low cost. That would make it even more indispensable in countries in which conventional power resources were scarce and costly.

26. An intermediate phase might intervene, between the present era and the atomic era, during which the required increase in production might be achieved more economically by the development of conventional methods or through para-conventional solutions.

27. On the one hand, oil prospecting could be expected to continue, and hydroelectric power was likely to increase substantially through the harnessing of rivers not yet exploited for power production.

28. On the other hand, various new techniques were currently being developed. Countries rich in solar heat were considering the direct use of solar energy. In the Pyrenees, for instance, France had constructed an experimental solar centre which supplied some 80 kilowatts of power for about 250 days in the year. That method might offer tropical and under-developed countries a useful source of power. Tide-power and wind-power might also be used. A tide-power plant was to be built in Brittany, and projects of considerably larger scale were under consideration. A French scientist had developed a process by which energy, in the form of heat, could be recuperated by using the difference in temperature between the surface and the bottom of the sea; that process too could be used in tropical countries lacking natural resources. Two other methods worthy of note were the direct transformation of solar energy or the energy contained in radio-active radiation into electric current. Finally, the use of terrestrial heat should not be overlooked; it was already being used for a number of purposes.

29. The atomic energy conference would have to study the manifold aspects of atomic science and the even more varied aspects of energetics, for one of the essential aims of the United Nations was to raise mankind's standard of living substantially, priority being given to the under-developed regions.

30. International co-operation was essential for the development of science and its blessings, but it would not come into its own until the threat of thermonuclear destruction had been removed. Nevertheless, the start and the development of such co-operation should not wait upon that event; boldly conceived, it would help to avert that threat.

31. The establishment of an international atomic energy agency had been proposed, to co-ordinate national efforts, to enable less favoured States to benefit from the experience of others, to increase the efficiency of each and to hasten the progress of all. The French Government was in favour of the plan and had, indeed, been a party to the current negotiations from the very start.

32. In that connexion, it should be pointed out that it had been for practical reasons only that those negotiations had so far been limited to a few States. The initiative had had to come from the United States. Subsequently, eight countries, especially qualified by reason of their raw materials resources or the scale of their atomic programmes, had come to an understanding. It was to be hoped that they would soon set up an international agency.

33. The agency should be open to all who were prepared to make an effective contribution. It was to be hoped that the USSR would agree to join in the common task; by so doing, it would broaden the scope of the work and make it possible, one day, to turn the undertaking into a real international pool.

34. The agency would start slowly. It would have to draw up a list of priorities and adapt its objectives to its means, Nevertheless, those objectives should as soon as possible attain a scope corresponding to the purpose for which the agency had been established, and the agency should be able to supply nuclear material for the needs of scientific research and for peaceful uses, in particular for the production of power.

35. The agency's relationship to the United Nations should be similar to that between the United Nations and its specialized agencies. The agency would therefore have to be set up under the auspices of the United Nations, steps being taken at the same time to ensure that it had the independence necessary for efficient operation.

36. The scientific conference mentioned in the joint draft resolution (A/C.1/L.105) would have the task of exploring the different fields of atomic energy application in which progress could be made and of studying how international co-operation might be made most effective. The conference would, of course, examine in all their aspects—scientific, technical, economic and social—the possibilities of utilizing the atom as a source of power. It might perhaps also study the whole problem of power resources.

37. In addition to all the States invited, representatives of the specialized agencies should participate in the conference and the Secretary-General should be able to consult them during the preparatory period, prior to the opening of the conference.

38. The conference should not be linked directly with the international agency, which latter should have been established by the summer of 1955; nor did France wish to propose a connexion between the world agency and the organization known as the European Centre for Nuclear Research, a regional European agency devoted to pure science.

39. The efforts to foster international co-operation with a view to developing the use of atomic energy for peaceful purposes should not be confused with the efforts which the United Nations had made and would go on making with regard to disarmament. They were distinct, yet related, for they were directed to the same ends, and any progress achieved in one field would lead to progress in the other.

40. The French delegation hoped that the unanimous vote on disarmament, that omen of future progress, would be followed by an equally unanimous resolution promoting international co-operation for the development of atomic energy.

41. Mr. VAN LANGENHOVE (Belgium) said that besides its duty of promoting the peaceful solution of international disputes liable to endanger peace, the United Nations had another, equally important, mission; to develop friendly relations among nations, to ensure their co-operation and to harmonize their efforts. That was the aim of the proposals before the Committee. There was nothing surprising, therefore, in the welcome which those proposals had received on 8 December 1953, when they were submitted to the General Assembly (470th meeting) by the President of the United States. On that day new prospects had opened up for a world terrified by the problem of the control of atomic energy.

42. While the plan under consideration did not constitute a solution of the disarmament problem, it nevertheless dealt with the positive aspect of the atomic energy question and encouraged international co-operation with a view to developing the use of atomic energy for peaceful ends. The representatives of the United States, the United Kingdom, Canada and France had described the results obtained and the possibilities opened up in the field of international co-operation. Belgium could bear witness to those facts, as it was among the countries which had practised such co-operation and had benefited from it.

43. The plan as it stood consisted of two concrete proposals, the first for the setting up of an international atomic energy agency and the second for the convening of an international conference to study the peaceful uses of that energy.

44. The Soviet objections to the United States proposals had led the United States to extend its negotiations with the Soviet Union to include other States which were exploiting large raw materials resources or had contributed to the harnessing of atomic energy. That was how Belgium had been called upon to take part in the current consultations.

45. As a result of those objections on the part of the Soviet Union, the original proposal had been somewhat modified. Instead of making the proposed international agency an institution designed to serve as a raw materials pool and distribution centre, it was now proposed to use that body, at least at the outset, as a sort of clearing-house. Belgium had fully approved that plan and pledged its co-operation.

46. The fact that, in the disarmament question, the Soviet Union had finally accepted the compromise proposal contained in the Franco-British memorandum of 11 June 1954 (DC/53, annex 9) as a basis for discussion, justified hopes of a speedy solution. The obstacle encountered in the disarmament problem had resulted from the Soviet Union insistence on the previous and unconditional prohibition of atomic weapons. As that difficulty had been overcome in the case of the disarmament problem, there was no reason why it could not also be solved in the case of the question under consideration.

47. Plainly, however, the international atomic energy agency could not come into operation in the immediate future. The entry into force of the multilateral treaty defining the agency's functions would be subject to the ratification of the treaty by the signatory States in accordance with their respective constitutional processes. That fact made it even more desirable to convene an international conference at the earliest opportunity to study the peaceful uses of atomic energy.

48. That conference would examine the different possible methods of using atomic energy for peaceful purposes and would consider the exchange of information on the subject. The Belgian delegation regarded as very sound the proposals made on that subject by the United Kingdom representative (707th meeting), especially the suggested choice of Geneva as the meeting place of the conference.

49. Belgium attached considerable importance to the proposed plan. Because of the wealth of its coal fields, Belgium had been the cradle of the industrial revolution on the continent of Europe. It was still one of the countries with the highest *per capita* consumption of coal and electricity. However, some of its deposits were being exhausted and its economic life required cheap power. For those reasons, any changes which might affect the generation of power were of great importance to Belgium. Belgium's ambition was not only to provide for its own capital equipment, but also to contribute, as it had done in the past, to that of foreign countries.

50. Before the war, Belgium had had a virtual monopoly of radium production. But although, with the return of peace, Belgian deliveries of uranium could still account for the bulk of the stocks of nuclear materials in the Western world, in the scientific field Belgium had had to make up ground lost through the occupation of the national territory.

51. After the war, an inter-university institute of nuclear physics had been established in order to further fundamental studies of a purely scientific nature; later, in 1952, a study centre for the application of atomic energy had been set up for purposes of technical research. The training of Belgian technicians had been pursued with the co-operation of both the United States and the United Kingdom, and the centre had undertaken and was proceeding with the construction of an experimental reactor which would serve both as a training instrument and as an abundant source of neutrons for scientific research. As a subsidiary activity, it would produce radio-active isotopes.

52. In those two fields of activity, Belgium had already had experience of international co-operation; it had benefited greatly from the very valuable assistance of the United States and of the United Kingdom and it had participated, with eleven other States, in the setting up of the European Centre for Nuclear Research.

53. The part which Belgium had taken in the atomic revolution, the vital importance of that revolution to its economy and the role which it intended to play, placed it among the countries principally interested in the setting up of an atomic energy agency. Those reasons had prompted it to associate itself with some similarly placed States in submitting the joint draft resolution (A/C.1/L.105), which was designed to facilitate the peaceful co-existence of peoples and to organize co-operation among them for the maximum common welfare.

54. Mr. VON BALLUSECK (Netherlands) said that at the end of the war it had been difficult to foresee that the new atomic power which had brought an end to hostilities was destined to play an ever more important role in international relations. And yet the destructive potentialities of the new invention had spread fear throughout the world. Paradoxical as it was, the fear was inspired by man himself, for it was

he who was devising new means of destruction by making irresponsible use of his scientific talents. While it was true that atomic energy could be used for constructive purposes, that reality was overshadowed by fear. As the United States representative had said (707th meeting), men were losing sight of the fact that the destructive power of atomic energy was exceeded only by its power for human good. That was the idea which had inspired the President of the United States when, a year earlier, he had presented a plan for the peaceful use of atomic energy. The plan had made it clear to all that the power of the atom was not necessarily a menace, and it had perhaps inaugurated a new phase in the atomic era.

55. As was to be seen from document A/2738, the Soviet Union had felt compelled to make discussion of Mr. Eisenhower's plan conditional on previous agreement regarding the prohibition of atomic weapons, thus linking the question to the disarmament problem. It would seem, however, that the door pushed open by President Eisenhower was not completely closed, and encouragement for that hope was to be found in the recent debate on disarmament. But for the Members of the United Nations to reach agreement on a preliminary step towards disarmament and the prohibition of atomic weapons was not enough. Mankind stood in urgent need of a new hope: that in future man would use his intelligence in the only right way — for the benefit of his fellow men.

56. The Netherlands delegation endorsed the principles underlying President Eisenhower's plan as explained by the United States delegation. It hoped that the debate would show that general agreement on those principles was possible, but stressed that if such agreement could not be achieved in the Committee, other means must be found. There was no justification for any further delay in the matter.

57. Although the Netherlands was not in a position to play a preponderant part in the development of atomic science, it was as much concerned with the problem as any other country. That concern was inspired not merely by the common fear, but also by the desire to make a contribution to the peaceful application of atomic energy. The Netherlands had a working arrangement with Norway under which a reactor was jointly operated in the latter country. It was also taking part in the activities of the European Centre for Nuclear Research and was a signatory to the 1953 Convention establishing the European Organization for Nuclear Research.

58. The Netherlands felt that it could make a contribution to the execution of the plans for exchange of information announced by the United States representative. Its only condition for co-operation in promoting the application of atomic energy for peaceful purposes was that the proposed agency must be founded on the firm desire to further nuclear science for the benefit of all mankind, and must be alive to the moral responsibility which had been placed on man's shoulders when he had uncovered that new secret of the miracle of creation.

59. Mr. VYSHINSKY (Union of Soviet Socialist Republics) felt that the statements made by the preceding speakers, and in particular by Mr. Lodge, had not given a sufficiently clear idea of the proposed international atomic energy agency or of the plans for organizing international co-operation dealt with in the joint draft resolution.

60. The plan itself seemed to have been modified so as to differ substantially from that previously put forward and from the purposes outlined by the President of the United States to the General Assembly in December 1953.

61. It would be helpful to know why the present United States proposal limited the extent and the form of international co-operation for the peaceful use of atomic energy as compared with the earlier proposals, in particular in regard to technical and economic assistance to under-developed countries. The question was of great importance, especially as in its proposals of 8 December 1953 the United States had stressed that the main purpose of the proposed measures was to provide an abundant supply of power for those regions which did not have adequate power resources.

62. It would also be useful to know why the present proposals limited the extent to which the international atomic energy agency would be responsible to the General Assembly and the Security Council. Whereas, according to the United States memorandum of 19 March (A/2738), the agency was to submit reports to those two principal United Nations organs, the present intention, to judge by Mr. Lodge's statement and the joint draft resolution (A/C.1/L.105), was to turn the agency into a specialized agency.

63. Mr. Vyshinsky also wondered what Mr. Lodge had meant by his statement that in the immediate future the international agency would be able to carry out only a few of its activities — those which Mr. Lodge had called "most suitable to it".

64. Mr. Vyshinsky also wished to know whether there was any intention to take steps — and, if so, precisely what steps — to reduce the destructive power of existing stocks of bombs and fissionable materials, as suggested in the statement of 8 December 1953.

65. Lastly, Mr. Vyshinsky wished to reply to the assertions made by Mr. Lodge and some other speakers to the effect that the Soviet Union had taken a negative attitude towards negotiations concerning international co-operation for the peaceful use of atomic energy. Such assertions were absolutely without foundation. Document A/2738, which had been circulated to the Committee, should suffice to convince any objective observer of that fact.

66. It was clear from that document that, in reply to the United States Note of 11 January 1954 inviting the Soviet Union to begin diplomatic conversations on the question, the Soviet Government had stated on 19 January 1954 that it was prepared to examine President Eisenhower's proposal of 8 December 1953. In conformity with paragraph 4 of the United States Note of 11 January 1954, the Soviet Union had put questions and submitted proposals. It had proposed the prohibition of atomic weapons, adding in that connexion that there was little hope of success for the work of the proposed agency unless action were taken to prohibit atomic weapons.

67. The Soviet Government had never made the negotiations conditional on the acceptance of that proposal. It had merely indicated that it would be desirable during the negotiations to consider the question of an agreement whereby participating States would undertake not to use weapons of mas destruction. The negotiations had been held, and the Soviet Government, in its Note of 22 September 1954, while pointing out that it had

not yet been possible to reconcile the views of the parties, had expressed the desire that the two Governments might continue their efforts to reduce their differences. That, as an objective and impartial study of the documents would show, was the position of the Soviet Union Government.

The meeting rose at 12.55 p.m.

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