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OF THE
COMMITTEE ON DISARMAMENT

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NOTE

Symbols of United Nations documents are composed of capital letters combined with figures. Mention of such a symbol indicates a reference to a United Nations document.

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INTRODUCTION

1. The Conference of the Committee on Disarmament submits to the United Nations General Assembly and to the United Nations Disarmament Commission a progress report on the Committee's deliberations on all questions before it for the period 16 April to 22 August 1974, together with the pertinent documents and records.

2. This report includes accounts of the Committee's work during 1974 on further effective measures relating to the cessation of the nuclear arms race at an early date and to nuclear disarmament, non-nuclear measures, including the question of the prohibition of chemical weapons, other collateral measures, and general and complete disarmament under strict and effective international control.

3. A special report on the question of a treaty banning underground nuclear weapon tests is set forth in section III of this document.

I. ORGANIZATION OF THE CONFERENCE

A. Procedural arrangements

4. Two sessions were held, the first from 16 April to 23 May 1974, and the second from 2 July to 22 August 1974. During this period, the Committee held 28 formal plenary meetings during which members set forth their Governments' views and recommendations for progress on the questions before the Committee. The Committee also held seven informal meetings without records.

5. In addition to the plenary meetings described above, members of the Committee met frequently for informal multilateral consultations on disarmament questions of common interest.

B. Participants in the Conference

6. Representatives of the following States continued their participation in the work of the Committee: Argentina, Brazil, Bulgaria, Burma, Canada, Czechoslovakia, Egypt, Ethiopia, Hungary, India, Italy, Japan, Mexico, Mongolia, Morocco, Netherlands, Nigeria, Pakistan, Poland, Romania, Sweden, Union of Soviet Socialist Republics, United Kingdom of Great Britain and Northern Ireland, United States of America and Yugoslavia.

7. The Co-Chairmen and the other members of the Conference of the Committee on Disarmament have agreed to invite the German Democratic Republic, Germany (Federal Republic of), Iran, Peru and Zaire to become members of the Conference of the Committee on Disarmament beginning 1 January 1975. Bearing in mind General Assembly resolution 2602 B (XXIV) of 16 December 1969, the Committee is reporting this agreement to the General Assembly for its endorsement.
8. In letters dated 6 August 1974 to the Co-Chairmen, Australia confirmed its interest in securing membership of the Committee. This request was noted and, with the concurrence of Australia, consideration of it by the Committee has been deferred to a later date.

II. WORK OF THE COMMITTEE DURING 1974

9. In a letter dated 1 April 1974, the Secretary-General of the United Nations transmitted to the Conference of the Committee on Disarmament the resolutions on disarmament questions adopted by the General Assembly at its twenty-eighth session.

10. Members of the Committee were assisted in their examination and analysis of possible disarmament measures by working papers and other documents that were submitted to the Conference of the Committee on Disarmament (annexes I and II) and the plenary statements of Committee members (annex III).

11. At the opening plenary meeting of the 1974 session, the Special Representative of the Secretary-General of the United Nations presented a message to the Conference from the Secretary-General. In his message, the Secretary-General noted some of the significant achievements of the Committee. He also referred to negotiations which are under way at the regional level, in Vienna, on mutual reduction of forces and armaments in Central Europe and at the Conference on Security and Co-operation in Europe. The Secretary-General emphasized that the Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons to be held in 1975 would offer an opportunity to strengthen the Treaty. He expressed the view that, at the bilateral level, the Strategic Arms Limitation Talks (SALT) between the Soviet Union and the United States had produced important agreements, and that they provided encouraging indications of the direction in which the international community wished to move. The Secretary-General stated that those developments, important though they were, represented only initial steps and that increased efforts would be required for success in halting the arms race.

The Secretary-General observed that the Conference of the Committee on Disarmament continued to be most directly concerned with two questions, namely, the cessation of nuclear weapon tests and the prohibition of chemical weapons. He reiterated his view that the stage had been reached where it would be of evident usefulness to all concerned to move on to concrete negotiations in working towards the complete realization of the objective of effective prohibition of chemical weapons. He also reaffirmed his view that a comprehensive nuclear test ban was an indispensable step in the efforts to halt the nuclear arms race, and he shared the grave concern voiced by the General Assembly over the lack of progress towards such a ban. The Secretary-General stated that the Conference of the Committee on Disarmament had proved through the years that it was an effective organ for multilateral disarmament negotiations, and he expressed confidence that the Committee would once again spare no effort to achieve further progress in the disarmament field.

12. In accordance with its provisional agenda, the Committee continued to work on the following measures in the field of disarmament:
(a) Further effective measures relating to the cessation of the nuclear arms race at an early date and to nuclear disarmament.

(b) Non-nuclear measures.

(c) Other collateral measures.

(d) General and complete disarmament under strict and effective international control.

A. **Further effective measures relating to the cessation of the nuclear arms race at an early date and to nuclear disarmament**

13. Members of the Committee continued their work in 1974 on questions relating to the cessation of the nuclear arms race.

14. In accordance with General Assembly resolution 3078 B (XXVIII) of 6 December 1973, a special report on the results of the Committee's deliberations on a treaty banning underground nuclear weapon tests has been prepared and is set forth as section III of this document.

15. The delegation of the Union of Soviet Socialist Republics stated that of great importance for diminishing and eliminating the danger of nuclear war would be the implementation of the solemn declaration of the twenty-seventh session of the General Assembly on behalf of the States Members of the United Nations concerning their renunciation of the use or threat of force, and permanent prohibition of the use of nuclear weapons. It called upon the Security Council to take as soon as possible appropriate measures to implement that solemn declaration in full, and expressed the view that strict observance by States of the solemn declaration of the United Nations on the matter would substantially contribute to the consolidation of peace. The delegation of the Soviet Union declared the readiness of its Government to come to agreement with any nuclear Power and to formalize in an appropriate way mutual obligations with regard to the non-use of force, including simultaneous prohibition of the use of nuclear weapons (CCD/PV.627 and 639). Similar views were expressed by the delegations of Bulgaria, Hungary and Mongolia (CCD/PV.630, 632 and 634).

16. The delegation of Romania expressed the view that a genuine détente cannot be built on force and on the instruments of force-arms and that new democratic relationships between States should be introduced based on confidence, equal rights, respect for national independence and sovereignty and the renunciation of the use of force or the threat of such use in international intercourse (CCD/PV.637).

17. The delegation of the United States of America stated that the Strategic Arms Limitation Talks between the United States and the USSR continue in an effort to place additional controls on strategic offensive weapons systems and eventually to reduce the number of these systems deployed by the United States and the USSR. It noted that the Standing Consultative Commission on SALT has also
begun to meet to promote the objectives and implementation of that agreement and of the Interim Agreement on certain measures with respect to the limitation of strategic offensive arms, and said that the Commission was a reflection of the importance of the initial SALT agreements and of the strong desire of the parties to implement those agreements effectively (CCD/PV.627).

18. The delegation of Japan emphasized that efforts must be made to stop an arms race, which was sometimes called "armament for the sake of disarmament", and to reduce as soon as possible the balance of military power to a lower level. It said that if such efforts were not made any attempt at disarmament would eventually be offset by "armament for the sake of disarmament" with no hope for strengthening world peace and security. The delegation expressed the hope that both the United States and the USSR would pay heed to this point and make efforts to substantiate détente (CCD/PV.628).

19. The delegation of Pakistan expressed the view that, despite the spirit of détente, the SALT talks, and other channels available to super-Powers, there had been no reversal in the alarming trend of the spiralling nuclear arms race between them. It stated that the imperatives of peace and prosperity demanded the highest degree of statesmanship from those who were in a position to influence and perhaps mold the forces of current history, and called on the United States and the Soviet Union to reach concrete solutions to problems that had hitherto remained unresolved (CCD/PV.630).

20. The delegation of Czechoslovakia stated that the process of the lessening of international tension in the political sphere should be implemented by military détente. The delegation indicated that socialist States were in this respect prepared to adopt far-reaching measures considerably helping to solve gradually the main problem, which the delegation continued to believe to be general and complete disarmament (CCD/PV.635).

21. The delegation of India expressed the view that, from the qualitative point of view, the nuclear arms race has assumed frightening proportions, and that research and development in the field of nuclear weapons have become even more intense. It expressed the view that the best way of checking the qualitative development of nuclear weapons was to agree on a comprehensive test ban (CCD/PV.636).

22. The delegation of Egypt pointed out that since the adjournment of the meetings of the Conference of the Committee on Disarmament in August 1973, a number of international events and developments have taken place which have their impact or bearing on its work. It stated that the continuing trend towards détente has given hope to the possibility of easing international tension in the interest of international peace and security. It noted that the Conference on Security and Co-operation in Europe entered its delicate and important stage of preparing "drafts of declarations, recommendations, resolutions or other final documents". It pointed out that the October war in the Middle East was a disturbing reminder of the possibility that the continuous threat to peace in the Middle East could give rise to a world conflagration of much wider dimensions (CCD/PV.636).
23. The delegation of Romania stressed the fact that despite the existence of the Conference of the Committee on Disarmament and the negotiations in other forums the arms race, particularly in the nuclear field, has followed its ascending curve totally unimpeded thus placing its grim stamp on the economic and social life of the nations and on their peace and security. It said that the failure to achieve concrete understandings on nuclear disarmament would induce other States to seek ways and means of developing their arsenals, including nuclear weapons. For that reason, Romania was firmly in favour of hastening the negotiations in the Conference of the Committee, concentrating as a matter of priority on nuclear disarmament. It reiterated concrete issues which it had proposed for negotiation in the nuclear field, namely a ban of the use of nuclear weapons; guarantees of security to States not possessing nuclear weapons; cessation of the production and development of nuclear weapons; and reduction and total elimination of arsenals of nuclear weapons and their vectors (CCD/PV.637 and 648).

24. The delegation of the Union of Soviet Socialist Republics said it advocated real changes in the field of disarmament and considered it necessary to develop broad co-operation in this field, based on the principles of equal security for all States with no unilateral actions for some countries to the detriment of the interest of other parties to the agreement (CCD/PV.639).

25. The delegation of the Union of Soviet Socialist Republics, referring to the third Soviet-United States summit meeting, said that of fundamental significance was the determination of the Soviet Union and the United States, recorded in the summit documents, to apply their joint efforts to removing the danger of war, including particularly war involving nuclear and other weapons of mass destruction, to limiting and eventually ending the arms race, especially of strategic arms, and to strengthening and extending the process of relaxation of tensions throughout the world (CCD/PV.642).

26. The delegation of the United States of America said that, while the arms control agreements signed in Moscow were the product of discussions between the States, they were also a contribution to the broad international effort in which we were engaged and were directed at widely shared goals: the strengthening of peace, the further relaxation of international tensions, and the cessation of the nuclear arms race (CCD/PV.643).

27. The delegation of Sweden said that it welcomed the agreement at the recent Moscow summit meeting to abstain mutually from a second anti-ballistic missile (ABM) site, which reinforced the important Treaty of 1972 on the Limitation of Anti-Ballistic Missile Systems. It expressed the view, however, that the continuing stalemate and pessimistic undertones regarding the central issue of curbing offensive strategic nuclear weapons gave rise to misgiving as to the possibilities of containing the still-accelerated arms race in this field (CCD/PV.647).

28. The delegation of Mexico submitted a document (CCD/439) containing the texts of the bilateral SALT agreements of 1973, since it considered them of direct interest to the Committee and because one of them contained the following provision regarding the implementation of which it would be useful to have some relevant
explanation from the two signatory States: "Over the course of the next year the two sides will make serious efforts to work out the provisions of the permanent agreement on more complete measures on the limitation of strategic offensive arms with the objective of signing it in 1974." (CCD/PV.650)

29. The delegation of Italy, quoting from a recent speech of the Minister for Foreign Affairs of Italy, said that the signing in Moscow of a Protocol to the 1972 ABM Treaty looked positive because the two major Powers had voluntarily divested themselves of a defence potential. It also said that technological progress in the nuclear field would entail ever bigger risks of mass destruction and expressed the hope that agreements for curbing offensive strategic nuclear weapons would be reached before it is too late (CCD/PV.653).

30. The Canadian delegation welcomed the recent agreement to limit further United States and Soviet anti-ballistic missile systems and expressed the hope that this decision would give new impetus to the SALT talks (CCD/PV.653).

31. The delegation of Mexico announced that it had submitted to the Secretariat a "Working paper on the practical application of article VI of the Treaty on the Non-Proliferation of Nuclear Weapons" (CCD/444, CCD/PV.654).

32. A number of delegations commented on the question of the non-proliferation of nuclear weapons.

33. The delegation of the United States of America reported on the establishment, by United Nations Members Parties to the Treaty on the Non-Proliferation of Nuclear Weapons, of a Preparatory Committee to make arrangements for the 1975 Review Conference, and on completion of the first meeting of the Committee and plans for two further preparatory meetings in August 1974 and February 1975. It was proposed that the Review Conference begin on 5 May 1975. The delegation also reported completion by the Federal Republic of Germany of its parliamentary procedures for ratification of the Treaty and noted that Japan had indicated that such procedures would be initiated. It expressed the hope that other nations would also adhere to the Treaty in time to participate in the Review Conference, and expressed pleasure at the adherence of the Sudan and Gabon, both of which would so participate (CCD/PV.627).

34. The delegation of Mexico stated that the Treaty was another patent example of a partial disarmament measure urgently awaiting completion. The delegation expressed the view that, although the Treaty was proclaimed by the two super-Powers and originally accepted by the non-nuclear weapon States as a balanced treaty designed to ban both vertical and horizontal proliferation of nuclear weapons, in practice the Treaty had been used by those Powers to consolidate their privileged position and at the same time continue, heedlessly and relentlessly, the nuclear arms race through increased nuclear-weapon testing (CCD/PV.627).

35. The delegation of Mexico reiterated its view that the non-proliferation treaty was a partial instrument which remained truncated and mutilated not because of a lack of accessions, but rather as a result of the failure of the nuclear super-Powers to comply with the basic provisions contained in its articles VI and V (CCD/PV.627 and 650).
36. The delegation of Japan expressed the view that, in order to stabilize and make durable the Treaty system, it must be supplemented and complemented by the limitation of strategic weapons and the prohibition of all kinds of nuclear weapon tests and that, pending the Review Conference scheduled for next year, this was the very point that should be kept clearly in mind (CCD/PV.628).

37. The delegation of the United Kingdom stressed that if the Treaty was partial it was because not all countries were as yet prepared to accede to it. Citing the protracted negotiations and extensive compromise that led to the Treaty, the delegation reaffirmed the importance of preventing the further spread of nuclear weapons, and observed that over two thirds of the membership of the United Nations had acceded to or signed the Treaty. The delegation suggested that the Committee might profitably consider how to increase the incentives to adhere to the Treaty (CCD/PV.630).

38. The delegation of Mongolia emphasized the special importance of strengthening the Treaty on the Non-Proliferation of Nuclear Weapons, which was rightly regarded as one of the most important instruments aimed at protecting mankind from the horrors of nuclear catastrophe. The delegation of Mongolia, having expressed the hope that the forthcoming Review Conference of the Treaty would make a valuable contribution to the strengthening of that Treaty, considered it necessary that appropriate measures be taken in that direction without waiting for the Conference (CCD/PV.634).

39. The delegation of Poland cited the Treaty as the most important multilateral agreement in the nuclear field and as a living testimony to the negotiating ability of the Conference of the Committee on Disarmament. It expressed the view that the objective of the Review Conference must be consolidation and strengthening of the Treaty and enlarging its scope by encouraging the widest participation in and strict observance of its provisions. The delegation expressed the further hope that all participants in the Conference of the Committee on Disarmament could take part in the Review Conference in 1975 (CCD/PV.635).

40. The delegation of India noted continuance of vertical proliferation despite the Treaty, and suggested that in such circumstances the danger of nuclear war might not be reduced just by more non-nuclear-weapon States becoming parties to the Treaty. It cited MIRV and MARV developments in the strategic field, and "mini-nuke" developments in the tactical field as examples of vertical proliferation (CCD/PV.636).

41. The delegation of Italy said that any advance in nuclear arms limitation and nuclear disarmament would greatly contribute to reinforce the Treaty. The Review Conference, planned for May 1975, should aim at an improvement of the existing Convention and have the objective of offering more incentives to States which have not yet done so to adhere fully to the Treaty (CCD/PV.636).

42. The delegation of Romania expressed the view that the Review Conference had the task of carrying out with the equal participation of all States parties to
the Treaty a multilateral and serious analysis of the practical results of the implementation of the Treaty and of defining political, legal and material measures to ensure total implementation of the Treaty (CCD/PV.637 and 648).

43. The delegation of Romania underlined that the Treaty was conceived and considered by many countries as a step to disarmament and strengthening international security. In its view the Treaty should have been followed, in accordance with its provisions, by new efforts and concrete measures in the disarmament field. Since the results of the work of the Conference of the Committee on Disarmament were far from meeting that expectation, the non-nuclear States have the duty to consistently ask for resolute steps to be taken towards disarmament and guarantees for their security. It reiterated the need for the States possessing nuclear weapons to assume a solemn obligation not to use those weapons or threaten their use against anyone in any circumstances (CCD/PV.637 and 652).

44. The delegation of India read the following official announcement regarding an underground peaceful nuclear explosion conducted by India on 18 May 1974:

"The Atomic Energy Commission, Government of India, announced today that it carried out a peaceful nuclear explosion experiment using an implosion device. The explosion was carried out at a depth of more than 100 metres.

"As part of the programme of study of peaceful uses of nuclear explosion, Government of India had undertaken a programme to keep itself abreast of developments in this technology, particularly with reference to its use in the field of mining and earth-moving operations.

"The Atomic Energy Commission, Government of India, also stated that India had no intention of producing nuclear weapons, and reiterated its strong opposition to military uses of nuclear explosions."

45. The delegation repeated India's affirmation of the right to use nuclear explosion technology for peaceful purposes, and declared its intention to pursue experiments in that direction. India, it stated, was committed to the use of nuclear energy for peaceful purposes, and to the study of all meaningful applications of economic significance; development of peaceful nuclear explosion technology was part of that policy. It stated that all countries developing uses of nuclear energy were nuclear Powers, those which develop or possess nuclear weapons were nuclear-weapon Powers and reaffirmed that India had no intention of becoming a nuclear-weapon Power (CCD/PV.637).

46. The delegation of Japan expressed regret over the tests conducted by India, repeating the long-standing opposition of the Japanese Government to all nuclear tests by all countries, and noting that there was no distinguishing between a nuclear test for peaceful purposes and a nuclear weapon test (CCD/PV.637).
47. The delegation of Canada stated its Government's concern at India's decision to explode a nuclear device, calling it a severe setback to efforts by the Conference of the Committee on Disarmament to halt all testing and check proliferation. Citing Canada's long-standing co-operation with India in the nuclear energy field, for peaceful purposes, the delegation noted that as a party to the Treaty on the Non-Proliferation of Nuclear Weapons Canada saw no difference between development of explosives for peaceful and for military purposes (CCD/PV.637).

48. The delegation of Sweden reiterated its Government's opposition to all nuclear tests and concern at their continuation. It quoted the statement of the Swedish Prime Minister, in which he observed, inter alia, that the Indian explosion broke the development of détente and normal neighbourly relations on the Indian subcontinent; thus, the test and planned series of new explosions caused concern. The Prime Minister called for intensified efforts to make the Treaty embrace all States, and to achieve a comprehensive ban against nuclear tests generally (CCD/PV.637).

49. The delegation of the United States of America reaffirmed the opposition of the United States to nuclear proliferation, because of its adverse impact on world stability (CCD/PV.637).

50. The delegation of Canada described the Indian explosion as a severe and major setback to efforts to halt proliferation and testing, but reaffirmed its Government's view that the Treaty was the most important of the multilateral agreements achieved by the Conference of the Committee on Disarmament. Describing the Treaty as the only commitment among nations against the spread of nuclear weapons, the delegation expressed the hope for adherence by more parties, and expressed confidence that the significance of support of the Treaty by an increasing majority of Members of the United Nations would not be lost on those Governments currently reluctant to accede to the Treaty (CCD/PV.638).

51. The delegation of the Netherlands stated that its Government viewed the Indian action (nuclear explosion) with utmost concern, and that it had taken note of the Indian announcement that it had no intention of becoming a nuclear-weapon Power and remained committed to using nuclear energy only for peaceful purposes. Nevertheless, the Netherlands Government was of the opinion that it was difficult to distinguish between a nuclear test for peaceful purposes, as carried out by India, and a nuclear test for weapon purposes. It believed that the Indian nuclear test undoubtedly represented a serious setback to non-proliferation efforts and efforts to ban tests everywhere and by everyone; a psychological dam had been breached. The Netherlands Government remained committed to a policy of non-proliferation and favours the widest possible adherence to the Treaty; the delegation noted that the Review Conference offered an opportunity to enhance the viability of the Treaty in all its aspects, and conveyed the appeal of its Government for renewed efforts by all members of the Committee towards nuclear arms control and disarmament, first by a cessation of all tests (CCD/PV.638).
52. The delegation of Nigeria stated its Government's belief in the Treaty, and that the acquisition of nuclear weapons by a few States increased the insecurity of all States. It cited inequalities of rights and obligations under the Treaty but had hoped that the development of new nuclear weapons by the existing nuclear-weapon States would be arrested, as well as acquisition by non-nuclear-weapon States. The delegation noted the lack of benefits under articles IV and V of the Treaty, as well as under the eleventh and ninth preambular paragraphs and article VI, and asserted that under those conditions the Indian test was expected. This did not make the shock easier to bear, and Nigeria was opposed to all nuclear tests, called for a comprehensive test ban, and hoped that India would refrain from further testing now that its point had been made. The delegation stated that it was glad to note India's intentions to use its newly acquired nuclear capability solely and exclusively for peaceful purposes (CCD/429, CCD/PV.638).

53. The delegation of the United Kingdom stated that its Government, as a depository Power of the limited test ban treaty and the Treaty on the Non-Proliferation of Nuclear Weapons, was particularly concerned that those treaties should be accepted by as many countries as possible and should be generally respected. It believed that nuclear explosions for whatever purpose should be carried out within the context of those treaties, and noted that particular care was taken in the drafting of the Treaty on the Non-Proliferation of Nuclear Weapons to ensure that potential benefits of peaceful nuclear explosions should be accessible to all countries (CCD/PV.638).

54. The delegation of the Union of Soviet Socialist Republics stressed the importance of increased participation in the limited test ban treaty and the non-proliferation treaty. It suggested that practical steps should be devised to encourage accession, that the Review Conference should be used to review the operation of the non-proliferation treaty, and that the most important task of that Conference would be to devise steps for strengthening the Treaty in every possible way (CCD/PV.638).

55. The delegation of Pakistan, represented by the Foreign Secretary of the Government of Pakistan, voiced the deep concern of the Government and the people of Pakistan over the emergence of a sixth nuclear-weapon Power. Describing a situation of menace to the immediate neighbours of India, the delegation asserted that the barrier to nuclear proliferation interposed by the Treaty had been demolished. It cited increased dangers of nuclear war described by the delegation of the Soviet Union in the First Committee of the General Assembly (A/C.1/PV.1624, para. 17), and the immediate reaction of the Government of Pakistan (CCD/422 and 423). It noted that there was no technical difference between nuclear weapons and nuclear explosives manufactured for peaceful purposes, a fact agreed to by the many authorities cited. Thus, all States that exploded nuclear devices were ipso facto nuclear-weapon Powers. The delegation further recalled warnings by the Government of Pakistan that an Indian test would be conducted ostensibly for peaceful purposes, and it expressed concern about the uninspected Canada-India reactor, citing assurances that had been given that the reactor would be used for peaceful purposes only, although
this reactor must have been the source of material for the Indian test. It pointed out the adverse effects of the test on détente in the south Asian subcontinent, outlining the political implications of the potential threat to Pakistan's security and its unique position in regard to this threat (CCD/PV.638).

56. The delegation cited a statement by the Prime Minister of Pakistan wherein he had emphasized to all concerned Powers that Pakistan's anxiety in this respect cannot but be unparalleled. No two among the five great nuclear-weapon Powers - the United States, the Soviet Union, China, France and Britain - have had a history of confrontation and wars between them in contemporary times or in the past remotely comparable to the relations between India and Pakistan. In barely a quarter of a century, between 1947 and 1971, India has gone to war three times against Pakistan. Throughout this period, India has spurned all possible methods of peaceful settlement of its disputes with Pakistan. The last war was the result of India's armed intervention in order to bring about the disintegration of Pakistan. The delegation thus maintained that Pakistan's situation was unparalleled because the potential nuclear threat to its security was unlike that faced by any other State, nuclear or non-nuclear. Nevertheless the delegation declared that the Government of Pakistan had firmly elected for a political option to Pakistan's problem of security against nuclear threat or blackmail. It cited a statement by Prime Minister Bhutto calling for credible security assurances for non-nuclear-weapon States in the form of a joint undertaking in the nature of an obligation by all permanent members of the Security Council to act collectively or individually on behalf of threatened States (CCD/PV.638).

57. The delegation of India repeated the announcement of the Indian peaceful nuclear explosion read earlier (CCD/PV.637; see also paragraph 44 above). It also read a statement by the Minister for External Affairs of India reiterating, inter alia, India's intent not to develop nuclear weapons, that no obligations had been violated by conduct of the test, and that apprehensions aroused in Pakistan were unfounded (presented as working papers CCD/424 and 425 respectively). The delegation noted with gratitude the statement by Nigeria recognizing the Indian declaration of the peaceful purpose of its explosion (CCD/PV.638). It stressed that neither international obligations nor any bilateral agreement had been violated, and suggested that opposition to all nuclear testing, particularly by the parties to the Treaty on the Non-Proliferation of Nuclear Weapons, was inconsistent with provision for peaceful explosions to be carried out by nuclear-weapon Powers. The delegation of India emphasized that international opinion as reflected in the various United Nations resolutions clearly speaks of nuclear-weapon testing. It would not, therefore, be correct to say that India had acted, or has acted, in contravention of international opinion. It asked further how the distinguished representatives could say that they were opposed to all nuclear testing after having supported those very United Nations resolutions which make a clear distinction between peaceful nuclear explosions and weapon tests by adopting the terminology nuclear-weapon tests. It also stated that the test did not constitute proliferation of nuclear weapons because the experiment carried out was for peaceful purposes. Referring to the objection that peaceful nuclear explosions
involve the same technology as nuclear weapons explosions and therefore should not be carried out, the Indian delegation disagreed with this concept and gave the example of dual-purpose chemical agents which nobody in the Conference of the Committee on Disarmament had thought of prohibiting as far as their peaceful uses were concerned. The delegation cited a letter from the Prime Minister of India to the Prime Minister of Pakistan wherein she had stated that India remained fully committed to its traditional policy of developing nuclear energy resources entirely for peaceful purposes and that the recent underground nuclear experiment conducted by the Indian scientists in no way altered that policy. The Prime Minister of India also assured the Prime Minister of Pakistan that India remained committed to settle all its differences with Pakistan peacefully through bilateral negotiations in accordance with the Simla Agreement under which both countries have resolved to break away from the past history of confrontation and conflict and work to develop normal relations and establish a durable peace. The Indian Prime Minister had stated further that there was no reason whatsoever to give up this healthy trend on the part of either country merely because India had conducted a test for the peaceful uses of nuclear energy. It stated that the security protection granted to non-nuclear-weapon countries should not be confined to certain limited groups or parties, such as the parties to the Treaty on the Non-Proliferation of Nuclear Weapons, but should encompass all the countries which did not have the means to defend themselves against nuclear weapons. The delegation of India drew the attention of the Committee to the double standards adopted by Pakistan while commenting on the Indian nuclear explosion. The Indian delegation noted that Pakistan was not a party to the limited test ban treaty. The Indian delegation quoted various official statements made by Pakistani leaders wherein they had welcomed and congratulated China for its weapons tests in the atmosphere (CD/PV.638).

58. The delegation of Pakistan asserted that intentions were not enough to assure peace and security. It cited once again the indistinguishability of peaceful and military nuclear explosives and recognition by the Security Council that acquisition of a peaceful nuclear explosion capability created a new situation in which security measures would require strengthening. The delegation pointed out that it was necessary in its view to go beyond the assurances of Security Council resolution 255 (1968) (CD/PV.638).

59. The delegation of the United States reaffirmed the policy of its Government against the proliferation of nuclear weapons and its support of the Treaty as one of the most significant contributions to disarmament and world peace. It urged States that had not adhered to the Treaty to do so. It restated the view of the United States that the technology of making nuclear-explosive devices for peaceful purposes was indistinguishable from the technology of making nuclear weapons. The delegation cited its understanding on record in the International Atomic Energy Agency (IAEA) that in all United States bilateral agreements for co-operation in the nuclear field the use of any material or equipment supplied by the United States under such agreements for any nuclear-explosive device was precluded, and that IAEA would verify that the safeguarded material was not used for any nuclear-explosive device; continued co-operation with other countries was dependent on the assurance that those understandings would continue to be respected in the future (CD/PV.639).
60. The delegation of the Soviet Union noted with regret that a number of important so-called near-nuclear States had not yet become parties to the Treaty, and suggested that the Review Conference should consider measures to ensure greater participation (CCD/PV.639).

61. The delegation of the United Kingdom recalled that the purpose of the Treaty was, and still is, to control the spread of nuclear weapons and nuclear explosive technology; in order to facilitate further ratifications of the Treaty, the United Kingdom Government had voluntarily offered to place its peaceful nuclear programme under IAEA safeguards. The Treaty made provision for non-nuclear-weapon States parties to the Treaty to enjoy the potential benefits of peaceful nuclear explosions. The delegation went on to say that the United Kingdom had hoped that the success of the Treaty would be confirmed at the forthcoming Review Conference, but Her Majesty's Government could not hide its deep concern over the Indian nuclear test. The assurances by the Indian Government of peaceful intent were noted, but India's decision had increased the danger that others might decide to follow suit. The delegation suggested that it might prove necessary to consider whether there were ways to strengthen the guarantees and safeguards contained in the Treaty to give greater assurance and confidence to those countries which still, by failure to adhere to the Treaty, indicate a desire to keep open their nuclear option. It endorsed the Soviet view (CCD/PV.638) that it would be the most important task of the Review Conference to devise ways of strengthening the Treaty, in order to achieve a positive extension of the international anti-proliferation regime (CCD/PV.641).

62. The delegation of India repeated the position of the Government of India that the Treaty was not an equal legal instrument. It was a discriminatory instrument and India would not become a party to it as long as its discriminatory character remained. The delegation of India wondered whether the Review Conference might take a look at this character of the Treaty and try to change it so as to make possible its universal acceptance (CCD/PV.641).

63. The delegation of Japan recognized the inherent right of all States to all research and development for the peaceful application of nuclear energy and to sharing the benefit deriving therefrom, and stated that if and when a peaceful explosion becomes distinguishable from nuclear weapons through some future technical innovation unpredictable at present then all States should of course have access to its production and use, in the same manner as to other forms of peaceful uses of nuclear energy (CCD/PV.642).

64. The delegation pointed out, however, that so long as it was the very momentary energy of a nuclear explosion that was used for the purpose of its peaceful application, the characteristics of a peaceful nuclear explosion, which released an enormous amount of energy in a matter of moments, were precisely the same as those of a nuclear weapon and different from those of nuclear reactors which derive energy from nuclear reactions in a controlled manner. It maintained, therefore, that, regardless of the intent of its producer or possessor, a "peaceful" nuclear explosive device could not avoid having a "military" implication and that the birth of a "nuclear test Power" constituted the proliferation of the centre of independent
decision-making concerning the use of nuclear explosive devices and was nothing but the birth of a new "nuclear Power". Under those circumstances, it emphasized that the time was already ripe for examining international arrangements concerning the implication of nuclear explosions for peaceful purposes so that any nuclear explosion for peaceful purposes could be conducted under some international control. It equally emphasized that the nuclear-weapon States, especially the United States and the Soviet Union, bear special responsibility in making international efforts to prevent the proliferation of centres of independent decision-making which detonate a nuclear explosive device and that there remained a number of matters that nuclear-weapon States should carry out for that purpose (CCD/PV.642).

65. The delegation of Pakistan endorsed the suggestion by the delegation of the United Kingdom (CCD/PV.641) that it might prove necessary for guarantees and safeguards under the Treaty to be strengthened, citing the resolution adopted at the Fifth Islamic Conference of Foreign Ministers at Kuala Lumpur in June 1974 (CCD/PV.642).

66. The delegation pointed out that the resolution represented the unanimous views of the 37 member States of the Islamic Conference attending the Kuala Lumpur meeting. It thus demonstrated that the concern for credible and binding guarantees against the threat or use of nuclear weapons was not felt only by India's immediate neighbours but also by a significant proportion of the non-nuclear States of the third world. The basic aim of the resolution was to promote a constructive reference to the danger of nuclear proliferation arising from the Indian nuclear test. The formula concerning the security guarantee was deliberately left as flexible as possible in the resolution in order to allow other processes of consultation to evolve generally acceptable recommendations (CCD/PV.642).

67. Referring to the repeated argument that the Government of Pakistan should take account of India's assurances that its nuclear programme was for peaceful purposes, the delegation of Pakistan cited Prime Minister Bhutto's letter, dated 5 June 1974, addressed to the Prime Minister of India wherein he had stated that it was well established that the testing of a nuclear device was no different from the detonation of a nuclear weapon. Given this indisputable fact, the Prime Minister of Pakistan had asked how it was possible for Pakistan's fears to be assuaged by mere assurances, assurances which might in any case be ignored in subsequent years. Governments change as do national attitudes. But the acquisition of a capability which had strict and immediate military consequences became a permanent factor to be reckoned with. The Prime Minister had stated further that he need hardly recall that no non-nuclear-weapon State, including India, has considered mere declarations of intent as sufficient to ensure their security in the nuclear age (CCD/PV.642).

68. The delegation suggested that India could give concrete manifestation that its programme was for peaceful purposes by placing it entirely under the IAEA safeguard system (CCD/PV.642).

69. The delegation of India stressed that India with the third largest Muslim population in the world had not been represented at the Fifth Islamic Conference of
Foreign Ministers at Kuala Lumpur and could not, therefore, regard the views expressed by the Conference as being in the proper perspective (CCD/PV.642).

70. In reply to a question posed by the delegation of India (CCD/PV.642), the delegation of Pakistan stated that Pakistan was and remains committed to the goal of general and complete disarmament. It appreciated that the objective of the partial test ban treaty was to promote this goal. Pakistan had therefore voted in favour of that Treaty and had signed it. Pakistan similarly voted in favour of the resolution of the General Assembly which commended for adoption the Treaty on the Non-Proliferation of Nuclear Weapons. However, since the partial test ban treaty prohibited nuclear weapons tests in the atmosphere, in outer space and under water only, it did not prevent the nuclear Powers parties to the Treaty from further developing and improving their nuclear arsenals. Also, by enabling India to explode a nuclear weapon device underground, the Treaty had failed to prevent further nuclear proliferation (CCD/PV.643).

71. The delegation stated further that Pakistan's willingness to accede to the partial test ban treaty and to other international agreements on nuclear disarmament has obviously been affected by the knowledge that India had embarked on a course of nuclear armament. Pakistan had tried to inform the international community of this on several occasions. In these circumstances, the delegation added that Pakistan could not be expected legally to foreclose its option (CCD/PV.643).

72. The delegation of Pakistan noted that Pakistan has placed its nuclear facilities under IAEA safeguards, and suggested India should do likewise. It described Pakistan's response to the Indian test as political, rather than nuclear, and reiterated Pakistan's desire for adequate security assurances (CCD/PV.643).

73. The delegation of Pakistan announced that the recent nuclear explosion by India had resulted in the spread of radio-active fall-out to and over the territory of Pakistan. This conclusion had been reached after a careful investigation by the Pakistan Atomic Energy Commission. It added that the Government of Pakistan has conveyed this information to the Depository Governments of the partial test ban treaty and requested them to circulate it to all the signatories of the Treaty for such action as they may deem appropriate in order to enforce the provisions of the Treaty and to secure compliance therewith by the Government of India, which is a party to the Treaty. The delegation stated further that India had thus violated article I of the partial test ban treaty (CCD/PV.643).

74. The delegation of the United States directed the attention of the Committee to language in the Joint United States-Soviet Communiqué in which both the United States and the USSR emphasized the fundamental importance of the non-proliferation treaty and reaffirmed their obligations under the Treaty, including article VI, and stated that they favoured increasing the Treaty's effectiveness (CCD/PV.643).

75. The delegation of India noted that Pakistan itself had declared that it could not be expected legally to foreclose its nuclear option. It had not fully answered
the question as to why Pakistan was concerned only about India's nuclear explosion and not about nuclear testing in general. Replying to the question as to why India does not place all its nuclear facilities under international safeguards, the Indian delegation stated that the Indian Government was for safeguards which were applicable universally and on a non-discriminatory basis. The Indian delegation also pointed out that the Conference of the Committee on Disarmament was a multinational negotiating body for disarmament. The tradition in the Conference, to avoid discussion of problems of bilateral nature in whatever garb they might be brought up, should be respected. If Pakistan's concern was of a bilateral nature, then the Simla Agreement provided an adequate framework (CCD/PV.643).

76. The delegation of India rejected as a figment of imagination Pakistan's allegation that there was radio-active fall-out over the territory of Pakistan as a result of the nuclear explosion by India, and added that this was an effort to falsify India's categorical declaration that in conducting the experiment India had not violated any international agreement to which it is a party. The delegation of India added that it could not understand how a country which was not a party to the partial test ban treaty was trying to take advantage of the Treaty (CCD/PV.643).

77. The delegation of Czechoslovakia stressed Czechoslovakia's endeavours, in conjunction with other States, to bar all access to nuclear weapons for all countries not possessing such weapons. The delegation expressed the hope that the preparation of the Review Conference, as well as the Conference itself, would further strengthen the Treaty on the Non-Proliferation of Nuclear Weapons and add to its parties (CCD/PV.644).

78. The delegation of Bulgaria expressed the hope that Governments would make all possible efforts to contribute to the reaffirmation of the basic aims of the Treaty on the Non-Proliferation of Nuclear Weapons and that States which had not yet adhered to the Treaty, and in particular the near-nuclear States, would join the other participants (CCD/PV.649).

79. The Yugoslav delegation expressed itself in favour of measures which it thought should be taken in order to remove the growing doubts about the credibility of the Treaty, to strengthen the confidence in it and make it universally acceptable. It suggested the undertaking of a solemn obligation by the nuclear-weapon States never to use in any circumstances nuclear weapons against non-nuclear-weapon States or to threaten those States with the use of such weapons, and to withdraw nuclear weapons from the territories of non-nuclear-weapon States. It also stated that a comprehensive test ban was one of the most urgent and important measures to be taken in order to strengthen the Treaty and a prerequisite for the creation of an internationally-agreed régime governing nuclear explosions for peaceful purposes for which, according to article V of that Treaty, an international conference should be convened. It also urged that a wider and more intensive application of nuclear energy technology for peaceful purposes should be made available to the developing non-nuclear-weapon States and that new ways and means should be found
for financing such activities, especially for the supply of energy needs and accessibility to nuclear fuels (CCD/PV.651).

80. The delegation of India stated that it should not be a matter of surprise or regret if India, without contravening any treaty it has entered into, were to experiment and try to develop nuclear explosion technology for exploiting natural resources within its own territory. The Indian delegation made it clear that India was not prepared to wait for others to perfect nuclear explosion technology and thereby lag behind them by a decade or more in its development. The Indian delegation quoted various sources and authorities to demonstrate that peaceful explosions were a legitimate activity for a country's economic development and that India was not alone in holding such a view. The Indian delegation replied to the suggestion that it should place its nuclear activities under IAEA safeguards by drawing attention to the Indian statement made before the IAEA Board of Governors wherein it had been said that India would certainly consider this possibility when all the member States of the Agency, and indeed others too outside the Agency, voluntarily place all their nuclear activities, civil and military, under the Agency's safeguards. The Indian delegation also indicated that it had consistently advocated safeguards on a completely non-discriminatory basis so that they did not operate mainly against the developing countries and that they should be devised on functional criteria. It expressed surprise that, while the nuclear activities of nuclear-weapon States were allowed to operate in a completely unrestrained manner, some delegations seemed more concerned with controlling the peaceful activities of non-nuclear-weapon countries. The delegation also refuted the criticism that the Indian explosion for peaceful purposes had somehow damaged the Treaty on the Non-Proliferation of Nuclear Weapons. There was no question of other countries going in for nuclear weapons because of India's example, since India had solemnly declared, even after the explosion, its intention to use nuclear energy for peaceful purposes only. The Indian delegation made it clear that it had no desire to campaign against the Treaty although it disagreed with its approach. India was opposed to all proliferation, vertical or horizontal, of nuclear weapons. The Indian delegation expressed the hope that all nuclear-weapon States, as well as non-nuclear-weapon States, like India, would commit themselves to use nuclear energy for peaceful purposes only. It added that the nuclear-weapon States had a special responsibility in this matter (CCD/PV.651).

81. The delegation of Sweden said that in order to implement the Treaty fully in regard to peaceful nuclear explosions, an agreement on such explosions must be concluded and that this agreement must state explicitly that the potential benefits should be made available on a non-discriminatory basis to those countries that forego production of nuclear devices. The technical feasibility of a particular project, its economic, health and safety aspects should be evaluated by IAEA. The over-all advisability of the project should be determined by a political international body which should also have the authority to license such a project. As to the execution of the project, IAEA would have an important role to play in arranging for and controlling the actual explosion. This was only one aspect of the imperative that the use of nuclear energy in general should be under the control
of an international régime which would protect all nuclear material in order to prevent nuclear-weapons proliferation and guarantee the safest possible management of nuclear-energy production (CCD/PV.647).

82. The delegation of the USSR stated that it could not share criticism of the Treaty on the Non-Proliferation of Nuclear Weapons and of its safeguards system by some delegations in the Committee. It noted that the system of safeguards that had been elaborated by a large number of States was sufficiently effective and served the purposes for which it had been established. The delegation of the Soviet Union called upon States parties to the Treaty which had not yet done so to speed the conclusion of safeguards agreements and the finalization of relevant understandings on the practical implementation of the Treaty's provision prescribing that exports of fissionable material and special equipment to non-nuclear countries should be carried out solely under the control of IAEA. The Soviet delegation noted that the revision of the present safeguards system proposed by Sweden could only lead the Committee away from the task of an all-round strengthening of the said system. It pointed out that peaceful nuclear explosions had so far no practical application because of inadequate technology and that therefore there were no grounds for speaking of failure to implement the relevant provisions of the Treaty. The delegation of the Soviet Union drew attention to the agreements concluded during the third Soviet-United States summit meeting, notably, to the Protocol on the limitation of ABM systems, the Treaty on the Limitation of Underground Nuclear-Weapon Tests and the understandings to undertake a joint Soviet-United States initiative to outlaw the most dangerous lethal means of chemical warfare and to prohibit the use of environmental modification techniques for military purposes, and emphasized that those agreements contributed largely to the implementation of the obligations of the two Powers under the Treaty. The Soviet delegation did not accept the assessment of some of the Soviet-United States agreements given by the Swedish delegation (CCD/PV.650).

83. The delegation of Canada reviewed some of the major short-comings of the Treaty in order to illustrate the magnitude of the task of making Governments face up to the catastrophic consequences of nuclear proliferation and acknowledge and adopt the hard decisions involved in a change of course. The delegation said it remained of the view that until a better instrument could be perfected that would find at least as wide acceptability, the Treaty must serve as the basis of a structure upon which to build. It warned that the dangers posed by the weapons race between the super-Powers and the proliferation of nuclear weapons to countries not now possessing them were closely linked. The delegation indicated that Canada would be considering what further steps it might take to strengthen and to promote wider adherence to the non-proliferation structure. One area it suggested for exploration was whether or not the international community should provide more clearly defined and safeguarded arrangements for nuclear explosions to be applied for peaceful economic purposes, with a view to implementing article V of the Treaty. The Canadian delegation also called for stronger support of the application of IAEA safeguards in order that international commerce could be promoted in a manner in which States could be assured that their co-operation would not be inimical to their mutual security. It further reminded the Committee that for the same reason that Canada challenged the behaviour
of the nuclear Powers it also disputed the thesis that because those Powers would not see the error of their ways the remaining countries were fully justified in refusing to organize to prevent further spread on the grounds that this would be discriminatory. The Canadian delegation supported the view that non-nuclear weapons would be best served by following the procedures outlined in article V since it was so difficult to separate weapons technology from nuclear explosive technology. Canada fully held to the position that all peaceful nuclear tests should be carried out under international supervision and only after a careful study of the necessity and utility of each such test. The delegation also emphasized the collective responsibility of all nations, especially those represented in the Committee, to press on each Government the critical importance of the need to ratify the Treaty (CCD/PV.653).

84. The delegation of the United States referred to speculation that the threshold test ban treaty concluded by the United States and the USSR on 3 July 1974 recognized some distinction in the technology for weapons tests and explosions for peaceful purposes. The delegation stated that this was not the case, and pointed out that Secretary of State Kissinger had stated that "It is unrealistic to make a distinction at the early stages of nuclear development between peaceful uses and potential military applications because any capacity to produce an explosion has obvious military application no matter what purpose the country concerned asserts it is attempting to serve". The delegation added that the purpose of the separate bilateral agreement on nuclear explosions for peaceful purposes would be to make sure that further advances in weapons development or other military testing was not being carried out in the course of, or under the guise of, explosions for peaceful purposes, and that the procedures of the proposed peaceful nuclear explosions agreement would not be applicable to States in the early stages of the development of nuclear technology (CCD/PV.654).

85. The delegation of the United States, answering questions raised by the delegation of Sweden at the 633rd plenary meeting, stated that the United States Government had no intention whatever to treat low-yield tactical nuclear weapons systems as interchangeable with conventional arms, that it fully appreciated the distinction or "firebreak" between nuclear and non-nuclear arms as an important factor in preventing nuclear warfare, and that it would not act to erode this distinction. The delegation also stated that the United States interpreted Security Council resolution 255 (1968), concerning security assurances, as applying to nuclear aggression in which only "mini-nukes" were used, and that the agreement between the United States and the Soviet Union on the prevention of nuclear war would apply to wars in which only "mini-nukes" were used (CCD/PV.638).

86. Referring to the question of the so-called "mini-nukes", that is of nuclear mini-weapons, the delegation of the Soviet Union stated that the USSR's obligations under Security Council resolution 255 (1968) and the Soviet-United States Agreement on the prevention of nuclear war covered all types of nuclear weapons, whatever their power (CCD/PV.650).

87. The delegation of Sweden expressed its satisfaction over the statements made by the representative of the United Kingdom (CCD/PV.625), the representative of the United States (CCD/PV.638) and the representative of the Soviet Union (CCD/PV.650).
on the subject of "mini-nukes" and said that the position taken by these Governments should remove one of the potential dangers to the non-proliferation treaty régime. The issue of nuclear mini-weapons could under the present circumstances be considered closed in the Committee (CCD/PV.647 and 651).

88. The delegation of Yugoslavia expressed its concern at the continuance of the arms race, the increase of nuclear stockpiles, and the improvement of nuclear-weapon systems. It said that its attention was particularly drawn to the constant increase of different types and stockpiles of so-called tactical nuclear weapons, and to the possibility of being used also in "local" wars. While noting the good intention expressed at the time of the conclusion of some of the recent arms-control agreements, it stated that these have been immediately followed by nuclear-weapon tests and the announcement of a new series of tests aimed at further improvement of nuclear weapons. It urged the nuclear-weapon States to proceed more quickly along the road of nuclear disarmament, otherwise it might be expected that a certain number of non-nuclear-weapon States would try to solve their defence problems by developing and producing their own nuclear weapons (CCD/PV.651).

89. The question of nuclear-free zones was also discussed.

90. The delegation of Poland expressed the view that the Committee might consider certain aspects of nuclear-free zones essential to gain the widest support for and respect of such zones (CCD/PV.635).

91. The delegation of Romania stated that the Romanian Government has consistently pressed for proposals for the transformation of the region in which Romania was situated into a nuclear-free zone, convinced that the attainment of that objective fully corresponded to the interests of all the peoples of the Balkans and fitted into the wider concern for security and co-operation in Europe and for a climate of peace and security in the world (CCD/PV.637).

92. The delegation of Nigeria referred to the declaration adopted by the Organization of African Unity (OAU) in July 1964 aimed at making Africa a nuclear-free zone, and said that in the light of recent developments, and the increasingly intense collaboration between some nuclear Powers and South Africa in the development of nuclear science and technology, particularly in the field of enriched uranium and plutonium, the possible military use of which must be expected, it intended to take a second look at this declaration (CCD/PV.638).

93. The delegation of the United States of America expressed the view that it would be a constructive development if African nations decided to re-examine the question of an African nuclear-free zone. The delegation stated that the United States had supported the General Assembly resolution which had endorsed the proposal for such a zone. The delegation also pointed out that in 1965 the United States delegation had suggested four criteria for the establishment of a nuclear-free zone and refined them the following year; namely, that the initiative should be taken by the States in the region concerned, that the zone should preferably include all States in the area whose participation was deemed important, that the
creation of a zone should not disturb necessary security arrangements, and that provision should be made for adequate verification. The delegation said that the United States Government would be interested in further expressions of views on this subject (CCD/PV.639).

94. The delegation of Romania, dealing with the need for the Conference of the Committee on Disarmament to encourage the efforts of States in various regions of the world to establish nuclear-free zones, reiterated its proposal that the Conference of the Committee should formulate a framework agreement on regional denuclearization which could serve as a guide for negotiation of regional legal instruments in the field of denuclearization. It mentioned a number of possible basic elements of such a framework agreement, *inter alia*: (1) the agreement should be considered as an integral part of a system of measures to lead to the complete elimination of nuclear arms; (2) it should provide mutual obligations for all parties; (3) it should offer guarantees for equal security to all parties, with the States possessing nuclear weapons assuming the solemn commitment not to use those weapons against the States parties to such zones and not to threaten them with their use, and also observing the status agreed upon among the States of the region; (4) it should not limit in any way the use of nuclear energy for peaceful purposes; (5) it should establish a system of clear and equitable control based on the principle of full equality of States. The delegation of Romania also suggested that the United Nations Secretariat should prepare a compendium of the various ideas relevant for such a framework agreement on regional denuclearization which have been put forward by delegations in the Conference of the Committee on Disarmament, the General Assembly and in other forums (CCD/PV.652).

95. The delegation of Mexico, as representative of the depository Government of the Treaty for the Prohibition of Nuclear Weapons in Latin America (Treaty of Tlatelolco) and in keeping with its long-standing tradition of maintaining Committee members informed of all new developments concerning that Treaty, took special pleasure in recording that France and the People's Republic of China had deposited their instruments of ratification of the Treaty's Additional Protocol II on 22 March and 12 June 1974, respectively. The delegation noted that this brought to four the number of nuclear-weapons Powers which are parties to that instrument, thus leaving the Soviet Union as the only nuclear-weapon State to which the Secretary-General has been transmitting the repeated appeals of the General Assembly concerning Additional Protocol II which has yet to lend its support to the Treaty (CCD/PV.652).

96. The delegation of Pakistan supported the idea of the establishment of nuclear-free zones in various geographical regions of the world and announced that Pakistan had requested the inscription of a supplementary item on the agenda of the twenty-ninth session of the General Assembly entitled: "Declaration and establishment of a nuclear-free zone in South Asia". Noting that all the countries of South Asia had already proclaimed their opposition to the acquisition of nuclear weapons or to the introduction of such weapons into the region, it stated that the recent events made the time ripe for declaring South Asia a nuclear-free zone. It said that the Treaty of Tlatelolco could be a model for a similar agreement among the countries of South Asia (CCD/PV.653).
97. The delegation of Egypt stated that its Government had constantly given its active support to the principle of nuclear-free zones. He pointed out the contribution of Egypt to the adoption by OAU of the 1964 Declaration regarding a nuclear-free zone for Africa and its support of the initiative and efforts of the States of Latin America for a nuclear-free status for that region which led to the negotiation of the Treaty of Tlatelolco. The delegation of Egypt informed the Conference that the delegation of Egypt to the United Nations informed the Secretary-General of the United Nations 1/ that it has decided to co-sponsor the request of Iran for inclusion in the agenda of the twenty-ninth session of the General Assembly of the item entitled: "Establishment of a nuclear-free zone in the region of the Middle East" (CCD/PV.653).

B. Non-nuclear measures

Questions of chemical and bacteriological (biological) weapons

98. Having in mind the recommendations of General Assembly resolution 3077 (XXVIII), the Conference continued its efforts to achieve progress on all aspects of the problem of the elimination of chemical weapons. Members of the Conference of the Committee on Disarmament emphasized the importance and urgency which they attach to the prohibition of chemical weapons.

99. The delegation of the Soviet Union stated that, in spite of the thorough consideration by the Committee of the problem of the prohibition of chemical weapons, there was still no substantial progress towards its solution. It held that the Soviet Union was in favour of the complete prohibition of all types of chemical weapons - the prohibition of their development, production and stockpiling, and the destruction of their stockpiles. In connexion with the signing of the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction 2/ by more than 100 States, the delegation said that the task was to make the Convention another operative international instrument as soon as possible (CCD/PV.627).

100. The delegation of the United States asserted that the United States remained firmly committed to the objective of achieving effective international restraints on chemical weapons. It understood and shared the desire to make rapid progress in controlling chemical weapons, but continued to believe that genuine progress could only be made by a careful study of all the complex issues involved (CCD/PV.627).

101. The delegation of Mexico noted that, although two years had passed since the biological weapons convention was opened for signature and although the General Assembly had since adopted three resolutions reaffirming the objective of effective prohibition and elimination of chemical weapons, it had not yet been possible to conduct the "negotiations in good faith" intended to lead to the "early agreement" referred to in article IX of that Convention. The delegation also stated that, according to well-informed opinion, the production of "binary weapons" would mean that "the prohibition of chemical weapons would become virtually impossible" (CCD/PV.627).

102. The delegation of the Netherlands stated that the advantage of the approach contained in the Japanese working paper on chemical weapons (CCD/413) 3/ was that it made possible the adoption of partial measures in the broader context of a comprehensive ultimate goal. It pointed out, however, that there might be some reluctance to accept a treaty with a mixture of obligations - that is, obligations which became binding on the acceptance of the treaty and obligations which became effective only if and when supplementary agreements are concluded. It said that there should be a reasonable measure of certainty that such supplementary agreements were forthcoming. The delegation also asserted that national control systems could not by themselves provide assurance to other parties and therefore could not form the corner-stone of a chemical weapons control system (CCD/PV.630).

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2/ General Assembly resolution 2826 (XXVI), annex.
103. The delegation of Pakistan said that statements in the General Assembly by the United States (A/C.1/PV.193%), the Soviet Union (A/C.1/PV.1938) and the United Kingdom (A/C.1/PV.1941) regarding the Japanese working paper (CCD/U13) were positive indications that the representatives saw in the Japanese proposal sufficient merit to take the step from discussion to negotiation (CCD/PV.630).

104. The delegation of the United Kingdom said that its aim remained the achievement of an effective adequately verified and comprehensive ban on the development, production and stockpiling of chemical weapons. It also informed the Committee that in February the United Kingdom Government had completed the necessary legislative processes to enable it to ratify the biological weapons convention, and it urged early ratification by other signatory States so that the Convention could enter into force as soon as possible (CCD/PV.630).

105. The delegation of Bulgaria expressed the belief that after two years of deliberations of a general nature the time had come for detailed substantive negotiations (CCD/PV.630).

106. The delegation of Japan submitted a "draft convention on the prohibition of the development, production and stockpiling of chemical weapons and on their destruction" (CCD/1420). The draft convention, the delegation said, was based on two principles: first, that the agreement should prescribe a comprehensive ban; and second, that, since it would not be realistic to expect a comprehensive ban to be achieved from the outset, a comprehensive prohibition should be achieved in stages. Accordingly, while article I of the draft convention adopted purpose criteria in prohibiting all chemical agents and related activities intended for hostile purposes, article IV provided that States may, in accordance with annex I, take provisional measures until further agreements, including those on effective verification measures, were reached. Annex I of the draft convention enabled States to exclude temporarily certain chemical agents from the scope of the prohibition. The delegation of Japan pointed out that the scope of agents excluded in this manner would be narrowed gradually through review conferences as provided for in article XVII. The draft convention also called for a combination of national and international verification measures. It contained provisions for the destruction or diversion to peaceful purposes of chemical agents in the presence of observers from an international verification agency, for the preparation and submission of periodic reports by national control organs, for the establishment and functions of an international verification agency, for procedures to request explanations regarding compliance with treaty obligations and for the initiation of international inspections on the territories of parties requested to provide such explanations (CCD/PV.631).

107. The delegation of Hungary welcomed the submission of the draft convention by the delegation of Japan and expressed the view that this initiative would give new impetus to the work of seeking a solution for the prohibition of all chemical weapons (CCD/PV.632).

108. The delegation of Sweden expressed appreciation for the effort of the Japanese delegation and hoped that it would open the way for a final negotiation. It held
that the structure of the draft convention was interesting. It maintained that the choice between alternatives A and B for annex I would largely be decided on the basis of technical considerations regarding scope and verification and that therefore it would be desirable to hold informal meetings with chemical weapons experts in order to hear views of other delegations on these matters (CCD/PV.633).

109. The delegation of the Soviet Union noted with satisfaction the initiative taken by the delegation of Japan. It emphasized that the scope of prohibition was a basic question to which all other provisions of a convention should be subordinate. It pointed out that the draft, which represented a positive contribution by Japan to the consideration of the problem, would be studied by the Soviet side with due attention. It recalled that the socialist countries, in their draft convention, had proposed the prohibition of all types of chemical weapons and all related activities and indicated that the authors of the socialist draft expected a specific answer regarding scope from the Western countries. The delegation also indicated that it was prepared to consider favourably the question of participating in the informal meetings with experts (CCD/PV.633).

110. The delegation of Mongolia expressed appreciation to the Japanese delegation for elaborating and submitting its draft convention, and expressed the view that much had been done in the draft to find a compromise between differing viewpoints. The delegation wished to know whether it would be possible for the Secretariat to prepare a comparative table of the views of various delegations or groups of delegations on the main provisions of a future chemical weapons convention (CCD/PV.634).

111. The delegation of Czechoslovakia recalled that in approximately one year mankind would mark the fiftieth anniversary of the signing of the Geneva Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare. The delegation expressed the hope that on the date of the fiftieth anniversary of the existence of the Protocol other States would join it which would secure its further universality and reaffirm its international significance (CCD/PV.635).

112. The delegation of Poland expressed the view that a convention limited to the prohibition of the development and production of chemical weapons, failing to provide for the destruction of existing stocks, would be of little practical consequence until after those stocks had deteriorated and lost their military value. In this regard, the delegation noted with satisfaction that the Japanese approach to the destruction or conversion to peaceful uses of stockpiles had remarkably evolved since last year. It stated, however, that the draft convention seemed to exclude binary weapons from the scope of measures envisaged for the first stage and that the Polish delegation had definite doubts about this matter (CCD/PV.635).

113. The delegation of Czechoslovakia expressed appreciation to the delegation of Japan for looking for compromise solutions satisfying all delegations as to existing stocks of chemical weapons. It said that, unlike working paper CCD/413, the draft convention called for the destruction of existing stocks of the prohibited chemical weapons and therefore was a considerable improvement (CCD/PV.635).
114. The delegation of Japan welcomed the formal proposal of the delegation of Sweden for informal meetings with experts. These meetings, the delegation said, would help in clarifying a number of issues left open in the Japanese draft convention (CCD/PV.635).

115. The delegation of Italy held that the initial scope of a treaty would not depend solely on an abstract political will of States, but on the treaty provisions for effective controls. It stated that the broader and more effective the system of controls written into the treaty, the greater would be the readiness of States adhering to such a treaty to accept increasingly wider measures of limitation and prohibition. In particular, the delegation said that the obligation to destroy stocks raised the requirement of adequate verification. It expressed the hope that the opportunity afforded by the Japanese initiative would be seized by all in order to reach positive conclusions in the shortest possible time (CCD/PV.636).

116. The delegation of Nigeria said it would like a comprehensive study to be made on the status and scope of application of the Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare, signed at Geneva on 17 June 1925. It indicated that it would like to see the scope of the Protocol expanded to cover warfare against crops and animals and all contingencies of armed conflict. Nigeria believed that any Convention banning chemical warfare should aim, inter alia, at reaffirming and strengthening the Geneva Protocol of 1925. Consequently, it appealed to all the States that have not done so to accede to the Protocol so that it might be universally binding (CCD/PV.636).

117. The delegation of Egypt stated that its position on the question of chemical weapons has been constantly defined on previous occasions. It pointed out that its approach to this problem has been defined in the working paper which it, together with non-aligned delegations, has submitted (CCD/400). The delegation of Egypt stated that the Japanese draft convention, together with the draft convention presented by the socialist delegations (CCD/361), and the working paper submitted by the delegations of 10 non-aligned States (CCD/400), constituted an adequate basis for meaningful negotiations towards an agreed text (CCD/PV.637).

118. The delegation of Canada stated that the draft convention put forward by the socialist countries and the paper submitted by the non-aligned States had not resolved the question of how to achieve an adequately verified comprehensive ban. With respect to the verification provisions contained in the Japanese draft treaty, the delegation held that the international on-site verification of destruction of declared stocks was technically feasible and would involve the most minimal political or commercial intrusion. It recognized that the general approach of verification by challenge was designed to meet the difficult political restrictions imposed on the Committee, but that the approach nevertheless had the demerit of placing the onus on the challenger. The delegation doubted that such

an approach, even combined with the verification of the destruction of stocks, would provide sufficient assurances at this time for States perceiving a threat of chemical warfare to adhere to a comprehensive ban. It added that for this reason it was appropriate that the Japanese draft treaty put forward these verification proposals in the context of a phased approach (CCD/PV.638).

119. The delegation of the Soviet Union stated that the difficulties impeding the solution to the problem were due not to questions of verification, but to the unwillingness of some States to take a political decision renouncing chemical warfare agents (CCD/PV.638).

120. The delegation of the United States welcomed the Japanese draft treaty as a constructive step towards the common objective of achieving effective restraints on chemical weapons. It believed that the provisions of the draft treaty dealing with verification could point the Committee's consideration of verification issues in a promising direction. The delegation also said that the gradual approach adopted in the draft treaty was consistent with the principle that the scope of chemical weapons limitations should be related to the possibilities for effective verification (CCD/PV.638).

121. The delegation of the United States indicated that during the recess the United States Government had continued its studies of chemical weapons and that it planned to submit three working papers based on United States studies (CCD/PV.639).

122. The delegation of the Soviet Union stated that when the positions of Western countries were known with respect to the initial scope of chemical weapons prohibitions, it would be possible to judge if there exist favourable prospects for progress in the negotiations. The delegation also informed the Committee that the Soviet Union intended to ratify the biological weapons convention this year. The Soviet delegation stressed that to put that measure into effect at an early date the States depositaries of the convention on bacteriological weapons must speed the process of their ratification (CCD/PV.639).

123. The delegation of the United Kingdom welcomed the announcement at the Moscow summit that the United States and the Soviet Union have agreed to consider a joint initiative in the Conference of the Committee on Disarmament with respect to chemical weapons. It stated that the United Kingdom was committed to seek effective measures for a comprehensive prohibition of chemical weapons and for the destruction of existing stockpiles. It had also said that it was prepared to consider partial measures. It asserted that a comprehensive prohibition which did not cater to the need of signatories to be assured of other States' compliance would create risks of military instability. The delegation added that, while the Japanese draft convention tackled constructively the problem of what the international community should do once a breach of the convention has been detected it did not, as it stood, show how the early detection of a suspected breach would take place (CCD/PV.641).
124. The delegation of the Soviet Union noted that a number of countries had raised objections to the complete prohibition of chemical weapons. It expressed the view that it was possible to conclude an international agreement only if the opinions of all parties concerned had been taken into account and that the "all or nothing" approach could not lead to success. Therefore, the delegation continued, in an effort to conclude an effective international agreement which would exclude chemical weapons from the arsenals of States, the Soviet Union had agreed to consider with the United States a joint initiative in the Conference of the Committee on Disarmament with respect to the conclusion, as a first step, of an international convention dealing with the most dangerous, lethal means of chemical warfare (CCD/PV.642).

125. The delegation of Japan stated that discovering for which substances effective verification measures could be found under the present circumstances was the key to deciding the scope of substances which were to be prohibited first. It also answered questions posed earlier by representatives of Sweden (CCD/PV.635), Poland (CCD/PV.635) and the United States (CCD/PV.638). The delegation noted with special attention the part of the joint United States-Soviet Union communiqué in which the United States and the Soviet Union agreed to consider a joint initiative on chemical weapons and maintained that the Committee's deliberations would be greatly expedited if such an initiative were taken (CCD/PV.643).

126. The delegation of the United States noted that at the Moscow summit the United States and the Soviet Union, desiring to contribute to early progress towards an international agreement which would exclude chemical weapons from the arsenals of States, had agreed to consider a joint initiative in the Conference of the Committee on Disarmament with respect to the conclusion, as a first step, of an international convention dealing with the most dangerous, lethal means of chemical warfare. The delegation stated that the United States, for its part, would work seriously to fulfil that statement of joint purpose (CCD/PV.643).

127. The delegation of Canada suggested that the Committee consider an alternative to the concept in the Japanese draft convention applying to annex I whereby the phasing of the prohibition would not be on the basis of excluded agents, but rather on the basis of excluded activities. Under that approach, the delegation explained, all Governments would be expected to agree to prohibit the production and development of agents, munitions and delivery systems, while those States having chemical warfare stocks would agree to the destruction of an agreed quantity of their stocks within a fixed period. It further stated that the Review Conference procedure would provide a mechanism for negotiation of further phases involving, in one or more steps, the destruction of all remaining stocks and the implementation of a comprehensive ban (CCD/PV.643).

128. On 17, 18, 19 and 22 July 1974, informal meetings took place, at the request of the delegation of Sweden supported by a number of other delegations, with the participation of technical experts from 13 member States. A discussion of questions pertaining to the scope and verification of the prohibition of chemical weapons took place at those meetings. Members of the Committee found the informal meetings of value in promoting their work on the question of the effective
prohibition of chemical weapons. The following documents were presented for discussion at the informal meetings:

CCD/427 (Sweden): Some observations on the draft convention on the prohibition of the development, production and stockpiling of chemical weapons and on their destruction presented by the delegation of Japan on 30 April 1974 (CCD/420).

CCD/430 (Japan): Working paper containing views of Japanese experts on the scope of prohibition and on the verification of organophosphorus compounds for the informal meetings with participation of experts of the Conference of the Committee on Disarmament in 1974.

CCD/432 (Finland): Methodology for chemical analysis and identification of chemical warfare agents.

CCD/433 (Canada): The problem of defining compounds having military significance as irritating and incapacitating agents.

CCD/434 (Canada): Destruction and disposal of Canadian stocks of Second World War mustard agent.


CCD/437 (United States): Working paper on diversion of commercial chemicals for weapons.

129. The delegation of Czechoslovakia welcomed the statement on chemical weapons in the United States-Soviet Union joint communique as proving the goodwill of both sides to tackle the question of the prohibition of chemical weapons in a businesslike manner. While the delegation believed that the Committee should continue to aim at a complete ban, if a majority of members desired a step-by-step approach to that goal through partial measures, Czechoslovakia would not stand in their way (CCD/PV.644).

130. The delegation of India informed the Committee that on 15 July 1974 India had deposited its instrument of ratification of the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction in the capitals of the three depositary Governments. The delegation indicated that India supported the Convention because it was the first measure of actual disarmament and because it required that all parties assume equal obligations (CCD/PV.644).

131. The delegation of the Soviet Union noted the positive contribution made by the experts in the informal meetings, but asserted that, without political decisions by States, the ideas and conclusions of the experts would not advance the discussions on the problem of the prohibition of chemical weapons. The
delegation also reiterated its view that, because of the difficulties and impracticability of international supervision of prohibitions of chemical weapons, a solution to the problem should be sought in the use of national means of supervision supplemented by certain international procedures. The Soviet delegation pointed out that however important the problem of organizing control over the prohibition of chemical weapons might be, it was a secondary one and that it depended on the scope of the prohibition (CCD/PV.647).

132. The delegation of Romania reiterated its stand in favour of the elimination of chemical weapons as an integral part of the process of the elimination of all weapons of mass destruction, in particular of nuclear weapons (CCD/PV.648).

133. The delegation of Bulgaria stated that it continued to favour the concept of a comprehensive prohibition of chemical weapons, but, taking into account that at present the only realistic approach to solve the problem was the gradual one, it gave its full support to the statement on chemical weapons in the Soviet Union-United States joint communiqué. The Bulgarian delegation expressed the view that the difficulties inherent in the present situation where some States were and some others were not parties to the 1925 Geneva Protocol were even further compounded in the Japanese draft convention (CCD/420) in that it allowed for some States to submit to a total ban from the very beginning whereas others might opt for the gradual alternative (CCD/PV.649).

134. The delegation of Mexico noted that the draft convention on the prohibition and elimination of chemical weapons submitted by Japan had been one of the few positive contributions to the Committee's 1974 session. The delegation expressed the hope that this imaginative and commendable effort would stimulate negotiations and draw a constructive response from the two super Powers, especially from the one which until now has refrained from submitting a draft treaty or convention of its own (CCD/PV.650).

135. The delegation of Yugoslavia reiterated its Government's position in favour of a comprehensive agreement on measures for prohibiting the development, production and stockpiling of chemical weapons and for their destruction (CCD/PV.651).

136. The delegation of Mongolia favourably assessed the declaration made by the Union of Soviet Socialist Republics and the United States of America on their agreement to consider a joint initiative in the Committee on Disarmament with respect to the conclusion, as a first step, of an international convention dealing with the most dangerous, lethal means of chemical warfare. The delegation, in that connexion, stressed that if a so-called phasing-out method were to be applied the first step should encompass the widest possible categories of the means of chemical warfare, and suggested that such a method would have more relevance in the case of certain dual-purpose agents and substances that could be discovered in the future (CCD/PV.652).

137. The delegation of Italy noted that the tendency and practicability of an "instalment agreement", based on the principle of a global prohibition of chemical warfare, have gradually emerged from the discussion within the Committee and from contact between experts. It said that the problem of reaching a precise definition of chemical warfare and a clear determination of the initial sphere of application of the treaty will most likely be solved by experts. The delegation also said
that the problem of control was not a secondary one and that verification should be carried out through the adoption of appropriate national and international systems of control. In particular, the delegation said that a positive approach on the subject of control would test the real political will of Governments represented in the Committee to achieve effective measures for banning chemical warfare (CCD/PV.652).

138. The delegation of Sweden stated that a valuable feature of the Japanese draft convention was its purpose to achieve a comprehensive ban. The delegation was willing to participate in serious negotiations on that basis, aimed at making the convention as comprehensive as possible but at the same time considering possibilities to allow for some suspensions from the ban for a shorter, limited time. A realistic way to handle this might be to combine the two alternatives now proposed in the Japanese draft convention, i.e. to have the two different lists provided for in the proposed alternative annexes put together in one annex. With this arrangement not only the basic convention but also the annex would cover all chemical warfare agents. The delegation considered that the ability of the Committee on Disarmament to appraise the value of a chemical weapons draft convention was now quite outstanding, thanks to the knowledge on those matters that had been collected during the deliberations and expert meetings during the last few years (CCD/PV.652).

139. The delegation of Canada recalled the useful exchange of views which had taken place at the meeting of experts on chemical warfare which it hoped would serve to compensate the Japanese delegation for their endeavours and as encouragement to developing further their welcome initiative. The delegation noted that, during the discussion of the Japanese draft, one significant point had arisen which Canada believed to be important, namely, that there now appeared to be a general, if not yet completely unanimous, acceptance of the idea of a treaty which, at least at the beginning, would involve agreement to partial measures. The Canadian delegation added that it demonstrated a growing willingness to negotiate seriously on that which was obtainable now, while not losing sight of the ultimate goal. The Canadian delegation also expressed the hope that even first steps could include some destruction of chemical warfare stocks and noted that an important requirement for this would, of course, be agreement on satisfactory verification (CCD/PV.653).

140. The Canadian delegation joined with other delegations in welcoming the "joint initiative" to be taken by the United States and the Soviet Union with regard to certain means of chemical warfare, and expressed the hope that the Co-Chairmen would be able not only to keep the Committee informed but, if possible, to bring the Committee into their negotiations in the near future (CCD/PV.653).

141. The delegation of Poland stated that the announcement at the Moscow summit meeting that the Soviet Union and the United States had agreed to consider a joint initiative with a view to conclusion, as a first step, of an international convention dealing with the most dangerous, lethal means of chemical warfare was an important development and a potential break-through in the efforts to elaborate an agreement on the prohibition of chemical weapons that was acceptable to all parties.
Its particular merit was that a convention of such nature would eliminate the types of weapons which were the most effective from the military point of view (CCD/PV.653).

142. The delegation of the United States expressed the view that the informal meetings with chemical experts had advanced the Committee's collective understanding of the important issues of defining chemical warfare agents, determining the scope of chemical warfare limitations, finding useful criteria for defining the scope of prohibitions and devising an effective verification system. The delegation also commented on the particular difficulty of verifying the destruction of chemical warfare stockpiles. It stated that it knew of no way to verify the destruction of declared stockpiles except by the observation of destruction, and said that it was convinced that it would be possible to devise procedures for chemical warfare destruction so that neither industrial nor military secrets would be revealed. The delegation commented that it was much easier to envisage a solution for the verification of destruction of declared chemical warfare stockpiles than it was to solve the problem of verifying that the declaration of stockpiles was in fact complete (CCD/PV.654).

C. Other collateral measures

143. The delegation of the Soviet Union pointed out that the USSR had repeatedly submitted proposals for reducing military expenditures, and expressed the view that the Soviet proposal for the reduction of the military budgets of the permanent members of the Security Council was concrete and realistic and based on the principle of the equal responsibility of those five Powers for the state of affairs in the world (CCD/PV.627, 638 and 639).

144. The delegations of Bulgaria (CCD/PV.630) and Czechoslovakia and Poland (CCD/PV.635) expressed their support for the Soviet proposal.

145. The delegation of Sweden proposed that the Committee should examine the possibilities of bringing about an inquiry among States about their willingness to account in general, but comparable, terms for their defence expenditures and how those expenditures have been assigned to different purposes. The delegation expressed the view that such a measure would promote confidence between States and pave the way for real disarmament (CCD/PV.635).

146. The delegation of India spoke about the world economic situation lending a greater urgency to the task of disarmament. In this context, the delegation welcomed the initiative of the Soviet Union which had resulted in the adoption by the General Assembly of resolution 3093 (XXVIII) regarding the reduction of the military budgets of States permanent members of the Security Council by 10 per cent and utilization of part of the funds thus saved to provide assistance to developing countries, which constituted a step in the right direction. It urged all the permanent members of the Security Council to accept the principle and act in accordance with the recommendation of the General Assembly (CCD/PV.636).

147. The delegation of Nigeria stressed the imperative need of the rich great Powers to help build a more equitable and just world order by reducing their military expenditures deliberately and through some co-ordinated arrangements, such as the one proposed by the Soviet delegation and adopted by the General Assembly as
resolution 3093 (XXVIII) to reduce military budgets of States permanent members of the Security Council by 10 per cent. Nigeria was proud to serve on the Committee of Experts that had met to consider the implementation of the resolution (CCD/PV.638).

148. The delegation of the United States welcomed the Swedish suggestion for more openness in defence expenditures, and expressed the view that greater knowledge about those expenditures could promote confidence among States and also be useful in approaching the question of restraints on conventional weapons. The delegation observed that there was a problem in establishing the comparability of budget information which might be provided, and expressed the hope that the study by an expert group convened by the Secretary-General pursuant to General Assembly resolution 3093 B (XXVIII) would arrive at a generally accepted definition of what was to be understood by military budgets (CCD/PV.639).

149. The delegation of the United Kingdom stated that it attached importance to the concept of openness on military expenditure and, having pointed out that details of the United Kingdom defence budget were available to all, expressed the hope that other States which had not already done so would make details of their spending public (CCD/PV.641).

150. The delegation of Romania expressed the view that one step that could be taken towards the cessation of the arms race and especially of the nuclear arms race would be to freeze and reduce military budgets in accordance with a concrete programme beginning with the budgets of the heavily armed countries. In that connexion, it referred to General Assembly resolution 3075 (XXVIII) (CCD/PV.637 and 648).

151. The delegation of Mexico expressed the view that the negotiations called for in the sea-bed treaty concerning further measures in the field of disarmament for the prevention of an arms race on the sea-bed have been conspicuous by their absence (CCD/PV.627).

152. The delegation of Sweden said that the fact that the Conference of the Committee on Disarmament had not devoted any work to negotiations concerning further measures in the field of disarmament regarding the sea-bed might partly be because it had focused on other disarmament matters, and partly, perhaps, because it had been felt that the United Nations Conference on the Law of the Sea should first yield some guidance for future work. The delegation expressed the view, however, that the Committee must soon start serious negotiations on the admittedly difficult task of obtaining complete demilitarization of the sea-bed (CCD/PV.633).

153. The delegation of Poland stated that the consideration by the Conference of the Committee on Disarmament of the question of the total demilitarization of the sea-bed was pressing in view of the commitments contracted in the sea-bed treaty as well as the 1977 Review Conference provided for in its article VII (CCD/PV.635).

154. The delegation of the Soviet Union stressed the need for practical negotiations
on further steps to demilitarize the sea-bed in accordance with the obligations, taken by the parties to the Treaty on the Prohibition of the Emplacement of Nuclear Weapons and Other Weapons of Mass Destruction on the Sea-Bed and the Ocean Floor and in the Subsoil Thereof, which entered into force in 1972. The delegation stressed that the Soviet position on the sea-bed was set out in the draft treaty on Prohibition of the Use for Military Purposes of the Sea-Bed and the Ocean Floor and the Subsoil Thereof, submitted to the Committee in 1969, 7/ and this position was still in force. The delegation said that it awaited concrete observations and suggestions on the topic from other members of the Committee which it would examine with due attention (CCD/PV.638 and 639).

155. The delegation of Bulgaria expressed its support for measures aimed at the further demilitarization of the sea-bed. It also noted with interest the recent new proposal of the Soviet Union aimed at the withdrawal from the Mediterranean of all Soviet and American ships and submarines carrying nuclear weapons. It was the Bulgarian delegation's belief that measures of that kind would serve the interests of all countries in the area and would contribute to the strengthening of peace and security throughout the world (CCD/PV.649).

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156. The delegation of Sweden stated that the meteorological field required closer attention by the Committee to see what measures could be taken to prevent the development of methods for meteorological warfare (CCD/PV.633).

157. The delegation of Poland said there was merit in the Swedish delegation's contention that the Committee should pay close attention to the area of meteorological warfare. It expressed the view, however, that before the Committee looked into the matter in greater detail, it should perhaps try to obtain expert opinion about the various implications of developments in these and related areas in order to be in a position to pursue an educated discussion (CCD/PV.635).

158. The delegation of the Soviet Union stated that a number of delegations had rightly raised the question of the prohibition of such means of warfare as the modification of the environment for military purposes. The delegation expressed the view that modification techniques might be used for military purposes with respect not only to weather, but also to other components of human environment, and that this was another question requiring careful study. It noted that, having taken into account those considerations, the United States and the Soviet Union had made a joint statement in Moscow in favour of the most effective measures possible in order to overcome the dangers of the use for military purposes of environmental modification techniques, and that to achieve that goal they had decided to hold this year a meeting of Soviet and United States representatives to study the problem (CCD/PV.642).

159. The delegation of the United States, referring to the joint communiqué issued at the conclusion of the Moscow summit conference, noted that the two sides jointly declared their support for the most effective measures possible to overcome the dangers of the use of environmental modification techniques for military purposes, and that United States and Soviet representatives would meet this year to explore the problem and discuss what steps might be taken to remove the threat of the hostile use of those techniques (CCD/PV.643).

160. The delegation of Poland expressed its gratification over the joint Soviet-American statement on environmental warfare. It believed that an agreement on the question of preventing any military application of weather modification techniques would be of major importance not only as an arms control measure in its own right, but also as a gain for those who held environmental protection as a special responsibility for the sake of future generations (CCD/PV.653).

161. The Canadian delegation welcomed the agreement between the United States and the Soviet Union to hold talks on the most effective measures possible to overcome the dangers of the use of environmental modification techniques for military purposes. It suggested that this might be an appropriate subject for discussion in the Committee once the interested countries had an opportunity to define technically the scope of the problem (CCD/PV.653).

162. The delegation of the United States of America stressed the desirability of considering the question of effective restraints on conventional weapons. It stated that it had in the past submitted for the consideration of the Committee a number of principles and guidelines related to such restraints, and that it would welcome the comments and views of others on the subject (CCD/PV.627).

163. The delegation of the United Kingdom said it would be beneficial if countries were to discuss seriously the prospect of reaching regional agreements to control the ever-growing volume of conventional weapons. The delegation referred to the fact that European States were engaged in a regional negotiation in Vienna, and said it would be a welcome development if, within the context of the Committee, the representatives of other regions were to turn their attention to those difficult problems. The delegation also stated that the United Kingdom intended to play an active part in the projected conference of government experts, to be held at Lucerne, concerning conventional weapons which might cause unnecessary suffering or have indiscriminate effects. It expressed the hope that the conference would provide a firm foundation for further progress on the subject. When actual measures of constraint came to be considered, it would be no surprise if they were found to be appropriate for discussion in the Committee (CCD/PV.630).

164. The delegation of Sweden stated that the limitation and reduction of conventional weapons and weapons systems was an extremely important problem which merited serious international debate, and which should, at an appropriate time, be discussed in the Committee. At present, however, it believed that realistic negotiations to this end could only be conducted in regional forums. The delegation expressed the view, however, that the question of prohibiting the use of weapons which may cause unnecessary suffering or have indiscriminate effects should not be referred to the Committee at this stage (CCD/PV.633).

165. The delegation of India expressed the view that at present the non-nuclear-weapon States should not be asked to forego even the meagre defence provided by conventional weapons. It also expressed the view that, when thought was ultimately given to disarmament in the conventional weapons field, it would be necessary to avoid any type of discriminatory treaty as an objective (CCD/PV.636).
166. The delegation of Italy referred to the experts' meeting on certain conventional weapons to be convened at Lucerne, and expressed the hope that it would serve to clarify many difficult aspects of the problem. The delegation raised the question of whether the discussion of the weapons under consideration might not be better and more adequately conducted at the Conference of the Committee on Disarmament. It expressed the view that the Conference might prove to be a more appropriate forum than any other for the elaboration, whenever this was found possible and necessary, of international instruments concerning the use of any particular type of conventional weapon (CCD/PV.636).

167. The delegation of Romania expressed the view that the Committee must move towards the practical consideration and application of military disengagement and disarmament measures. It reiterated a set of measures which it had proposed in the past and it said that Romania also supported such measures to be taken at the Conference on Security and Co-operation in Europe as an integral element of the disarmament process on a world scale (CCD/PV.637).

168. The delegation of Canada expressed support for the meeting of experts on the question of use of conventional weapons which may cause unnecessary suffering or have indiscriminate effects. It stated that through the meeting a modest beginning might be made towards the control of conventional weapons, which it said was a subject which could usefully be pursued by the Committee (CCD/PV.638).

169. The delegation of the United Kingdom said it attached importance to the forthcoming meeting of experts in Lucerne, and that it intended to submit for consideration positive proposals concerning the complex legal, military and medical problems involved (CCD/PV.641).

D. Question of general and complete disarmament

170. The delegation of Mexico stated that in regard to the "negotiations in good faith" on "a treaty on general and complete disarmament" under strict and effective international control, envisaged in article VI of the Treaty on the Non-Proliferation of Nuclear Weapons, anyone who commented on those negotiations would necessarily have to employ a large dose of sarcasm (CCD/PV.627).

171. The delegation of the Netherlands touched upon the problem of qualitative weapons development as the most destabilizing factor on the road towards general and complete disarmament. The delegation warned that it would be far better to aim at preventing development of new armaments than to let things slide in the hope of coming to agreed limitations at a later stage. It referred to estimates in a recent study by the Stockholm International Peace Research Institute (SIPRI) concerning annual levels of military research and development expenditure by the United States, the Soviet Union, the United Kingdom, France, China and the Federal Republic of Germany. The delegation argued that the allocation of funds to military research and development should be decided upon by the political authorities in the light of long-term prospects of international co-operation. Countries usually would only then be ready to give up military options if they
were reasonably assured that potential adversaries were doing the same. The heartening aspect of the talks in Vienna and in Geneva was that they were based on the realization that an unlimited arms race was in nobody's interest (CCD/PV.630).

172. The delegation of Italy expressed the view that the following pre-conditions were, and remained, valid for the whole field of disarmament: (1) any international disarmament measure should define equal rights and obligations for all parties; (2) any measure must be sufficiently clear as to its scope, as well as to the rights and obligations it entails; (3) all activities and exercises undertaken in this field should be infused with a broader vision of the complex problems of disarmament; and (4) verification was an essential key to, and a fundamental component of, any international instrument concerning disarmament (CCD/PV.636).

173. The delegation of Egypt expressed the view that there could be little difference among members of the Committee on the urgent character of disarmament and the central position it occupied in contemporary international problems and present-day international institutions. This central position of disarmament derived from its organic relationships with, and reciprocal influence on, the maintenance of international peace and security (CCD/PV.637).

174. The delegation of Romania expressed the view that disarmament had now become the consideration of all States and of all peoples, and that all must actively participate in bringing it about. The delegation expressed its concern at the lack of progress in the Committee on Disarmament and said that increased vigour and a fresh impetus were needed in its activities. The delegation stated that the Conference of the Committee must address itself to the global issues of disarmament as set forth in its agenda, and, above all, to the questions of priority and of substance, namely, a halt to the arms race and disarmament (CCD/PV.637).

175. The delegation of Poland stressed the fact that, despite a certain slowdown in the elaboration of new partial measures of disarmament in the Committee, there was sustained confidence in the role which the Committee had to play in the process of multilateral disarmament negotiations and in its ability to play the role successfully. This was confirmed by the officially expressed interest and desire of a number of States to participate actively in the Committee's endeavours (CCD/PV.653).

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176. A number of delegations commented on the question of the organizational forms of disarmament negotiation and expressed views regarding the desirability of the participation of all nuclear-weapon States in disarmament efforts.

177. The delegation of the Soviet Union said the implementation of substantial disarmament measures required the participation of militarily-significant States, including first of all the nuclear-weapon Powers, and that it was necessary to continue efforts to enlist the participation of all nuclear, near-nuclear, and other militarily-significant States in the negotiations on disarmament and in the international disarmament agreements already concluded (CCD/PV.627).
178. The delegation of Mexico, after reviewing the four multilateral measures that the Committee has produced in 12 years of labour, expressed the view that those measures have been truncated and mutilated despite the ardent desire of all the peoples of the world. It stated its view that if the Committee should disappear after what was now its third year of sterility, its epitaph might be that the road to its tomb had been paved with formal promises and solemn undertakings that the nuclear super-Powers had totally ignored and which mankind had so far longed in vain to see fulfilled (CCD/PV.627).

179. The delegation of Pakistan said it would not oppose considering the advisability of introducing appropriate reforms in the method of work and membership of the Committee, but that the objective must be to ensure that the geographic and political balance were maintained and that the negotiating role of the Committee was effectively preserved and strengthened (CCD/PV.630).

180. The delegation of Hungary stated that the present organizational and procedural set-up of the Committee had never prevented it from carrying out constructive negotiations leading to mutually acceptable agreements (CCD/PV.632).

181. The delegation of Sweden said that it was prepared to do everything in its power to strengthen multilateral negotiation machinery. It said that the Committee could put on record some major achievements in the field of disarmament, but that despite the patient efforts of so many members of the Committee, the many initiatives taken to solve technical problems involved have been unfruitful (CCD/PV.633).

182. The delegation of Poland said that the major accomplishments of the Committee were only too well known and that, granted political will, it was fully capable of putting to good use its negotiating potential. The delegation also said it was odd that the Committee's record on the significance of the agreements, painstakingly elaborated under its auspices, should be belittled, or that the body should be denigrated for the lean years that the Committee had regrettably seen in its time (CCD/PV.635).

183. The delegation of India said that if the Committee were to remain a negotiating body and not become a forum for mere debate, its size must be kept within reasonable limits and its political balance should remain unchanged. It said that it had no fundamental objections to a change in the procedure of the Committee, but that any change must result in the improvement of the negotiating function and not otherwise (CCD/PV.636).

184. The delegation of Egypt expressed the view that the state of progress in the Committee, while being a reason for concern, should not be a cause for despair, and expressed the hope that the Committee would produce further milestones on the road towards disarmament comparable to its previous achievements. The delegation also said that it favoured an enlargement of the Committee on Disarmament which, while making it more fully representative, would preserve its basic character as a negotiating organ (CCD/PV.637).
185. The delegation of Romania said that a body responsible for multilateral negotiations could not function effectively unless there was genuine dialogue, the views of all members were taken into consideration, and the participation of all was assured on the basis of the principle of equality of the participating States. It also said that the Committee was in a critical situation because it was being kept away from the most urgent disarmament problems concentrating on a single isolated topic, which led to a loss of its perspective and ultimately to deadlock (CCD/PV.637).

186. The delegation of Canada said that it shared the disappointment of other delegations that the Committee had not made the progress expected of it. The delegation added, however, that it had no illusions that changes related to the organization of the Committee would add appreciably to its effectiveness. It expressed the view that a cause of weakness in the Committee was the fact that all major military Powers, and in particular all nuclear Powers, did not yet participate in its deliberations (CCD/PV.638).

187. The delegation of the Soviet Union said that it was not satisfied with the present state of affairs in the Committee's negotiations on disarmament, but that this state of affairs did not depend on the structure of the Committee. It said it fully shared the concern of States regarding the absence from the Committee of several militarily significant and important countries (CCD/PV.638).

188. The delegation of the United Kingdom said that the steady, patient work of the Committee was itself a contribution towards improved international relations. It said that while spectacular progress could not be expected here or in any other conceivable forum which it could be hoped to devise, without progress in the political climate, it had no doubt that by perseverance the Committee might contribute towards the development of trust between nations. The delegation expressed the view that the Committee had the experience and dedication to treat the obstinate problems of disarmament with the respect and stubbornness they demanded, and that one should not throw away this well-proven and practical body in a fit of exasperation at a check in momentum which all hoped would be temporary. The delegation also cautioned against radically altering the structure of the Committee in the course of enlargement (CCD/PV.641).

189. The delegation of Mexico placed on record its hope that the enlargement of the Committee would enhance its effectiveness. In order to achieve that aim, the delegation expressed the view that it would be necessary not only to enlarge the Committee, but at the same time to reorganize it. The delegation recalled that it had been advocating this since 1969 and had suggested a number of specific reforms (CCD/PV.650).

190. The delegation of Yugoslavia regretted that the Committee would not be able again to submit to the General Assembly any concrete results. It said that it would appreciate the creation of conditions conducive to the participation in multilateral disarmament negotiation of all nuclear-weapon and other militarily significant States whose contribution would add to the achievement of concrete results (CCD/PV.651).
191. The Argentine delegation stated that it welcomed the Australian application. The delegation noted with satisfaction that Australia had concurred in postponing its consideration, since Argentina could not have accepted any wording in the report which did not have Australian consent.

192. The delegation of Brazil expressed its deep appreciation for the enlargement of the Conference of the Committee on Disarmament, and for the agreed invitation to the German Democratic Republic, Germany (Federal Republic of), Iran, Peru and Zaire to join that body, which, it trusted, would bring forth a relevant contribution to the work of the Committee in particular and to the cause of universal disarmament. The delegation also expressed its sympathy for the interest expressed by Australia to become a member of the Committee. It hoped that the question could be considered in the near future.

193. The Canadian delegation welcomed all the applications for membership in the Committee. In particular, the Canadian delegation indicated that it was strongly sympathetic to the Australian application and expressed the hope that in the future, taking into consideration the need to maintain an equitable balance, it would be possible for Australia to join the Committee.

194. The delegation of India said that it was in sympathy with Australia's desire to join the Conference of the Committee on Disarmament.

195. The delegation of Japan stated that it favoured the admittance of Australia to the Committee because that country was so enthusiastic about matters of disarmament and arms control that it would make great contributions to the joint work of the Committee. It believed that Australia was one of the countries best qualified to be a member of the Committee. The delegation of Japan also expressed itself in favour of Australian admittance from the viewpoint of rectifying the under-representation of the South Pacific region in the Committee. The delegation of Japan hoped that the day would come soon when Australia was admitted to the Committee with the blessings of all its members.

196. The delegation of Mexico expressed its satisfaction that agreement had been reached among all Committee members, including the two Co-Chairmen, to invite the Federal Republic of Germany, the German Democratic Republic, Iran, Peru and Zaire to become members of the Conference as of 1 January 1975. The delegation added that it trusted that they would make a valuable contribution to the urgent task of remedying the discouraging situation in which the Committee found itself (CCD/PV.654).

197. The delegation of Mexico expressed its support for the candidacy of Australia, adding that, if it proved necessary to include yet another member in order that the Co-Chairmen might reach agreement on that candidacy, this should not be an obstacle.

198. The Netherlands delegation stated that it would not have any objection to Australia's joining the Committee if this could be effected without consequences for further enlargement.

199. The delegation of Romania expressed the view that disarmament being a matter of deep concern to all States each of them had the right to participate in the
disarmament negotiations. Romania welcomed and supported all the applications for membership of the Committee, including the request made by Australia. It stated that any decision on the enlargement of the Committee was to become final.

200. The delegation of the Soviet Union expressed its satisfaction with the agreement reached on the enlargement of the Committee and hoped that the participation in the Committee's work of its new members - the German Democratic Republic, Germany (Federal Republic of), Iran, Peru and Zaire - would contribute to the fulfilment of the tasks before the Committee.

201. The United Kingdom delegation said that it would welcome Australia in any international forum, and expressed the view that Australia would be able to make a particularly valuable contribution to the work of the Committee and the hope that it would be possible to arrange Australia's admission at a future date in a way which did not entail such a further enlargement of the Committee as to prejudice its efficiency.

202. The Yugoslav delegation stated that it bowed with sympathy to the Australian application for membership of the Committee and that it would support a consensus in the Committee in this regard.

203. Some delegations also devoted attention to the question of a world disarmament conference. The delegations of the Soviet Union, Hungary, Mongolia, Bulgaria, Poland and Romania expressed support for the convening of a world disarmament conference with the participation of all the States of the world. They expressed the view that discussion at such a forum of urgent matters of disarmament would contribute to further normalization of international relations, as well as to progress in curbing the arms race and implementing disarmament measures (CCD/PV.627, 630, 632, 634, 635 and 639).

204. The delegation of India expressed the view that a world disarmament conference, held after adequate preparation and with the participation of all States, would promote the cause of general and complete disarmament. It said that India would exert the utmost effort to facilitate the convening of a world disarmament conference (CCD/PV.636).

205. The delegation of Czechoslovakia noted with satisfaction that the United Kingdom and France were taking part in the work of the Ad Hoc Committee in New York - a good example to the other two nuclear Powers (CCD/PV.644).

206. The delegation of Yugoslavia reiterated that Yugoslavia would make all necessary efforts in the future for an urgent convening of the world disarmament conference (CCD/PV.651).

207. The delegation of Poland stated that the amount and scope of progress made with respect to the convening of a world disarmament conference was impressive enough to justify the speeding up of the on-going efforts by the transformation of the Ad Hoc Committee into a preparatory committee at the twenty-ninth session of the General Assembly (CCD/PV.653).
III. SPECIAL REPORT ON THE QUESTION OF A TREATY BANNING UNDERGROUND NUCLEAR WEAPON TESTS

208. In its resolutions 3078 A and B (XXVIII), the General Assembly asked the Conference of the Committee on Disarmament to continue, as a matter of highest priority, its deliberations on a treaty designed to achieve the objective of a comprehensive test ban. With this in mind, members of the Committee during 1974 continued to address the question of a treaty banning underground nuclear weapons tests. Many delegations spoke in favour of the early achievement of a comprehensive treaty prohibiting the testing of nuclear weapons underground, some urged that all nations subscribe to the limited test ban treaty of 1963, and some observed that, to be truly comprehensive, a test ban treaty must prohibit tests in any environment by all nations.

209. The delegation of the Soviet Union insisted on the cessation of all nuclear weapon tests, everywhere and by all, including underground tests. A corresponding agreement should be verified by national means supported by international co-operation of the parties in the exchange of seismic data. The Soviet Union was prepared to participate in such co-operation on certain conditions provided that it would form part of the agreement (CCD/PV.627).

210. The delegation of the United States reaffirmed its commitment to the objective of a comprehensive test ban with adequate verification, and its belief that adequate verification required some on-site inspection. Progress in the continuing seismic research programme relating to verification was described (CCD/PV.627).

211. The delegation of Mexico noted that the General Assembly had already adopted some 30 resolutions on the question of the cessation of nuclear weapon tests, that in four of those resolutions it had condemned with the utmost vigour all such tests and that in three resolutions it had specially emphasized that "whatever may be the differences on the question of verification, there was no valid reason for delaying the conclusion of a comprehensive test ban". The delegation also noted that this statement agreed in essence with what the Secretary-General had affirmed on 29 February 1972, that is, that "No other question in the field of disarmament has been the subject of so much study and discussion as the question of stopping nuclear weapon tests. I believe that all the technical and scientific aspects of the problem have been so fully explored that only a political decision is now necessary in order to achieve final agreement" (CCD/PV.545). The delegation asserted that the yearly average number of nuclear weapon tests in the decade after the 1963 Moscow Treaty was 60 per cent higher than the 1945-1963 annual average (CCD/PV.627).

212. The delegation of Japan affirmed its opposition to all nuclear weapon tests by any country, its request that tests in the atmosphere be stopped, and its desire that the nations involved in atmospheric testing participate in disarmament negotiations. It stressed that the absence of those nations should not be permitted to obstruct the discussions of a comprehensive test ban. It noted the relationship between the Strategic Arms Limitation Talks and the comprehensive test ban. It stated that a major obstacle to progress was not a view in favour
of effective verification, but rather apathy or rejection concerning the necessity of effective verification measures. It referred, in that connexion, to the safeguard measures, including on-site inspection, accepted by States parties possessing no nuclear weapons under the Treaty on the Non-Proliferation of Nuclear Weapons and expressed the opinion that this implied that by so doing each of the non-nuclear States completely fulfilled its obligations under the Treaty, leaving no room for doubt to others, and thereby also expressed its desire to see confidence among nations increased. Accordingly, it held that elimination of the view that international verification measures impinged on national sovereignty was a prerequisite for real progress in disarmament negotiations. On the other hand, the delegation urged that verification be dealt with in full recognition of the necessity for practicality and that it be recognized that "effective verification" and "complete verification" were not synonymous (CCD/PV.628).

213. The Netherlands delegation endorsed the views expressed by the delegation of Japan, and questioned arguments that on-site inspection was unacceptable as a matter of principle. It observed, however, that even with on-site inspection there would be room for some clandestine testing. The choice is whether to accept this risk or the risk posed by continued unrestricted testing. The Netherlands Government, it said, was deeply convinced that cessation of testing was a prerequisite to halting the nuclear arms race (CCD/PV.630).

214. The delegation of Pakistan noted that, in spite of extensive debates following a long series of resolutions by the General Assembly, a treaty for a comprehensive test ban was not in sight because of disagreement on verification. The delegation of Pakistan believed that on-site inspections no longer were essential for a viable verification system; it expressed the view that all tests above 10, and, with development, five kilotons, could be detected by national means. The delegation believed that an agreement would be an indispensable factor in slowing down the nuclear arms race (CCD/PV.630).

215. The delegation of the United Kingdom agreed with the views of the delegation of Japan (CCD/PV.628, p.9) on verification. It defined adequate verification as that which satisfied all parties concerned, and stated the United Kingdom objective of an adequately verified comprehensive test ban treaty and the cessation of all nuclear test explosions for weapons purposes in all environments and by all countries. The United Kingdom hoped to furnish the Committee with a further technical contribution in the course of the summer (CCD/PV.630).

216. The delegation of Bulgaria reaffirmed its support for a comprehensive ban on all nuclear weapon tests everywhere and by all States, and asserted its belief that national means of control were adequate to provide verification, but that these could be supplemented by the international exchange of seismic data. It cited insistence on on-site inspection as an example of how unjustified verification requirements could become an obstacle to solution of disarmament problems; verification measures should not go beyond their purpose of offering reasonable guarantees of compliance. The delegation stated that a comprehensive ban on nuclear weapon tests was not possible without participation of all nuclear-weapons Powers (CCD/PV.630).
217. The delegation of Hungary, noting that for more than 10 years no real progress had been made towards a comprehensive test ban treaty, stated its opinion that the means were at hand to detect and verify nuclear weapon tests, and called for participation by all nuclear Powers (CCD/PV.632).

218. The delegation of Sweden noted that in spite of exceptional effort no concrete result had been reached on a comprehensive test ban, which it regarded as the most important immediate step that could be taken to halt the nuclear arms race. It suggested that lack of political will, emanating from supposed military advantages of continued testing, had often been cited as the only obstacle to a treaty. It proposed that the cessation of underground tests by the two main testing Powers would improve prospects for cessation of all nuclear tests. The delegation cited the dangers inherent in "mini-nukes" as an additional reason for cessation of testing (CCD/PV.633).

219. The Mongolian delegation, noting that some representatives of the Western Powers tended to confuse the concept of effective control with on-site inspection, stated that effective verification was not equivalent to on-site inspection (CCD/PV.634).

220. The delegation of Czechoslovakia cited opinions that the Committee should proceed to discussions leading to a concrete agreement banning nuclear tests, but observed that this required acceptance by the nuclear Powers of a political decision. It concurred in the view that national means of verification were sufficient, supplemented by the exchange of seismic data and by consultation, and suggested that the continued insistence on on-site inspection by some delegations hid an unwillingness to accede to a ban on all nuclear tests. The delegation stated that participation by all nuclear-weapon States in both the Moscow Agreement of 1963 and in a "comprehensive test ban", without exception, was essential according to the meaning of the term. The term "comprehensive" had two aspects: banning all tests in all environments, and equal application of the ban to all States. Two nuclear Powers alone could not attain a "comprehensive test ban" (CCD/PV.635).

221. The delegation of India stressed the importance of the comprehensive test ban in checking the qualitative development of nuclear weapons and the nuclear arms race. It added that the provisions of the partial test ban treaty should be fully observed and those nuclear-weapon States which had not yet subscribed to that Treaty should do so without further delay (CCD/PV.636).

222. The delegation of Italy noted the relation of the testing issue to the review of the Treaty on the Non-Proliferation of Nuclear Weapons, and observed that agreement on a comprehensive test ban could not be reached until such an agreement contained provisions for verification satisfactory to all parties to the Treaty. It suggested, therefore, that efforts to agree on a solution might include the adoption of temporary or partial measures (CCD/PV.636).
223. The delegation of Egypt stated that its position on the question of a comprehensive test ban had been constantly defined on previous occasions. It drew attention to the fact that the General Assembly reiterated in resolution 3078 A (XXVIII) its conviction that, whatever might be the differences on the question of verification, there was no valid reason for delaying the conclusion of a comprehensive test ban (CCD/PV.637).

224. The delegation of the Soviet Union expressed disagreement with the claim that international on-site inspection was required for adequate control over cessation of underground tests (CCD/PV.639).

225. The delegation of the United Kingdom welcomed the bilateral United States/Soviet Union threshold treaty as another step on the path towards a comprehensive test ban agreement, and recalled that the United Kingdom Government had committed itself to abide by its provisions. The delegation reaffirmed the aim of the United Kingdom to pursue the goal of a comprehensive test ban treaty stated in the preamble to the threshold treaty, and stated that a working paper to that end would shortly be tabled dealing with the problem of discriminating between earthquakes and explosions (CCD/PV.641). This working paper was subsequently submitted as document CCD/440.

226. The delegation of Japan noted recent atmospheric tests in the Pacific Ocean and Asia, and other underground tests by the nuclear-weapon Powers, and reiterated the opposition of the Government of Japan to any test by any country, and its desire for the earliest possible realization of nuclear disarmament. It adjured the testing countries to bring about the cessation of all tests, citing the environmental effects of atmospheric tests and possibly of underground tests. It urged participation in the limited test ban treaty, particularly by the countries now testing in the atmosphere. The delegation expressed dissatisfaction with the effective date of the bilateral threshold treaty, but assessed the threshold agreement as a step forward towards a comprehensive ban, and it raised the question of how the bilateral agreement was to be developed into a broader multilateral agreement. It noted the unwritten understanding that peaceful nuclear explosions above 150 kilotons would be monitored by observers, and observed that if this understanding took concrete form it would make the results of the summit meeting even more constructive (CCD/PV.642).

227. The delegation of the Soviet Union drew attention to the important contribution of the Soviet-United States summit meeting to solution of the problem of the comprehensive prohibition of nuclear weapon tests, and described the provisions of the new threshold treaty and the accompanying Protocol (CCD/PV.642).

228. The delegation of the United States reported that, in the absence of any prospect of early resolution of the problems of verifying a comprehensive test ban, leaders of the United States and the Soviet Union had agreed to take a partial but significant step towards the objective of a comprehensive test ban treaty by signing the threshold treaty. It noted that such partial measures had been recommended by several members of the Committee, and expressed the belief that the treaty would have significant moderating effect on nuclear arms competition.
between the parties, by helping to preclude development of new generations of high-yield warheads compatible with modern delivery systems. The effective date would permit further detailed discussions of the requirements for verification, time for the exchange of verification-related data, and for negotiation of the integrally-related agreement covering nuclear explosions for peaceful purposes. The delegation noted the declared intention of the Parties to negotiate with a view towards achieving a solution to the problem of the cessation of all underground nuclear weapon tests, reaffirming the United States commitment to an adequately-verified comprehensive test ban. The delegation described the requirements for verifying that peaceful explosions do not serve weapons development, and noted that this has been the subject of an understanding in principle, including the presence of observers (CCD/PV.643).

229. The delegation of Czechoslovakia acknowledged with gratitude the circulation of the threshold treaty documents in the Committee, and expressed the hope that the agreement marked the beginning of a new phase in negotiation on test prohibition and nuclear disarmament. It stated that the treaty represented a first major step in the direction of complete prohibition, and that its importance lay in limitation of further development of strategic weapons, reducing the danger of a new cycle in the strategic arms race. The delegation noted the undertaking by the Parties to limit tests to a minimum, and observed that control would be by national means, supplemented by consultation and the exchange of information. It cited the treaty as an example of the operation of political will, rather than removal of technical difficulties (CCD/PV.644).

230. The delegation of Sweden observed that six countries had conducted tests of nuclear devices in recent months, more than ever before, and stated its opinion that continued testing by the two major nuclear-weapon nations involved greater risks than prohibition of all tests. It suggested that continued testing did not strengthen the Treaty on the Non-Proliferation of Nuclear Weapons, but noted that from the environmental point of view atmospheric tests were more harmful than those conducted underground. Commenting that in recent years a majority of United States and Soviet tests have been below the 150 kiloton threshold established in the new treaty, the delegation foresaw only a moderate decrease in the frequency of tests under the treaty, and an increase in the number of tests above the threshold before the treaty became effective. The delegation expressed the hope that the threshold treaty would not lead to a false sense of security; would not be seen as legitimizing testing below 150 kilotons. Development of precision guidance was seen as the technical reason behind the threshold test treaty. The advantage of reduced destruction in war, the delegation said, might be offset by its increased likelihood. The delegation noted the bilateral nature of the threshold treaty, expressed a desire for multilateral access to the data exchanged to facilitate control, as well as for multilateral observation of peaceful nuclear explosions, and proposed existing IAEA procedures for such observation as a starting point. It called for international inspection when the nuclear-weapon Powers conduct peaceful nuclear explosions anywhere for any purpose, and stated that the threshold treaty might or might not make a comprehensive ban easier to obtain. It might be regarded as closing the testing issue; but, on the other hand, the detailed control co-operation arrangements under the threshold treaty could facilitate agreement on the control issues in a comprehensive ban (CCD/PV.647).
231. The delegation of Mexico took a rather sceptical view of the Moscow Treaty of 3 July 1974 between the United States and the Soviet Union on the limitation of underground nuclear weapon tests. The delegation's scepticism was based on the following considerations: first, the promise contained in article I (e) of the Treaty that the Parties "shall continue their negotiations with a view toward achieving a solution to the problem of the cessation of all underground nuclear weapon tests" comes after (1) 11 years of waiting in vain for the translation into acts of the "determination" so solemnly proclaimed in the preamble to the 1963 partial test ban treaty, to achieve "the discontinuance of all test explosions of nuclear weapons for all time" and (2) some 30 resolutions by the General Assembly urging the nuclear Powers to put an end to all nuclear weapon tests; second, reliable studies show that in the past few years the vast majority of nuclear explosions carried out by the two super-Powers have been below the 150 kiloton threshold; third, the agreement would not enter into force until 31 March 1976, leaving a 20-month period in which, as experience in similar cases had shown, the two super-Powers would engage in an all-out race to test nuclear weapons, even those over 150 kts; and fourth, according to the best-qualified experts, the super-Powers would have no difficulty at all in completing, before the Treaty entered into force, all the new generations of nuclear warheads which they had planned (CCD/PV.650).

232. The delegation of Yugoslavia reiterated its Government's opposition to all nuclear weapon tests, in all environments and by all States (CCD/PV.651).

233. The Canadian delegation recalled that its Government recently had expressed publicly its concern and regret that a number of countries had exploded nuclear devices this year notwithstanding the long-standing objective of a comprehensive test ban. It noted the responsibility falling upon the United States and the Soviet Union to take the lead in moving towards a comprehensive test ban. In the light of these concerns the delegation said it joined in the expressions of disappointment about the scope of the partial nuclear test ban treaty recently concluded between the United States and the Soviet Union, and expressed the hope that at least the treaty would have the merit of inhibiting the development of future generations of large-yield weapons. In addition it noted in particular the commitment in the treaty to continue negotiations with a view to a cessation of all underground tests. The delegation urged that the parties pursue negotiations to this objective without awaiting implementation of the agreement. In addition it welcomed the provisions in the agreement for the exchange of scientific data between the two parties and urged that it commence as soon as possible in order to increase confidence between the two countries in the ability to detect underground nuclear tests (CCD/PV.653).

* *

234. The Committee agreed to reconvene on a day to be established by the Co-Chairman in consultation with all members of the Committee.
235. This report is transmitted by the Co-Chairmen on behalf of the Conference of the Committee on Disarmament.

(Signed) A. A. ROSECHIN  
(Union of Soviet Socialist Republics)

(Signed) Joseph MARTIN (Jr.)  
(United States of America)
ANNEX I

Documents issued by the Conference of the Committee on Disarmament*

On 16 April 1974, the Secretary-General of the United Nations transmitted to the Co-Chairmen a letter containing the resolutions of the General Assembly (CCD/419).

On 30 April 1974, the representative of Japan submitted a draft convention on the prohibition of the development, production and stockpiling of chemical weapons and on their destruction (CCD/420).

On 14 May 1974, the representative of Sweden submitted a paper on presentation of defence expenditures and their distribution for defence purposes (CCD/421).

On 23 May 1974, the representative of Pakistan submitted some excerpts from the statement made on 19 May 1974 by the Prime Minister of Pakistan on the nuclear underground test explosion conducted by India on 18 May 1974 (CCD/422).

On 23 May 1974, the representative of Pakistan submitted a statement issued on 19 May 1974 at Islamabad by an official spokesman of the Government of Pakistan on India's explosion of an underground nuclear device on 18 May 1974 (CCD/423).

On 23 May 1974, the representative of India submitted the text of the official announcement made by the Department of Atomic Energy, Government of India, regarding the underground peaceful nuclear explosion experiment conducted on 18 May 1974 (CCD/424).

On 23 May 1974, the representative of India submitted a statement made by the Minister for External Affairs of India on 21 May 1974 on the peaceful underground nuclear explosion conducted by the Atomic Energy Commission of India on 18 May 1974 (CCD/425).

On 23 May 1974, the representative of Canada submitted the text of a statement by the Secretary of State for External Affairs of Canada, the Honourable Mitchell Sharp, on 22 May 1974 (CCD/426).

On 2 July 1974, the representative of Sweden submitted some observations on the draft convention on the prohibition of the development, production and stockpiling of chemical weapons and on their destruction presented by the delegation of Japan on 30 April 1974 (CCD/427).

* With the exception of document CCD/43, which contains the draft report of the Conference of the Committee on Disarmament, and document CCD/45, which contains the final report, all the documents listed appear in annex II.
On 11 July 1974, the representative of Pakistan submitted the text of the resolution on strengthening the security of non-nuclear States adopted by the Fifth Islamic Conference of Foreign Ministers, held at Kuala Lumpur from 21 to 25 June 1974 (CCD/428).

On 11 July 1974, the representative of Nigeria submitted a letter dated 5 July 1974 from the Permanent Representative of Nigeria to the Special Representative of the Secretary-General to the Conference of the Committee on Disarmament (CCD/429).

On 12 July 1974, the representative of Japan submitted a working paper containing views of Japanese experts on the scope of prohibition and on the verification of organophosphorus compounds for the informal meetings with participation of experts of the Conference of the Committee on Disarmament in 1974 (CCD/430).

On 16 July 1974, the representatives of the Union of Soviet Socialist Republics and the United States of America submitted a Treaty between the United States of America and the Union of Soviet Socialist Republics on the limitation of underground nuclear weapon tests (CCD/431).

On 16 July 1974, the Special Representative of the Secretary-General to the Conference of the Committee on Disarmament submitted a letter dated 12 July 1974 from the Permanent Representative of Finland to the Special Representative transmitting a working paper by the Government of Finland on methodology for chemical analysis and identification of chemical warfare agents—progress of a Finnish research project (CCD/432).

On 16 July 1974, the representative of Canada submitted a paper on the problem of defining compounds having military significance as irritating and incapacitating agents (CCD/433).

On 16 July 1974, the representative of Canada submitted a paper on destruction and disposal of Canadian stocks of Second World War mustard agent (CCD/434).

On 16 July 1974, the representative of the United States of America submitted a working paper on toxicity of chemical warfare agents (CCD/435).

On 16 July 1974, the representative of the United States of America submitted a working paper on chemical agent destruction (CCD/436).

On 16 July 1974, the representative of the United States of America submitted a working paper on diversion of commercial chemicals for weapons (CCD/437).

On 1 August 1974, the representative of Sweden submitted a paper on underground nuclear test activities in the United States and the Union of Soviet Socialist Republics from 1969 to 1973 (CCD/438).

On 6 August 1974, the representative of Mexico submitted a letter dated 6 August 1974 from the leader of the delegation of Mexico to the Special Representative of the Secretary-General to the Conference of the Committee on Disarmament (CCD/439).
On 13 August 1974, the representative of the United Kingdom submitted a working paper on a development in discriminating between seismic sources (CCD/440).

On 13 August 1974, the representatives of Japan and Sweden submitted a working paper on the identification of seismic events in the USSR using seismological data from observatories in Japan and Sweden (CCD/441).

On 13 August 1974, the representative of Japan submitted a working paper on the accuracy of locating seismic events (CCD/442).

On 22 August 1974, the representative of Mexico submitted a working paper on the practical application of article VI of the Treaty on the Non-Proliferation of Nuclear Weapons (CCD/444).
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<td>18. United States of America: working paper on chemical agent destruction</td>
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<td>24. Japan: working paper on the accuracy of locating seismic events</td>
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<td>25. Mexico: working paper on the practical application of article VI of the Treaty on the Non-Proliferation of Nuclear Weapons</td>
<td>CCD/444</td>
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1. Letter dated 1 April 1974 from the Secretary-General of the United Nations to the Co-Chairmen of the Conference of the Committee on Disarmament transmitting the resolutions on disarmament adopted by the General Assembly at its twenty-eighth session (CCD/419)

I have the honour to transmit herewith the following resolutions adopted by the General Assembly at its twenty-eighth session, which entrust specific responsibilities to the Conference of the Committee on Disarmament:

3077 (XXVIII) "Chemical and bacteriological (biological) weapons"

3078 A and B (XXVIII) "Urgent need for suspension of nuclear and themonuclear tests".

I would draw attention, in particular, to the following specific provisions contained in these resolutions.

In paragraph 3 of resolution 3077 (XXVIII), the General Assembly requested the Conference to the Committee on Disarmament to continue negotiations, as a matter of high priority, on the problem of chemical and bacteriological (biological) methods of warfare, with a view to reaching early agreement on effective measures for the prohibition of the development, production and stockpiling of all chemical weapons, for their elimination from the arsenal of all States and for the complete realization of the objective as set forth in the resolution; and in paragraph 7 it requested the Conference of the Committee on Disarmament to report on the results of its negotiations to the General Assembly at its twenty-ninth session.

In paragraph 2 of resolution 3078 A (XXVIII), the General Assembly reiterated its conviction that, whatever may be the differences on the question of verification, there is no valid reason for delaying the conclusion of a comprehensive test ban of the nature contemplated as long as 10 years ago in the preamble of the Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and under Water; 1/ and in paragraph 3 it urged once more the Governments of nuclear-weapon States to bring to a halt without delay all nuclear weapon tests either through a permanent agreement or through unilateral or agreed moratoria.

In paragraph 5 of resolution 3078 B (XXVIII), the General Assembly vigorously urged the States members of the Conference of the Committee on Disarmament, especially those which are nuclear-weapon States and parties to the Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and under Water, immediately to start negotiations for elaborating a treaty designed to achieve the objective

of a comprehensive test ban; and in paragraph 6 it requested the Conference of the Committee on Disarmament to continue, as a matter of highest priority, its deliberations on this treaty, taking into full account the suggestions already made in the Committee, as well as the views expressed at the current session of the General Assembly and at previous sessions, and to submit to the Assembly at its twenty-ninth session a special report on its deliberations on this vitally important matter, including the areas of agreement on the achievement of a draft treaty.

The General Assembly, in paragraph 6 of resolution 3077 (XXVIII), also requested the Secretary-General to transmit to the Conference of the Committee on Disarmament all documents of the First Committee relating to questions connected with the problem of chemical weapons and chemical methods of warfare. The relevant documents are the following: A/9141, 2/ A/C.1/L.653 3/ and A/C.1/L.653/Rev.1, 4/ which were discussed at the 1934th, 1935th, 1938th, 1940th-1954th, 1968th and 1970th meetings of the First Committee; and document A/9363, which was examined at the 2192nd plenary meeting.

In connexion with resolutions 3078 A and B (XXVIII), the relevant documents are the following: A/9141, 2/ A/9208, A/9081, A/9084, A/9086, A/9093, A/9107, A/9109, A/9110, A/9117, A/9166, A/C.1/1031, A/C.1/1036, A/C.1/1039, A/C.1/L.651, 5/ A/C.1/L.652 6/ and A/C.1/L.652/Rev.1, 7/ which were discussed at the 1934th, 1935th, 1938th, 1940th-1953rd, 1956th and 1960th meetings of the First Committee; and document A/9364, which was examined at the 2192nd plenary meeting.

All these documents and records were distributed during the twenty-eighth session of the General Assembly to all Members of the United Nations, including all the members of the Conference.

I also have the honour to transmit herewith, for the information of the members of the Conference, the following resolutions adopted by the General Assembly at its twenty-eighth session, which deal with disarmament matters:

3075 (XXVIII) "Economic and social consequences of the armaments race and its extremely harmful effects on world peace and security"

3076 (XXVIII) "Napalm and other incendiary weapons and all aspects of their possible use"


4/ Ibid., para. 7.


6/ Ibid., para. 7.

7/ Ibid., para. 8.
3079 (XXVIII) "Implementation of General Assembly resolution 2935 (XXVII) concerning the signature and ratification of Additional Protocol II of the Treaty for the Prohibition of Nuclear Weapons in Latin America (Treaty of Tlatelolco)"

3080 (XXVIII) "Declaration of the Indian Ocean as a zone of peace"

3093 A and B (XXVIII) "Reduction of the military budgets of States permanent members of the Security Council by 10 per cent and utilization of part of the funds thus saved to provide assistance to developing countries"

3183 (XXVIII) "World Disarmament Conference"

3184 A to C (XXVIII) "General and complete disarmament".

I also wish to refer to General Assembly resolutions 3056 (XXVIII), 3102 (XXVIII) and 3185 (XXVIII), which are related to disarmament matters.

In paragraph 5 of resolution 3056 (XXVIII) entitled "Report of the International Atomic Energy Agency", the General Assembly commended the International Atomic Energy Agency for the progress it has made in meeting its safeguards responsibilities and in negotiating agreements for the application of safeguards with non-nuclear-weapon States, in particular the agreements arrived at with the European Atomic Energy Community and the non-nuclear-weapon States of that organization.

In paragraph 7 of resolution 3102 (XXVIII) entitled "Respect for human rights in armed conflicts", the Secretary-General was requested to report to the General Assembly at its twenty-ninth session on relevant developments concerning human rights in armed conflicts, in particular on the proceedings and results of the 1974 session of the Diplomatic Conference on the Reaffirmation and Development of International Humanitarian Law Applicable in Armed Conflicts.

In paragraph 6 of resolution 3185 (XXVIII) entitled "Implementation of the Declaration on the Strengthening of International Security", the General Assembly appealed to all militarily significant States to exert efforts in order to extend the political détente so far achieved to military détente, to stop the arms race as well as to take practical steps to reduce armament, with a view to making available additional resources for economic and social development, particularly to the developing countries.

Kurt WALDHEIM
Secretary-General

2. JAPAN

Draft convention on the prohibition of the development, production and stockpiling of chemical weapons and on their destruction (CCD/420)

[Original: English]
[30 April 1974]

The States Parties to this Convention,

Determined to act with a view to achieving effective progress towards general and complete disarmament, including the prohibition and elimination of all types of weapons of mass destruction, and convinced that the prohibition of the development, production and stockpiling of chemical weapons and their elimination, through effective measures, will facilitate the achievement of general and complete disarmament under strict and effective international control,

Recognizing the important significance of the Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare, signed at Geneva on 17 June 1925, and conscious also of the contribution which the said Protocol has already made, and continues to make, to mitigating the horrors of war,

Reaffirming their adherence to the principles and objectives of that Protocol and calling upon all States to comply with them,

Recalling that the General Assembly of the United Nations has repeatedly condemned all actions contrary to the principles and objectives of the Geneva Protocol of 17 June 1925,

Recalling also that each State Party to the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction, in article IX of the Convention, affirmed the recognized objective of effective prohibition of chemical weapons and, to this end, undertook to continue negotiations in good faith with a view to reaching early agreement on effective measures for the prohibition of their development, production and stockpiling and for their destruction, and on appropriate measures concerning equipment and means of delivery specifically designed for the production or use of chemical agents for weapon purposes, and

Convinced that an agreement on the prohibition of chemical weapons, in the wake of the above-mentioned Convention on bacteriological (biological) and toxin weapons, will contribute to the strengthening of confidence between peoples and the general improvement of the international atmosphere, and also contribute to the realization of the purposes and principles of the Charter of the United Nations,

Have agreed as follows:
Article I

Each State Party to this Convention undertakes never in any circumstances to develop, produce, stockpile or otherwise acquire or retain:

(a) Chemical agents of types and in quantities that have no justification for protective or other peaceful purposes;

(b) Weapons, equipment or means of delivery designed to use such agents for hostile purposes or in armed conflict.

Article II

1. Each State Party to this Convention undertakes to destroy, or to divert to peaceful purposes as soon as possible all agents, weapons, equipment and means of delivery specified in article I, which are in its possession or under its jurisdiction or control.

2. States Parties to this Convention shall notify the International Verification Agency, defined in article VI, of the pending destruction or diversion to peaceful purposes of the agents and others as specified under paragraph 1 of this article on each such occasion.

3. The States Parties to this Convention shall, in carrying out the destruction or diversion to peaceful purposes of the agents and others as specified under paragraph 1 of this article, invite the International Verification Agency to send observers.

4. The International Verification Agency shall forthwith communicate the notification under paragraph 2 of this article to each State Party to this Convention.

5. The destruction or diversion to peaceful purposes of the agents and others as specified under paragraph 1 of this article shall be reviewed at a conference or conferences of States Parties to this Convention provided for in article XVII.

6. In implementing the provisions of paragraph 1 of this article all necessary safety precautions shall be observed to protect populations and the environment.

Article III

Each State Party to this Convention undertakes not to transfer to any recipient whatsoever, directly or indirectly, and not in any way to assist, encourage, or induce any State, group of States or international organizations to manufacture or otherwise acquire any of the agents, weapons, equipment or means of delivery specified in article I.
Article IV

Notwithstanding the provisions of articles I and II, the States Parties to this Convention may take provisional measures provided for in the annex I of this Convention until further agreements, including those on effective verification measures, are reached.

Article V

1. Each State Party to this Convention shall take any necessary measures to ensure the fulfilment of its obligations deriving from this Convention, and notify the International Verification Agency of its national organ or organs responsible for taking such necessary measures.

2. Each State Party to this Convention shall submit to the International Verification Agency periodic reports on the state of the fulfilment of its obligations deriving from this Convention in accordance with the provisions of annex II.

3. The functions of the national organ referred to in paragraph 1 of this article shall include the following:

   (a) Observation as well as supervision of the national activities related to the subject matter of this Convention;

   (b) Collection of statistical and other information thereon;

   (c) Preparation of periodic reports to the International Verification Agency;

   (d) Co-operation with the International Verification Agency such as presentation thereto of requested statistical and other documents or information, and acceptance of inspection.

Article VI

1. In order to promote the realization of the provisions of this Convention and the fulfilment of obligations assumed by the States Parties under this Convention, the States Parties to this Convention shall establish an International Verification Agency.

2. The functions of the International Verification Agency shall include the following:

   (a) To analyse and evaluate periodic reports and statistical and other documents or information submitted by each State Party;

   (b) To request explanation and conduct inquiries as under article VIII;
(c) To conduct inspection as under article IX;
(d) To send notifications and reports as under article X;
(e) To consult and co-operate with the national organs;
(f) To make recommendations for amendments to the Annexes;
(g) To send observers as under article II;
(h) To carry out decisions which may be made at the conference of States Parties to this Convention.

3. Details pertaining to the composition and functions of the International Verification Agency shall be provided for in annex III.

Article VII

The States Parties to this Convention undertake to consult one another directly or through the International Verification Agency and co-operate in solving any problems which may arise in relation to the objectives of, or in the application of the provisions of, this Convention.

Article VIII

1. Any State Party to this Convention which suspects that any other State Party is acting in breach of obligations deriving from the provisions of this Convention may request, directly or through the International Verification Agency that State Party to provide explanations. This request should include a list of all the evidence that roused the suspicion.

2. Request for explanations as under paragraph 1 may also be made by the International Verification Agency, when it deems it to be necessary.

3. The State Party which is requested to provide explanations under paragraphs 1 and 2 of this Article shall comply with such request in good faith. This State Party may request the International Verification Agency to conduct an inquiry. This request should include evidence which it considers sufficient to remove suspicion.

Article IX

1. A State Party which has been requested to provide explanations as under paragraphs 1 and 2 of article VIII may at any time invite the International Verification Agency to conduct an inspection in its territory.

2. If the State Party which is requested to provide explanation as under paragraphs 1 and 2 of article VIII fails to provide adequate explanations, the International Verification Agency may notify such State Party of an impending inspection to be conducted in its territory.
3. The State Party which is notified by the International Verification Agency of inspection as under paragraph 2 of this article shall make every effort to accept, as soon as possible, such inspection in its territory. The State Party which finds it impossible to accept such inspection in its territory shall provide adequate reasons to the International Verification Agency why the State Party finds it impossible to accept the inspection.

Article X

1. The International Verification Agency shall notify each State Party to this Convention of the results of analysis and evaluation as under paragraph 2 (a) of article VI, of explanation or inquiry as under article VIII, and of inspection as under article IX.

2. The International Verification Agency may, when it is deemed necessary, report the contents of the notification as under paragraph 1 of this article to the Security Council of the United Nations.

Article XI

Each State Party to this Convention undertakes to provide or support assistance, in accordance with the Charter of the United Nations, to any Party to this Convention which so requests, if the Security Council decides, upon notification as provided for in article X, that such Party has been exposed to danger as a result of violation of this Convention.

Article XII

Nothing in this Convention shall be interpreted as in any way limiting or detracting from the obligations assumed by any State under the Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare, signed at Geneva on 17 June 1925, as well as under the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction.

Article XIII

Each State Party to this Convention undertakes to continue negotiations in good faith with a view to achieving an agreement, as soon as possible, which will make it possible to eliminate the provisional measures referred to in article IV.

Article XIV

1. The States Parties to this Convention undertake to facilitate and have the right to participate in the fullest possible exchange of equipment, materials
and scientific and technological information for the use of chemical agents for peaceful purposes. Parties to this Convention in a position to do so shall also co-operate in contributing individually or together with other States or international organizations to the further development and application of scientific discoveries in the field of chemistry for peaceful purposes.

2. This Convention shall be implemented in a manner designed to avoid hampering the economic or technological development of States Parties to the Convention or international co-operation in the field of peaceful chemical activities, including the international exchange of chemical agents and equipment for the processing, use or production of chemical agents for peaceful purposes in accordance with the provisions of this Convention.

Article XV

The annexes referred to in this Convention shall constitute an integral part of this Convention.

Article XVI

Any State Party may propose amendments to this Convention. Amendments shall enter into force for each State Party accepting the amendments upon their acceptance by a majority of the States Parties to this Convention and thereafter for each remaining State Party on the date of acceptance by it.

Article XVII

1. Three years after the entry into force of this Convention, a conference of States Parties to this Convention shall be held at Geneva, Switzerland, to review the operation of this Convention, with a view to assuring that the purpose of the preamble and the provisions of this Convention are being realized. At intervals of three years thereafter, further conferences shall be held with the same objective of reviewing the operation of this Convention, if a majority of the Parties to this Convention submit a proposal to this effect to the International Verification Agency. Such review shall take into account any new scientific and technological developments relevant to this Convention.

2. The International Verification Agency shall convocate a conference of States Parties to this Convention as provided for in paragraph 1 of this article.

Article XVIII

1. This Convention shall be of unlimited duration.
2. Each State Party to this Convention shall, in exercising its national sovereignty, have the right to withdraw from this Convention if it decides that extraordinary events, related to the subject-matter of this Convention, have jeopardized the supreme interests of its country. It shall give notice of such withdrawal to all other States Parties to this Convention, the International Verification Agency and to the Security Council of the United Nations three months in advance. Such notice shall include a statement of the extraordinary events it regards as having jeopardized its supreme interests.

**Article XIX**

1. This Convention shall be open to all States for signature. Any State which does not sign this Convention before its entry into force in accordance with paragraph 3 of this article may accede to it at any time.

2. This Convention shall be subject to ratification by signatory States. Instruments of ratification and instruments of accession shall be deposited with the Governments of ----------------------, which are hereby designated the Depositary Governments.

3. This Convention shall enter into force after the deposit of the instruments of ratification by ---------------------- Governments, including the Governments designated as Depositaries of this Convention.

4. For States whose instruments of ratification or accession are deposited subsequent to the entry into force of this Convention, it shall enter into force on the date of the deposit of their instruments of ratification or accession.

5. The Depositary Governments shall promptly inform all signatory and acceding States of the date of each signature, the date of deposit of each instrument of ratification or of accession and the date of the entry into force of this Convention, and of the receipt of other notices.

6. This Convention shall be registered by the Depositary Governments pursuant to Article 102 of the Charter of the United Nations.

**Article XX**

This Convention, the Chinese, English, French, Russian and Spanish texts of which are equally authentic, shall be deposited in the archives of the Depositary Governments. Duly certified copies of this Convention shall be transmitted by the Depositary Governments to the Governments of the signatory and acceding States.

IN WITNESS WHEREOF the undersigned, duly authorized, have signed this Convention.

Done in __________ copies at ____________________________,
this __________ day of ______________________, ________.
Annex I (Alternative A)

1. States Parties to the Convention may suspend the application of articles I and II of the Convention with regard to the chemical agents which come under the categories in the schedule to this annex.

2. States Parties to the Convention desiring to invoke the provisions of paragraph 1 above shall so notify the Depositary Governments at the time of, or within --------- days from, the deposit of their instruments of ratification or accession. The Depositary Governments shall forthwith communicate these notifications to all signatory and acceding States and the International Verification Agency.

3. Any State Party to the Convention may propose amendments to the schedule to this annex. The text of any such amendment and the reasons therefor shall be communicated to the International Verification Agency which shall communicate them to the States Parties.

4. If a proposed amendment circulated under paragraph 3 above has not been rejected by any State Party within ------ months after it has been circulated, it shall thereupon enter into force. If however a proposed amendment is rejected by any State Party, the International Verification Agency may decide, in the light of comments received from States Parties, whether a conference shall be called to consider such amendments.

Annex I (Alternative B)

1. States Parties to the Convention may exclude from prohibition the chemical agents to which they consider it impossible to apply forthwith articles I and II of the Convention. However, the agents listed in the schedule to this annex shall never in any circumstances be excluded from the prohibition.

2, 3 and 4. (same as paragraphs 2, 3 and 4 of Alternative (A)).
I. Introduction

Collection and presentation of data on defence expenditures would provide a better basis for the assessment by Governments of short- and long-term trends in defence efforts and their consequences for the military balance. Such openness, which does not exist today in many States, would increase mutual confidence among States and reduce the risk for the arms race by suspicion or misunderstanding.

This paper includes an analysis of what economic data would be of interest for that purpose and, therefore, should be made generally available. As an example, such data concerning the defence expenditures of Sweden are included in the appendix.

II. Basic requirement - the definition of defence expenditure

Information concerning defence expenditure is contained in the official public accounts of central governments. States differ, however, in their definitions of defence expenditure, and information concerning their methods of classification is commonly not available. Some expenditures which would be considered as military may be excluded from the official data. In addition, there are often differences within States as to the basis of pricing of military output as compared with that of the output of the rest of the economy. Furthermore, different States have different economic structures and patterns of prices.

For these reasons official statistics on defence expenditure, when used to increase mutual confidence among States, would greatly benefit from a common definition of the concept and an agreement to supply information concerning the methods of classification used in each State.

It may not be easy to define the concept in exact terms but the official statistics on defence expenditure normally include:

- pay and allowances to military personnel
- pay to civilian personnel
- operations and maintenance
- procurement
- research and development
- construction
Furthermore in many States the following expenditures are also considered as defence expenditure:
- military aid
- civil defence
- pensions to retired personnel
- para-military forces
- parts of or total expenditure for certain activities that are acknowledged as having mixed civil/military functions, e.g., space research, atomic energy.

III. Matters to be covered by the presentation of statistics on defence expenditure

1. The level and trend of defence expenditure over the past decade according to official defence budget and including defence expenditure incurred outside the budget

Here it is essential to supply information as to what expenditures are considered as defence expenditure in various States.

2. The same as III.1 but in relation to the level and trend of GNP for the State

3. The distribution and break-down of military expenditure in terms of procurement, personnel, research and development, capital investment and other

In order to use trends of defence expenditure as information about a State's military potential, it is necessary to analyse the distribution of the expenditures in the terms listed above. This distribution can be used in an analysis of which basic decisions concerning military resource allocation and which decisions on principles of defence production and organization are made in different States. The distribution can also be of value when considering how much of a State's defence resources is consumed in the short run, and how much represents investments giving returns in terms of military potential in the long run. For the latter purpose the expenditures can be distributed into:

- Expenditures used to maintain present defence resources in the short run.
- Expenditures used to renew old equipment and add new equipment.
- Expenditures used for research and development giving returns in the long run.

4. The level and trend of employment of manpower within the defence organization and in defence-related activities (e.g. defence-related industry)

Statistics on manpower employed by the defence authorities, and statistics on
the number of employees in other sectors of a State's economy but still engaged in production for defence, give valuable information about both military potential and the economic consequences of the arms race for a State. Statistics on the proportion used for defence production for export are also of value. Statistics on the proportion of a State's total labour force which is used for defence purposes are often considered as an indicator of the influence of defence activities on the rate of growth of a State's economy.

5. The level and trend of manpower and financial resources devoted to research and development for defence purposes as a proportion of the State's total expenditure for research and development

A State's military potential in the long run is to a large extent based on the priority given to research and development for defence purposes. Statistics on this matter should cover the use of human and financial resources for defence research at both government authorities and government-financed defence research in industry.

6. Cost growth within the defence sector

In many States the production for defence purposes shows a cost disadvantage compared to the economy as a whole. There are also indicators of differences in cost growth between States. The relative military potential is strongly influenced by the relative trend in prices of goods and services used for military purposes and the relative cost trend of production within the defence authorities.

7. The level, trend and structure of defence-related imports and exports and provided or received military aid

The geographical spread of the arms race is of essential interest in measuring military potential. The possibility of valuing the flow of weapons, military equipment and other defence-related goods and of analysing its geographic pattern is of main importance to further developments in arms control and disarmament. Analysis of trends in the arms trade, in military aid and of supply and import policies demands statistics which could be supplied by the States.

Estimating the amount of arms supply in cases of no payment or partial payment only is of course a difficult problem even if the supply is materially specified. This is also true in cases of joint or licensed production programmes. Accuracy ambitions, therefore, have to be limited.

Information about defence-related imports and exports and military aid is also necessary in order to pay attention to differences in the pattern of defence production between the industrialized and the less industrialized countries and between allies of military blocs. Imports and exports of the technologically advanced weapons and military equipment characterized by high degrees of technical know-how have expanded quickly and the build-up of stocks of weapons in less industrialized countries is one of the new features. Statistics on the arms trade and military aid also give valuable information about the military posture of a State. The arms trade influences economic development in the recipient regions through the diversion of resources for purchase and maintenance of weapons and military equipment. The economic structure of a recipient country also tends to be affected by the usually close relations established between suppliers and recipients.
Statistics on arms trade and military aid to be supplied should measure the full monetary value of the flow of military goods. The monetary value may not correspond to actual prices paid, which vary considerably according to different pricing methods, the degree of aid and the terms involved in each individual transaction. In this matter it is also necessary to deal with the measuring problems connected with joint and licensed production of weapons.

IV. Regularity of information

It would seem desirable if information on the matters discussed in this paper could be provided by States on an annual basis.
APPENDIX

Example of a presentation of defence expenditures, their distribution for different purposes and other matters discussed in the working document.

The following should be seen as an example of information that could be supplied on the matters discussed in the working document. The figures are taken from official Swedish statistics.

II. The definition of Swedish defence expenditures

The "total defence" of Sweden consists of four component parts: the "military defence", the "civil defence", the "economic defence" and the "psychological defence".

The Swedish concept of "total defence" thus has a very broad significance. It includes not only military defence but also measures to protect the population from war damages, to ensure supplies of goods and services, and to maintain the will to defend and a spirit of resistance. Even such functions as medical care, social welfare, police system, and communications as well as other social activities must be adapted during war according to the pattern of the total defence effort.

Preparations for defence must make it possible not only to meet a military invasion and other forms of military attack but also to meet such events as isolation and political and economic threats.

The components of military expenditures are: payment and allowances to military personnel, civilian personnel and conscripts, expenditures for operations and maintenance, expenditures for procurement of munition, research and development expenditures and expenditures for construction of buildings and fortifications.

Sweden has no military expenditure abroad except for advances for United Nations troops, neither does Sweden receive military aid from abroad.

Real resources used for military ends are, except for expenditures for construction of buildings and fortifications, classified in the national accounts as consumption. The reason for this is that the use of resources for these ends is not presumed to add to the productive capital stock. This rule of classification of expenditures should be noticed when reading table III.3.
III.1 The level and trend of Swedish defence expenditures over the past decade

(a) The "total defence" expenditures 1963/64-1973/74

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(b) The "military defence" expenditures 1963/64-1973/74

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<td>5,330</td>
</tr>
<tr>
<td>1970/71</td>
<td>5,810</td>
</tr>
<tr>
<td>1971/72</td>
<td>6,249</td>
</tr>
<tr>
<td>1972/73</td>
<td>6,952</td>
</tr>
<tr>
<td>1973/74</td>
<td>7,382</td>
</tr>
</tbody>
</table>

*a/ Actual results for the fiscal years 1963/64 to 1971/72; calculated results for the fiscal years 1972/73 and 1973/74.*

*b/ Some social costs, earlier excluded, are included for the fiscal years 1972/73 and 1973/74.*
(c) The "military defence" expenditures 1963/64-1973/74

**Constant price figures according to the Swedish "net price index", 1971/72 prices c/ d/ e/**

(\text{In millions of Swedish crowns})

<table>
<thead>
<tr>
<th>Year</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1963/64</td>
<td>5 251</td>
</tr>
<tr>
<td>1964/65</td>
<td>5 354</td>
</tr>
<tr>
<td>1965/66</td>
<td>5 954</td>
</tr>
<tr>
<td>1966/67</td>
<td>5 653</td>
</tr>
<tr>
<td>1967/68</td>
<td>5 699</td>
</tr>
<tr>
<td>1968/69</td>
<td>5 768</td>
</tr>
<tr>
<td>1969/70</td>
<td>5 864</td>
</tr>
<tr>
<td>1970/71</td>
<td>6 080</td>
</tr>
<tr>
<td>1971/72</td>
<td>6 249</td>
</tr>
<tr>
<td>1972/73</td>
<td>6 685</td>
</tr>
<tr>
<td>1973/74</td>
<td>6 823</td>
</tr>
</tbody>
</table>

(d) The "civil defence" expenditures 1963/64-1973/74

**Current prices c/**

(\text{In millions of Swedish crowns})

<table>
<thead>
<tr>
<th>Year</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1963/64</td>
<td>57.5</td>
</tr>
<tr>
<td>1964/65</td>
<td>75.5</td>
</tr>
<tr>
<td>1965/66</td>
<td>69.2</td>
</tr>
<tr>
<td>1966/67</td>
<td>102.0</td>
</tr>
<tr>
<td>1967/68</td>
<td>87.4</td>
</tr>
<tr>
<td>1968/69</td>
<td>104.2</td>
</tr>
<tr>
<td>1969/70</td>
<td>113.6</td>
</tr>
<tr>
<td>1970/71</td>
<td>110.1</td>
</tr>
<tr>
<td>1971/72</td>
<td>153.7</td>
</tr>
<tr>
<td>1972/73</td>
<td>126.8</td>
</tr>
<tr>
<td>1973/74</td>
<td>136.8</td>
</tr>
</tbody>
</table>

\text{c/ Actual results for the fiscal years 1963/64 to 1971/72; calculated results for the fiscal years 1972/73 and 1973/74.}

\text{d/ Some social costs, earlier excluded, are included for the fiscal years 1972/73 and 1973/74.}

\text{e/ The price corrections, to remove the price increases caused by inflation, for the fiscal years 1972/73 and 1973/74 are based on an assumption of 4 per cent price increases per year.}
III.2 The Swedish defence expenditures related to the gross national product (GNP) and total public expenditures

(a) The "military defence" expenditures as a percentage of the GNP to factor costs, 1961/62-1971/72

<table>
<thead>
<tr>
<th>Year</th>
<th>Per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1961/62</td>
<td>4.38</td>
</tr>
<tr>
<td>1962/63</td>
<td>4.53</td>
</tr>
<tr>
<td>1963/64</td>
<td>4.44</td>
</tr>
<tr>
<td>1964/65</td>
<td>4.29</td>
</tr>
<tr>
<td>1965/66</td>
<td>4.56</td>
</tr>
<tr>
<td>1966/67</td>
<td>4.20</td>
</tr>
<tr>
<td>1967/68</td>
<td>4.04</td>
</tr>
<tr>
<td>1968/69</td>
<td>3.86</td>
</tr>
<tr>
<td>1969/70</td>
<td>3.73</td>
</tr>
<tr>
<td>1970/71</td>
<td>3.75</td>
</tr>
<tr>
<td>1971/72</td>
<td>3.78</td>
</tr>
</tbody>
</table>

(b) The "total defence" expenditures as a percentage of the GNP to factor costs, 1963/64-1971/72

<table>
<thead>
<tr>
<th>Year</th>
<th>Per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1963/64</td>
<td>4.99</td>
</tr>
<tr>
<td>1964/65</td>
<td>4.95</td>
</tr>
<tr>
<td>1965/66</td>
<td>5.09</td>
</tr>
<tr>
<td>1966/67</td>
<td>4.87</td>
</tr>
<tr>
<td>1967/68</td>
<td>4.65</td>
</tr>
<tr>
<td>1968/69</td>
<td>4.49</td>
</tr>
<tr>
<td>1969/70</td>
<td>4.28</td>
</tr>
<tr>
<td>1970/71</td>
<td>4.16</td>
</tr>
<tr>
<td>1971/72</td>
<td>4.20</td>
</tr>
</tbody>
</table>
(c) The "military defence" expenditures as a percentage of total public expenditures (federal budget)

<table>
<thead>
<tr>
<th>Year</th>
<th>Per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1961/62</td>
<td>17.53</td>
</tr>
<tr>
<td>1962/63</td>
<td>17.38</td>
</tr>
<tr>
<td>1963/64</td>
<td>17.45</td>
</tr>
<tr>
<td>1964/65</td>
<td>15.97</td>
</tr>
<tr>
<td>1965/66</td>
<td>16.08</td>
</tr>
<tr>
<td>1966/67</td>
<td>14.18</td>
</tr>
<tr>
<td>1967/68</td>
<td>13.38</td>
</tr>
<tr>
<td>1968/69</td>
<td>12.83</td>
</tr>
<tr>
<td>1969/70</td>
<td>12.05</td>
</tr>
<tr>
<td>1970/71</td>
<td>12.04</td>
</tr>
<tr>
<td>1971/72</td>
<td>11.26</td>
</tr>
<tr>
<td>1972/73</td>
<td>11.23</td>
</tr>
<tr>
<td>1973/74</td>
<td>11.00</td>
</tr>
</tbody>
</table>

*f/ See foot-note d/, table III.1 (c).

(d) The "total defence" expenditures as a percentage of total public expenditures (federal budget)

<table>
<thead>
<tr>
<th>Year</th>
<th>Per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1963/64</td>
<td>19.62</td>
</tr>
<tr>
<td>1964/65</td>
<td>18.41</td>
</tr>
<tr>
<td>1965/66</td>
<td>17.94</td>
</tr>
<tr>
<td>1966/67</td>
<td>16.46</td>
</tr>
<tr>
<td>1967/68</td>
<td>15.39</td>
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<tr>
<td>1968/69</td>
<td>14.93</td>
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<tr>
<td>1969/70</td>
<td>13.84</td>
</tr>
<tr>
<td>1970/71</td>
<td>13.38</td>
</tr>
<tr>
<td>1971/72</td>
<td>12.52</td>
</tr>
<tr>
<td>1972/73</td>
<td>11.96</td>
</tr>
<tr>
<td>1973/74</td>
<td>11.80</td>
</tr>
</tbody>
</table>
III.3 The distribution of Swedish military expenditures in terms of procurement, personnel, research and development, capital investment and other purposes, 1962/63-1973/74

<table>
<thead>
<tr>
<th></th>
<th>Total military expenditure</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Procurement</td>
<td>Per cent</td>
<td>Per cent</td>
<td>Per cent</td>
<td>Per cent</td>
<td>Per cent</td>
</tr>
<tr>
<td>1976/77 a/</td>
<td>1 990</td>
<td>27.0</td>
<td>2 425</td>
<td>32.9</td>
<td>646</td>
<td>8.8</td>
</tr>
<tr>
<td>1975/76 a/</td>
<td>1 968</td>
<td>27.4</td>
<td>2 448</td>
<td>32.3</td>
<td>663</td>
<td>6.9</td>
</tr>
<tr>
<td>1974/75 a/</td>
<td>1 892</td>
<td>27.2</td>
<td>2 490</td>
<td>32.5</td>
<td>649</td>
<td>6.9</td>
</tr>
<tr>
<td>1973/74 b/</td>
<td>1 968</td>
<td>27.0</td>
<td>2 428</td>
<td>32.3</td>
<td>653</td>
<td>8.8</td>
</tr>
<tr>
<td>1972/73 b/</td>
<td>1 968</td>
<td>27.4</td>
<td>2 448</td>
<td>32.3</td>
<td>663</td>
<td>6.9</td>
</tr>
<tr>
<td>1971/71 c/</td>
<td>1 968</td>
<td>27.0</td>
<td>2 428</td>
<td>32.3</td>
<td>653</td>
<td>8.8</td>
</tr>
<tr>
<td>1969/70 c/</td>
<td>1 968</td>
<td>27.0</td>
<td>2 428</td>
<td>32.3</td>
<td>653</td>
<td>8.8</td>
</tr>
<tr>
<td>1968/69 c/</td>
<td>1 968</td>
<td>27.0</td>
<td>2 428</td>
<td>32.3</td>
<td>653</td>
<td>8.8</td>
</tr>
<tr>
<td>1967/68 c/</td>
<td>1 968</td>
<td>27.0</td>
<td>2 428</td>
<td>32.3</td>
<td>653</td>
<td>8.8</td>
</tr>
<tr>
<td>1966/67 c/</td>
<td>1 968</td>
<td>27.0</td>
<td>2 428</td>
<td>32.3</td>
<td>653</td>
<td>8.8</td>
</tr>
<tr>
<td>1965/66 c/</td>
<td>1 968</td>
<td>27.0</td>
<td>2 428</td>
<td>32.3</td>
<td>653</td>
<td>8.8</td>
</tr>
<tr>
<td>1964/65 c/</td>
<td>1 968</td>
<td>27.0</td>
<td>2 428</td>
<td>32.3</td>
<td>653</td>
<td>8.8</td>
</tr>
<tr>
<td>1963/64 c/</td>
<td>1 968</td>
<td>27.0</td>
<td>2 428</td>
<td>32.3</td>
<td>653</td>
<td>8.8</td>
</tr>
<tr>
<td>1962/63 c/</td>
<td>1 968</td>
<td>27.0</td>
<td>2 428</td>
<td>32.3</td>
<td>653</td>
<td>8.8</td>
</tr>
</tbody>
</table>

* The total figures in this table are not fully consistent with the figures in table III.1 (b) due to a different statistical method.

a/ For the fiscal years 1974/75 to 1976/77 the basis for planning is a horizontal cost development in real terms.

b/ For the fiscal years 1972/73 and 1973/74 total costs are calculated results in current prices. The comparatively large changes in values from fiscal year 1971/72 are to a certain extent attributable to a change in statistical methods.

c/ For the fiscal years 1962/63 to 1971/72 total costs are actual results in current prices.
III.4 The level and trend of employment of manpower within the Swedish defence organization and in defence-related activities

The Swedish National Defence is based on general military conscription and so the country has no professional armed forces. This means that in addition to permanently employed personnel, the National Defence utilizes a large number of conscripted personnel for training. Slightly less than one third of defence expenditure covers the costs for permanently employed personnel. The remaining two thirds is used to purchase goods and services from other sectors of the economy. Labour is thus tied up in production for defence purposes.

(a) Manpower directly and indirectly employed in production for defence in Sweden for the years 1958, 1964 and 1968

<table>
<thead>
<tr>
<th></th>
<th>Number employed in different years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1958</td>
</tr>
<tr>
<td>By the defence authorities,</td>
<td></td>
</tr>
<tr>
<td>employees (a)</td>
<td>51,000</td>
</tr>
<tr>
<td>Conscripts in military training,</td>
<td></td>
</tr>
<tr>
<td>man-years (b)</td>
<td>52,000</td>
</tr>
<tr>
<td>Employees in other sectors engaged</td>
<td></td>
</tr>
<tr>
<td>in production for defence (c)</td>
<td>55,000</td>
</tr>
<tr>
<td>Total engaged in defence</td>
<td></td>
</tr>
<tr>
<td>(a + b + c) (d)</td>
<td>158,000</td>
</tr>
<tr>
<td>Total labour force (e)</td>
<td>3,510,000</td>
</tr>
<tr>
<td>(d) as a percentage of (e)</td>
<td>4.5</td>
</tr>
</tbody>
</table>

It is apparent that the number of conscripts expressed as the number of man-years utilized, has remained rather unchanged during the years shown. This is because the extent of the training is primarily determined by the size of the appropriate age group year after year. Thus utilization of available labour for this purpose is not influenced by the usual economic laws and principles but is more or less exogenously given.

The total volume of goods and services bought by the National Defence from other sectors of the economy increased only insignificantly between 1964 and 1972. It is therefore natural that the numbers employed in production for defence decreased owing to increases in productivity within the delivering sectors.
The number of permanent employees in the National Defence has been rather constant during the entire period. The savings in personnel which rationalization and normal increases in productivity within the National Defence have resulted in, have thus been employed for other purposes within the defence authorities. A certain proportion of the gains in productivity have, however, probably been used to compensate for decreases in the length of the work week.

The last line in the table gives the proportion of the total labour force within Sweden utilized for defence purposes. It should be remembered, though, that defence expenditure includes a large proportion of imported goods and services. Calculations show that about three fourths of the goods and services purchased by the National Defence utilize domestic productive capacity while one fourth utilizes the productive capacities of other countries. These imported goods and services must be paid for, however. It can thus be assumed that about 16,000 persons are employed in production of the goods which must be exported to balance the imports caused by defence expenditure. The proportion of the economy's labour resources utilized for defence production in 1964 in this wider meaning would then increase to about 4.6 per cent. To obtain an approximation for the society's costs for military defence, the percentages in the last line of the table should thus be increased by 0.4 percentage points.

It should be noticed that both the numbers employed by the defence authorities and the numbers employed in other sectors engaged in production for defence have somewhat decreased since 1968.

(b) Manpower directly employed by the defence authorities is apparent from the following table with figures for September 1972 (within parentheses) and for March 1973

<table>
<thead>
<tr>
<th></th>
<th>Military personnel</th>
<th>Civilian-military personnel</th>
<th>Civilian personnel</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Armed Forces</td>
<td>(8,537)</td>
<td>(1,010)</td>
<td>(9,796)</td>
<td>(19,343)</td>
</tr>
<tr>
<td></td>
<td>8,485</td>
<td>999</td>
<td>9,642</td>
<td>19,126</td>
</tr>
<tr>
<td>Naval Forces</td>
<td>(3,599)</td>
<td>(192)</td>
<td>(4,367)</td>
<td>(8,158)</td>
</tr>
<tr>
<td></td>
<td>3,608</td>
<td>173</td>
<td>4,312</td>
<td>8,093</td>
</tr>
<tr>
<td>Air Forces</td>
<td>(2,261)</td>
<td>(2,725)</td>
<td>(5,124)</td>
<td>(10,110)</td>
</tr>
<tr>
<td></td>
<td>2,238</td>
<td>2,706</td>
<td>5,061</td>
<td>10,005</td>
</tr>
<tr>
<td>Central and regional staffs</td>
<td>(1,176)</td>
<td>(202)</td>
<td>(2,338)</td>
<td>(3,716)</td>
</tr>
<tr>
<td></td>
<td>1,190</td>
<td>206</td>
<td>2,288</td>
<td>3,684</td>
</tr>
<tr>
<td>Central agencies and functions</td>
<td>(668)</td>
<td>(162)</td>
<td>(8,370)</td>
<td>(9,200)</td>
</tr>
<tr>
<td></td>
<td>686</td>
<td>154</td>
<td>8,299</td>
<td>9,139</td>
</tr>
<tr>
<td>Total military defence</td>
<td>(16,241)</td>
<td>(4,291)</td>
<td>(29,995)</td>
<td>(50,527)</td>
</tr>
<tr>
<td></td>
<td>16,207</td>
<td>4,238</td>
<td>29,602</td>
<td>50,047</td>
</tr>
<tr>
<td>Percentage distribution</td>
<td>(32.1%)</td>
<td>(8.5%)</td>
<td>(59.4%)</td>
<td>(100%)</td>
</tr>
<tr>
<td></td>
<td>32.4%</td>
<td>8.5%</td>
<td>59.1%</td>
<td>100%</td>
</tr>
</tbody>
</table>

a/ Specially educated military personnel, e.g. technicians.
The level and trend of manpower and financial resources devoted to research and development for defence purposes

It can be estimated that technical and scientific research and development activities in Sweden in 1964 corresponded to about 1.5 per cent of the GNP. Partial studies indicate that this proportion has since increased and that it was 1.7 per cent in 1967.

The level and development of the total human and financial resources devoted to research and the portions devoted to primarily military purposes are apparent from the following tables. The total costs for purchase by the National Defence of specific research and development projects is given in the research statistics (line c). This is, however, not true to the same extent for the other sectors of the economy. Thus it would seem that the statistics overestimate the National Defence's proportion of the total research and development costs.

The data have been collected using surveys from the recipients of research commissions. Such recipients, who have deeper insights into the problem area than the client, do not consider the whole project as research and development. This is an important explanation for the difference between the figures given here and those to be found in table III.3.

(a) Financial resources for research and development. Current prices*

(In millions of Swedish crowns)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total research and development (a)</td>
<td>981</td>
<td>1,013</td>
<td>1,148</td>
<td>1,293</td>
<td>1,513</td>
</tr>
<tr>
<td>Defence research at government authorities and institutions (b)</td>
<td>100</td>
<td>100</td>
<td>103</td>
<td>104</td>
<td>103</td>
</tr>
<tr>
<td>Government-financed defence research in industry (c)</td>
<td>220</td>
<td>172</td>
<td>180</td>
<td>200</td>
<td>240</td>
</tr>
<tr>
<td>Defence research as a percentage of all research, (b) + (c) as a percentage of (a)</td>
<td>32%</td>
<td>27%</td>
<td>.25%</td>
<td>24%</td>
<td>23%</td>
</tr>
</tbody>
</table>

* Statistics from more recent years on the matter shown in tables (a) and (b) are not at present available but can, if necessary, be worked out for future discussions.
(b) Human resources for research and development. Number of man-years

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total research and development (a)</td>
<td>19,800</td>
<td>21,169</td>
<td>22,068</td>
<td>22,974</td>
<td>23,200</td>
</tr>
<tr>
<td>Defence research at government authorities and institutions (b)</td>
<td>2,000</td>
<td>2,079</td>
<td>2,112</td>
<td>2,122</td>
<td>2,100</td>
</tr>
<tr>
<td>Government-financed defence research in industry (c)</td>
<td>4,570</td>
<td>3,840</td>
<td>3,515</td>
<td>3,980</td>
<td>3,500</td>
</tr>
<tr>
<td>Defence research as a percentage of all research, (b) + (c) as a percentage of (a)</td>
<td>35%</td>
<td>28%</td>
<td>25%</td>
<td>26%</td>
<td>25%</td>
</tr>
</tbody>
</table>

As can be seen from the tables, more and more human and financial resources are being devoted to research and development activities. The increase is restricted to research having civilian character. The procurement of munitions has remained at an approximately unchanged volume, over a period of time, and as a result of this it is reasonable that the absolute volume of the resources devoted to research and development of a military character should also have remained constant or decreased slightly.

Thus, military research and development in Sweden utilizes a large proportion of the limited supply of qualified researchers and scientists. However, it should be pointed out that the National Defence does not utilize a certain portion of a given number of researchers. The National Defence's demand for researchers has been one of the reasons why education of researchers and scientists has been carried out to the extent which has been the case and that the supply of researchers is as big as it is. The number of research workers used for military research and development has been fairly constant during recent years and so defence research has decreased in proportion to the total research efforts.

III.6 Cost growth within the defence sector

As in many other countries the tendency towards rapid increases in personnel costs is observable in Sweden. At the same time investments in new technology have run up ever higher bills. A consequence of increased personnel costs has been for consumption, to some extent, to increase its share at the expense of investments. However we still spend about one third of our defence budget on new weapons, research and development and more than 5 per cent on new buildings and fortifications. That puts our investments close to 40 per cent of our defence budget - an internationally high figure.
III.7 The level, trend and structure of defence-related imports and exports and provided or received military aid* **


(In millions of Swedish crowns)

<table>
<thead>
<tr>
<th>Year</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1969</td>
<td>230.6</td>
</tr>
<tr>
<td>1970</td>
<td>204.1</td>
</tr>
<tr>
<td>1971</td>
<td>98.8</td>
</tr>
<tr>
<td>1972</td>
<td>173.9</td>
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<td>1973</td>
<td>250.2</td>
</tr>
<tr>
<td>1974</td>
<td>210.6</td>
</tr>
</tbody>
</table>

* It should be noted that the year-to-year movements in the figures presented in this section often are rather erratic, due to the fact that the figures are affected by dominant import/export projects.

** The figures presented include direct import and export only and no licensing fees. Precise estimates of the latter may be produced.

a/ Including non-military products consumed/paid by the Swedish defence.

b/ Estimates are made in October each year, except for 1974, where the figure is estimated in March.
(b) Estimated values of Swedish imports of military equipment 1969-1974, distributed by suppliers. Current prices

(In millions of Swedish crowns)

<table>
<thead>
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<td>4.2</td>
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<td>Britain and Northern Ireland</td>
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(c) Estimated values of Swedish imports of military equipment 1974, classified by kind of equipment. Current prices

<table>
<thead>
<tr>
<th>Equipment Type</th>
<th>Value (in millions of Swedish crowns)</th>
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<tr>
<td>Electrical and telephone equipment</td>
<td>83.1</td>
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<tr>
<td>Oil</td>
<td>31.5</td>
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<tr>
<td>Engine equipment</td>
<td>24.5</td>
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<tr>
<td>Aircraft and helicopter equipment</td>
<td>19.5</td>
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<tr>
<td>Missile equipment</td>
<td>18.5</td>
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<tr>
<td>Vehicle equipment</td>
<td>13.1</td>
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<tr>
<td>Weapon and ammunition</td>
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<tr>
<td>Warship equipment</td>
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<td>Shelter equipment</td>
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<tr>
<td>Bridge equipment</td>
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<td>Optical equipment</td>
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<tr>
<td>Other</td>
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<td><strong>Total</strong></td>
<td><strong>210.6</strong></td>
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(d) Total values of Swedish exports of military equipment 1964-1973. Current prices

<table>
<thead>
<tr>
<th>Year</th>
<th>Value (in millions of Swedish crowns)</th>
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<td>1972</td>
<td>359.0</td>
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<tr>
<td>1973</td>
<td>333.7</td>
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</tbody>
</table>

(e) Sweden does not provide any military aid and has no military expenditures abroad except for advances for United Nations troops and neither does Sweden receive any military aid from abroad.
India has been at loggerheads, in one way or another, with practically all its neighbours. The most serious differences have been with Pakistan and China. As far as we are concerned, we set in train the process of normalizing relations with India at Simla two years ago and there has been a step-by-step progress in that direction. As far as China is concerned, it has officially declared that with the implementation of Security Council resolution 307 (1971), it is looking forward to the establishment of normal relations with all States of the subcontinent. Unless India seeks to reverse this evolution we cannot see relevance of this nuclear exercise to the immediate political setting of the subcontinent.

Moreover, we must realize that the exercise of nuclear threat by a nuclear-weapon Power against a non-nuclear-weapon country is something which affects not only the victim but also the entire international community, particularly the great Powers. Let us not, therefore, feel that we cannot secure political counter-measures against a potential nuclear threat from India. We shall not let ourselves be alone in facing this challenge. India has dynamited and shattered to pieces the non-proliferation treaty. This is bound to embolden Israel and South Africa to further work of demolition. It is not only we, therefore, but the Asian-African community that has been exposed to a new menace.

There is, therefore, no reason why Pakistan should abandon its efforts to explore the possibility of a political action against nuclear threat. Inasmuch as proliferation of nuclear weapons is a danger to the whole world, the United Nations has a clear and pressing duty to address itself more vigorously to the question of credible security assurances against nuclear threat or blackmail to all non-nuclear-weapon States. The existing assurances extended by the Security Council lack credibility. Nor can the United States-Soviet statement to act jointly to prevent nuclear war inspire sufficient confidence among victims of would-be nuclear aggressors. What is needed is a joint undertaking in the nature of an obligation by all the permanent members of the Security Council to act collectively or individually on behalf of the threatened State. In other words, a nuclear umbrella of all five great Powers or, failing that, of at least one of them is the irreducible minimum of protection that is required to give States like Pakistan a real assurance of security against nuclear threat or blackmail.

It has to be understood by all concerned Powers that Pakistan's anxiety in this respect cannot but be unparalleled. No two among the five great nuclear-weapon Powers - the United States, the Soviet Union, China, France and Britain - have had a history of confrontation and wars between them in contemporary times or in the past remotely comparable to the relations between India and Pakistan. In
barely a quarter century between 1947 and 1971, India has gone to war three times against Pakistan. Throughout this period India has spurned all possible methods of peaceful settlement of its disputes with Pakistan. The last war was the result of India's armed intervention in order to bring about the disintegration of Pakistan. Against this background, which is unique in the present age, we repeatedly warned the great Powers and also Canada that India would betray its assurances and its bilateral agreement with Canada and explode a nuclear device in order to claim the status of a nuclear-weapon Power. These warnings went unheeded. Meanwhile over two decades India steadily acquired nuclear know-how, built a plutonium device of the type it exploded in Rajasthan on Saturday, 18 May 1974. This production took place in a Canada-India reactor which was supplied on the express understanding that it would be used for constructive purposes only. I am not surprised and hardly relieved that the Canadian Government has expressed itself as very disturbed by the announcement of the Indian explosion and has termed it a severe setback to international efforts to prevent nuclear testing and the proliferation of nuclear weapons.

Such statements, while welcome in intent, cannot assuage our fears. Given the brutal fact of the 18 May explosion, Pakistan cannot be expected to rest on technicalities and protocol. It would be unfair, indeed immoral, that India's flagrant violation of non-proliferation assurances should make nuclear-weapon Powers resort to the double perversity of not only condoning it but also giving it a blessing by putting a stop or imposing restrictions on normal nuclear programmes of other States.

Indeed at this stage we are taking steps to secure a political ensurance against India's use of nuclear threat and I can announce some of these steps; we are formally approaching the Secretary-General of the United Nations and I am also sending the Foreign Secretary to China, France and Britain to explain our position to their Governments. I am visiting the Soviet Union myself and will take up this question with the Soviet leaders. I have asked the Minister of State for Foreign Affairs and Defence to raise this issue at the Central Treaty Organization (CENTO) meeting, Washington D.C., and to hold urgent discussions with officials of the United States Government. He will thereafter go to Canada, which has made a singular contribution to India's nuclear capability. I am also addressing letters to Heads of States and Governments of all nuclear-weapon States.
This does not come as a surprise to us. We have been repeatedly warning the United Nations, particularly the nuclear-weapon Powers and the international community, for a decade that India's ambitious nuclear programme aimed at equipping itself with a nuclear option was being undertaken to carry out a nuclear weapon explosion and stake a claim to the status of a nuclear-weapon Power.

It must be stated that the news of the underground nuclear explosion by India is a development which cannot but be viewed with the degree of concern matching its magnitude by the whole world and, more especially, by India's immediate neighbours. This concern can in no way be alleviated by India's contentions that the test had been carried out for peaceful purposes. It is an incontrovertible fact, stressed by the super-Powers themselves, that there is no difference between the explosion of a so-called peaceful nuclear device and the detonation of a nuclear weapon. Therefore, any State which explodes a so-called peaceful nuclear device stands as much in violation of the non-proliferation treaty as the one which tests it for military purposes. Hence, India's disavowal of intention to produce nuclear weapons is lacking in credibility.

The principal aim of the non-proliferation treaty, which was concluded in 1968 under the sponsorship and aegis of the United States and the Union of Soviet Socialist Republics, was to prevent the further spread of nuclear weapons among States other than the then five nuclear-weapon Powers, namely, themselves and France, Britain and the People's Republic of China. Now that India has taken the fateful step, throwing restraint to the winds and in contradiction to its earlier disavowal of designs to carry out a nuclear explosion, the efforts of the United Nations and the international community since the Moscow partial test ban treaty of 1963 to curb the nuclear arms race have been rendered futile. The non-proliferation treaty has been dealt a death blow.
6. INDIA

Text of the official announcement made by the Department of Atomic Energy, Government of India, regarding the underground peaceful nuclear explosion experiment conducted on 18 May 1974 (CCD/424)

The Atomic Energy Commission, Government of India, announced today that it carried out a peaceful nuclear explosion experiment using an implosion device. The explosion was carried out at a depth of more than 100 metres.

As part of the programme of study of peaceful uses of nuclear explosion, the Government of India had undertaken a programme to keep itself abreast of developments in this technology, particularly with reference to its use in the field of mining and earth-moving operations.

The Atomic Energy Commission, Government of India, also stated that India had no intention of producing nuclear weapons, and reiterated its strong opposition to military uses of nuclear explosions.

7. INDIA

Statement made by the Minister for External Affairs of India on 21 May 1974 on the peaceful underground nuclear explosion conducted by the Atomic Energy Commission of India on 18 May 1974 (CCD/425)

We are very happy to note that the peaceful nuclear experiment which took place on 18 May 1974 represents a step forward on the road to peaceful uses of nuclear energy for the welfare of our people. I would like to congratulate our scientists and others who have made possible this achievement by our country. This experiment is an important landmark in the development of nuclear technology for peaceful and economic uses. We have no intention of developing nuclear weapons.

Indian scientists and technologists have been active in this field for two decades; and it is well known that already two atomic power plants are supplying nuclear energy into our national power grid for the use of our people. The present experiment is important because it represents our resolve to develop our indigenous resources of energy for the benefit of our people through our own efforts. In performing this scientific test, India has not violated any of her international obligations. We are heartened by the enthusiastic support which we have received in this endeavour from countries of the developing world.
It is singularly unfortunate that the peaceful nature of this nuclear experiment of ours should be misconstrued and misread in Pakistan. Apprehensions aroused in Pakistan are unfounded. We value our commitment under the Simla Agreement to settle all our differences with Pakistan by peaceful and bilateral means. Moreover, both countries have resolved that past policies of confrontation and conflict are banished for ever.

We hope therefore that whatever misconception has arisen in Pakistan about this experiment will be replaced after cool reflection by more objective and realistic assessment. India has always supported development of co-operation amongst countries of this region on the basis of sovereign equality. Pakistan's allegations of hegemonistic designs have no basis at all and are, to say the least, uncharitable.

8. CANADA

Text of a statement by the Secretary of State for External Affairs of Canada, the Honourable Mitchell Sharp, on 22 May 1974 (CCD/426)

As I mentioned in my statement on 18 May, the Government was very disturbed by the announcement that India had exploded a nuclear device and today Cabinet has been giving serious study to the implications of this unfortunate development.

Our concern is related to two important aspects. First, we are concerned as to the effect that India's action, whatever its motivation, will have on international efforts, to which Canada has been an active party, to limit and control the proliferation of nuclear explosion technology for which there can be no distinction between peaceful and potential military application. For all intents and purposes, therefore, India now has developed the capability of producing a nuclear weapon. Many years ago Canada could have developed a similar capability but we chose not to do so because of our view that the dubious advantages of having our own explosive device were far outweighed by the dangers to world peace and security. The development of this technology by India is bound to have serious and widespread repercussions throughout Asia and the world.

Secondly, we are very distressed and concerned that this latest member of the nuclear club should be a country with which successive Canadian Governments have carried on over the past two decades extensive co-operation in the nuclear energy field. This long-standing co-operation with India in the nuclear energy field has involved the gift, under the Colombo Plan, of a nuclear research reactor; the provision of credit, expertise, materials and fuel for two electric generating reactors, and a variety of technical exchanges and training of personnel, etc. All of this assistance was intended to help India in meeting the critical energy needs of the Indian people and was provided to, and accepted by,
India on the basis that it would be used for peaceful purposes only. We have made it clear in international discussions and in bilateral exchanges with India that the creation of a nuclear explosion for so-called peaceful purposes could not be considered as a peaceful purpose within the meaning of our co-operative arrangements.

Canada continues to attach great importance to its general relations with India and remains anxious to contribute to the economic and social progress of the Indian people. It fully respects India's sovereignty and independence in all matters. It cannot, however, be expected to assist and subsidize, directly or indirectly, a nuclear programme which, in a key respect, undermines the position which Canada has for a long time been firmly convinced is best for world peace and security.

In view of the serious implications internationally and for our bilateral relations resulting from India's explosion of a nuclear device, Canada intends to reassess its nuclear co-operation with India as the Prime Minister had warned the Prime Minister of India, Mrs. Indira Gandhi, would be done if India developed such a device. We are seeking information from India on the source of the plutonium used in the explosion and on the specific ways in which they expect this nuclear explosion technique will benefit Indian economic development commensurate with the costs involved. Atomic Energy of Canada Limited has recalled for discussions Mr. Morrow, its resident representative in Bombay. The Canadian Government has suspended shipments to India of nuclear equipment and material and has instructed AECL, pending clarification of the situation, to suspend its co-operation with India regarding nuclear reactor projects and the more general technological exchange arrangements which it has with the Indian Atomic Energy Commission.

Canada will propose early discussions with India on future relations between our two countries, including, in particular, a discussion on the implications of this latest development for India's economic priorities. Canada is conscious of the very large costs involved in the normal development of nuclear energy for peaceful purposes and we have an appreciation of the substantial additional resources, material, managerial and technical, which must be devoted to the development of explosive devices. Canada does not intend to share the burden of relieving such costs. As a result, the Canadian Government is not prepared at this time to agree to any roll-over of India's commercial debt to Canada, which is largely related to India's nuclear energy programme. The Canadian Government, however, does not plan to interrupt its continuing programme of food and agricultural aid to the subcontinent although it will be reviewing other elements in the aid programme in consultation with the Indian authorities.

I am informing the Indian High Commissioner (Ottawa) of the steps outlined above.

With regard to the broader international implications of India's nuclear explosion, Cabinet has directed that officials enter into immediate consultations with a number of other Governments, including those which have been involved in India's nuclear development programme, signatories to the nuclear non-proliferation treaty and other members of the International Atomic Energy Agency.
Some observations on the draft convention on the prohibition of the development, production and stockpiling of chemical weapons and on their destruction presented by the delegation of Japan on 30 April 1974 (CCD/427)

The value of a future convention prohibiting development, production and stockpiling of chemical weapons will depend both on the final scope and on the temporary suspensions which may be prescribed. The final scope is established in article I of the draft convention presented by the delegation of Japan (CCD/420). The question of the more immediate scope is dealt with in article IV, which presents two main alternatives. Before discussing these two alternatives it might be helpful to present a general framework for reference to the different categories of chemical compounds.

A method for categorization

Each known chemical compound can be assigned to one point in a bounded surface (CC), as illustrated in the figure below.

![CC diagram](example)

CC = Chemical compounds

The concern of the present discussion is chemical warfare agents (CWA), represented in the figure below by a smaller bounded surface within the category of chemical compounds. Those chemical compounds which have peaceful uses are designated PCC. As some compounds or agents have both peaceful and warfare uses, the two areas PCC and CWA overlap to some extent. Thus, the figure shows the areas CWA and PCC as well as the overlap area DFWA, which represents the dual purpose agents.
CWA = Chemical warfare agents
DPWA = Dual purpose chemical warfare agents
PCC = Chemical compounds for peaceful use

By this presentation it is possible to categorize the chemical compounds covered - or not covered - by a convention. In this way, it is possible to describe the scope more illustratively.

The surfaces are of course not proportional to reality, since the whole surface represents millions of chemical compounds, while the chemical warfare agents* conceivably are only some few thousand compounds.

Interpretations of the Japanese draft convention

In the following we shall try to apply this method to the Japanese draft convention in the hope that this could possibly be of some assistance as to its proper understanding and further clarification. The figure below is intended to illustrate the present interpretation of the Swedish delegation in regard to the provisions of scope in the draft convention. Article I (a): "Chemical agents of types that have no justification for ... peaceful purposes" is interpreted to mean that the over-all scope of the draft excludes the DPWA and corresponds to the area CWA, in the figure above.

In addition article I (a) by its reference: "Chemical agents ... in quantities that have no justification ... for peaceful purposes" implies that unwarranted large quantities of DPWA are forbidden. (This sentence in article I could also be said to cover unwarranted quantities of such CWA, which are retained for research and development of protective measures.)

In the Swedish interpretation of annex I (A) 1, the area marked CSB inside the CWA area represents chemical warfare agents temporarily suspended from the ban by the schedule to this article.

* Chemical warfare agents are here taken to be chemical substances, whether gaseous, liquid, or solid, which might be employed because of their direct toxic effects on man, animals and plants.
The proposal of the delegation of Japan means - it would seem - that the schedule to this annex could include a suspension of the ban in article I (a) also on unjustified quantities of dual-purpose agents. This interpretation is illustrated in the figure above by that part of the area marked CSB which juts into the area DPWA.

The second sentence of annex I (B) indicates that the schedule to that annex lists obligatorily banned compounds, which would correspond to the area marked OBL in the figure above.

It seems to the Swedish delegation that the first sentence of annex I (B) 1 only reiterates annex I (A) 1. One consequence of this interpretation would be that a convention using alternative annex I (B) 1, must have two schedules. One schedule would list those chemical agents which could never be excluded from the ban ("the obligatories"), the other schedule would list suspensions. However, the existence of a schedule listing suspensions also in annex I (B) is not apparent in the draft convention.

One would also have to discuss to what categories components for binary chemical warfare agents belong, how yet undiscovered chemical warfare agents would be covered by the draft convention, etc.

This working paper deals only with the chemical compounds covered by the convention, but the same method of analysis could also be applied to the activities and the equipment covered by the draft convention, according to article I.

Questions

With reference to the analysis above the Swedish delegation would like to pose the following questions which could usefully be discussed at the meeting with experts on 17 July 1974.
(1) Are there any special intentions behind the use of the very comprehensive term "chemical agents" in the draft convention CCD/420, article I (a)?

(2) Would it be possible instead to use the expression "chemical warfare agents", as defined in the foot-note above and illustrated in the figure as the area CWA?

(3) Are components for binary production of chemical warfare agents clearly covered by the draft convention?

(4) Are dual-purpose agents covered by means of the quantity criterion in the draft convention, article I (a)?

(5) Although toxins are covered in the B-convention, would it not be necessary to state explicitly that they are covered also by a chemical convention?

(6) Will the schedule of annex I (A) be valid for all parties or will every party have its own list of exemptions to be accepted by other parties?

(7) Should a dual-purpose agent (DPWA) be exempted in the schedule of annex I (A) by a party who intends to retain it, or produce it, as a chemical warfare agent?

(8) Shall the schedule of unconditionally prohibited CW-agents in annex I (B) comprise both classes of agents, such as supertoxic agents, and individual agents, such as e.g. one particular nerve gas?

(9) Should annex I (B) have a list like annex I (A) of exempted agents (CSB)?

(10) Should it be possible to make both additions and subtractions in the schedules of annex I (A) and I (B) after the schedules have been agreed upon?

In comparison with the earlier Japanese working paper (CCD/413) the draft convention (CCD/420) is more comprehensive and less discriminatory, as it covers all activities, i.e., development, production, stockpiling and other ways of acquiring chemical agents, weapons, ammunition, equipment, means of delivery, etc.

However, this construction has another side as well. It seems that if a chemical warfare agent is exempt from the ban, the exemption automatically covers all activities connected with this chemical agent. Against this background also the following question could be discussed:

(11) Should particular activities under article I be subject to explicit exemptions from the ban under annex I (A) and possibly I (B)?
10. PAKISTAN

Text of the resolution on strengthening the security of non-nuclear States adopted by the Fifth Islamic Conference of Foreign Ministers, held at Kuala Lumpur from 21 to 25 June 1974 (CCD/420)

Recalling their traditional commitment herewith to the question of non-proliferation of nuclear weapons,

Noting that on 18 May 1974 India exploded a nuclear device, thus increasing the number of nuclear powers,

Considering that it is imperative for the international community to devise measures to assure the security of non-nuclear countries,

Further considering that it has become necessary to call for a reappraisal of the security assurances extended to non-nuclear-weapon States, in United Nations Security Council resolution 255 (1968) with a view to strengthening them:

1. Declares the firm support to the member countries of the Islamic Conference to the political independence, territorial integrity and State sovereignty of non-nuclear-weapon States against nuclear threat;

2. Recommends to member States to pursue without loss of time the question of strengthening the existing security assurances with a view to making them effective;

3. Calls upon all nuclear-weapon States to give a solemn undertaking in the nature of an obligation not to use or threaten to use nuclear weapons against any non-nuclear-weapon States.

11. NIGERIA

Letter dated 5 July 1974 from the Permanent Representative of Nigeria to the Special Representative of the Secretary-General to the Conference of the Committee on Disarmament (CCD/429)

I have the honour to refer to our conversation of 2 July 1974, regarding some minor errors and omissions which have, unfortunately, crept into the reproduction of my statement in your record of the 638th meeting of the Conference of the Committee on Disarmament (document CCD/PV.638 of 23 May 1974) and to reproduce hereunder the last sentence of the statement, as we discussed:

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"We are glad to note, however, that the Indian Government through its distinguished representative, Ambassador Mishra, has declared its intention to use its newly acquired nuclear capability solely and exclusively for peaceful purposes."

As I am anxious that a definitive version of my statement should be on record, I shall be glad if you will kindly consult the Co-Chairmen with a view to apprising the Committee of the particular omission to which I referred above.

(Signed) B. AKPORODE CLARK
Ambassador,
Permanent Representative

12. JAPAN

Working paper containing views of Japanese experts on the scope of prohibition and on the verification of organophosphorus compounds for the informal meetings with participation of experts of the Conference of the Committee on Disarmament in 1974 (CCD/430)

I. The scope of prohibition

Annex I, deriving from article IV of the "Draft convention on the prohibition of the development, production and stockpiling of chemical weapons and on their destruction" which was submitted by the delegation of Japan on 30 April 1974 (CCD/420), is expected to list, in the schedule, chemical agents provisionally suspended from the prohibition (Alternative A) or chemical agents to be prohibited from the beginning (Alternative B). Therefore, the content of the schedule will cause the scope of prohibition to vary at the first stage; however the scope should be determined by the adequacy of applied verification. In this connexion, in view of the present feasibility of effective verification measures, which is to be discussed in part II of this working paper, it will be realistic to list super-toxic organophosphorus compounds, among others, as chemical agents to be prohibited from the beginning, whether or not we adopt I (A) or I (B). Our views on the schedule of annex I are as follows:

1. Annex I (A) will list chemical agents provisionally suspended from the prohibition, namely, chemical agents other than the super-toxic organophosphorus compounds which are not used for peaceful purposes. One way of selecting these chemical agents may be to adopt the toxicity level of chlorine as a lower
threshold, as suggested in the Canadian working paper (CCD/414) 8/ and in the Swedish working paper (CCD/427) and to list dual-purpose chemical agents, placing organophosphorus compounds having the equivalent toxicity level of $L_{c50} = 20,000 \text{ mg} \cdot \text{min/m}^3$ on a lower threshold. However it must be noted that there is a difficulty in adopting this way in that few data have been disclosed concerning the inhalent toxicity value of organophosphorus compounds. This difficulty will be eliminated if more data are disclosed in some way or another or if it is agreed to replace it with the toxicity value determined by some other administration route such as the toxicity value determined by intraperitoneal administration, about which many data have already been published.

2. Annex I (B) is to list the chemical agents to be prohibited from the beginning, i.e., certain super-toxic organophosphorus compounds. In listing these, it is necessary to take into consideration three criteria: (i) a toxicity level ($L_{D50} = 0.62 \text{ mg/kg i.p.}, L_{D50} = 0.50 \text{ mg/kg S.O.}$) that Japan has suggested as an objective criterion; (ii) chemical formulae; (iii) whether or not chemical agents have no peaceful use. Mainly by the first two criteria, we have chosen, from published data, super-toxic organophosphorus compounds to be prohibited from the beginning and listed some of them as an example in table I.

In selecting the agents falling in these criteria, questions may arise concerning the ways of dealing with high toxic chemical agents used for peaceful purposes and not known to be used at present for military purposes, but which could potentially be used for the latter (e.g., Echothiophate used for medicine). It may seem illogical to list chemical agents for peaceful purposes in the schedule in so far as article I adopts purpose criteria, but, on the other hand, it may also be argued that they should be listed as dual-purpose chemical agents in view of their potentiality of being used for military purposes. In any case, whether or not we list them under the category of the prohibited chemical agents depends upon our judgement concerning the degree of their potentiality of being used for military purposes.

With regard to the toxicity level, the problem of international standardization concerning procedures of estimating lethal dose has yet to be solved. However, it will be made possible to make a list of chemical agents to be prohibited by selecting the lowest $L_{D50}$ value, measured under the condition that the same species and the same administration routes are employed, out of $L_{D50}$ values which have been reported and may be reported in the future.

---

8/ Ibid., Twenty-eighth Session, Supplement No. 31 (A/9141), annex II.
<table>
<thead>
<tr>
<th>No.</th>
<th>Chemical Name (Code Name)</th>
<th>Chemical formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Isopropyl methyl phosphonofluoridate (Sarin, GB)</td>
<td>(i-C_3H_7O)P(\equiv)OF</td>
</tr>
<tr>
<td>2.</td>
<td>Isopropyl ethyl phosphonofluoridate (Ethyl Sarin, GE)</td>
<td>(i-C_3H_7O)P(\equiv)OF</td>
</tr>
<tr>
<td>3.</td>
<td>3,3-Dimethylbutyl methyl phosphonofluoridate</td>
<td>((\text{CH}_3)_3)C(\equiv)OF</td>
</tr>
<tr>
<td>4.</td>
<td>Pinacolyl methyl phosphonofluoridate (Soman)</td>
<td>((\text{CH}_3)_3)C(\equiv)OF</td>
</tr>
<tr>
<td>5.</td>
<td>Cyclohexyl methyl phosphonofluoridate (GF)</td>
<td>(\text{CH}_3)P(\equiv)OF</td>
</tr>
<tr>
<td>6.</td>
<td>Ethyl N,N-dimethyl phosphoramidocyanidate (Tabun)</td>
<td>((\text{CH}_3)_2)N(\equiv)OF</td>
</tr>
</tbody>
</table>
7. Isopropyl N,N-dimethyl phosphoramidocyanidate

\[
(\text{CH}_3)_2 \text{N} \quad \xrightarrow{\text{P} \quad \text{CN}} \quad \text{i-C}_3\text{H}_7\text{O}
\]

8. 2-Trimethylammoniumethyl methyl phosphono-fluoridate iodide

\[
(\text{CH}_3)_3 \text{N} \quad \text{(CH}_2)_2\text{O} \quad \xrightarrow{\text{P} \quad \text{I}^-} \quad \text{CH}_3
\]

9. 3-Trimethylammoniumpropyl methyl phosphono-fluoridate iodide

\[
(\text{CH}_3)_3 \text{N} \quad \text{(CH}_2)_3\text{O} \quad \xrightarrow{\text{P} \quad \text{I}^-} \quad \text{CH}_3
\]

10. 2-Trimethylammonium-1-methylethyl methyl phosphonofluoridate iodide

\[
(\text{CH}_3)_3 \text{N} \quad \text{CH}_2\text{CH(\text{CH}_3)O} \quad \xrightarrow{\text{P} \quad \text{I}^-} \quad \text{CH}_3
\]

11. Dimethyl 1-methyl-2-carbomethoxyvinyl phosphate

(\text{\textalpha}-\text{phosdrin})

\[
\text{CH}_3\text{O} \quad \xrightarrow{\text{P} \quad \text{CH}_3} \quad \text{CH}_3\text{O} \quad \text{O-C} = \text{CHCOOCH}_3
\]

12. Diethyl 4-nitrophenyl phosphate (Paraoxon, E-600, Mintacol)

\[
\text{C}_2\text{H}_5\text{O} \quad \xrightarrow{\text{P} \quad \text{O-} \quad \text{NO}_2} \quad \text{C}_2\text{H}_5\text{O}
\]

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13. Ethyl 4-nitrophenyl ethylphosphonate (Armin)

\[
\begin{align*}
\text{C}_2\text{H}_5^0 & \quad \text{P} \quad \equiv \quad 0 \\
\text{C}_2\text{H}_5 & \quad \text{O} - \Phi\text{-NO}_2
\end{align*}
\]

14. Isopropyl 4-nitrophenyl methylphosphonate

\[
\begin{align*}
(\text{CH}_3)_2\text{CHO} & \quad \text{P} \quad \equiv \quad 0 \\
\text{CH}_3 & \quad \text{O} - \Phi\text{-NO}_2
\end{align*}
\]

15. 0,0-Diethyl S-ethylthiomethyl phosphorothioate

\[
\begin{align*}
\text{C}_2\text{H}_5^0 & \quad \text{P} \quad \equiv \quad 0 \\
\text{C}_2\text{H}_5 & \quad \text{SCH}_2\text{SC}_2\text{H}_5
\end{align*}
\]

16. 0,0-Diethyl S-ethylsulphinylmethyl phosphorothioate

\[
\begin{align*}
\text{C}_2\text{H}_5^0 & \quad \text{P} \quad \equiv \quad 0 \\
\text{C}_2\text{H}_5 & \quad \text{SCH}_2\text{S}-\text{C}_2\text{H}_5
\end{align*}
\]

17. 0,0-Diethyl S-ethylsulfonylmethyl phosphorothioate

\[
\begin{align*}
\text{C}_2\text{H}_5^0 & \quad \text{P} \quad \equiv \quad 0 \\
\text{C}_2\text{H}_5 & \quad \text{SCH}_2\text{S}-\text{C}_2\text{H}_5
\end{align*}
\]

18. 0,0-Diethyl S-(2-dimethylaminoethyl) phosphorothioate (217 AO)

\[
\begin{align*}
\text{C}_2\text{H}_5^0 & \quad \text{P} \quad \equiv \quad 0 \\
\text{C}_2\text{H}_5 & \quad \text{S(CH}_2)_2\text{N(CH}_3)_2
\end{align*}
\]

19. 0,0-Diethyl S-(2-diethylaminoethyl) phosphorothioate (Tetram, DSDP)
20. O-Ethyl S-(2-dimethylaminoethyl) methylphosphonothiolate (33 SN)

\[
\begin{align*}
\text{C}_2\text{H}_5^0 & \quad \text{P} \quad \equiv \quad 0 \\
\text{CH}_3 & \quad \text{S(CH}_2\text{)}_2 \text{N(C}_2\text{H}_5)_2 \\
\end{align*}
\]

21. O-Ethyl S-(2-diethylaminoethyl) methylphosphonothiolate (Edemo, VM)

\[
\begin{align*}
\text{C}_2\text{H}_5^0 & \quad \text{P} \quad \equiv \quad 0 \\
\text{CH}_3 & \quad \text{S(CH}_2\text{)}_2 \text{N(C}_2\text{H}_5)_2 \\
\end{align*}
\]

22. O-Ethyl S-(2-dimethylaminoethyl) ethylphosphonothiolate

\[
\begin{align*}
\text{C}_2\text{H}_5^0 & \quad \text{P} \quad \equiv \quad 0 \\
\text{C}_2\text{H}_5 & \quad \text{S(CH}_2\text{)}_2 \text{N(CH}_3\text{)}_2 \\
\end{align*}
\]

23. O-Ethyl S-(2-diethylaminoethyl) ethylphosphonothiolate (VE)

\[
\begin{align*}
\text{C}_2\text{H}_5^0 & \quad \text{P} \quad \equiv \quad 0 \\
\text{C}_2\text{H}_5 & \quad \text{S(CH}_2\text{)}_2 \text{N(C}_2\text{H}_5)_2 \\
\end{align*}
\]

24. O-Ethyl S-(2-methylphenylaminoethyl) methylphosphonothiolate (GT 23)

\[
\begin{align*}
\text{C}_2\text{H}_5^0 & \quad \text{P} \quad \equiv \quad 0 \\
\text{CH}_3 & \quad \text{S(CH}_2\text{)}_2 \text{N(C}_6\text{H}_5)_2 \\
\end{align*}
\]
25. O-Ethyl S-(2-piperidylaminoethyl) ethylphosphonothiolate

\[
\begin{align*}
C_2H_5O & \quad P \equiv O \\
C_2H_5 & \quad S(\text{CH}_2)_2 \text{NH-N}
\end{align*}
\]

26. O-Ethyl S-(2-diethylaminoethyl) i-propylphosphonothiolate

\[
\begin{align*}
C_2H_5O & \quad P \equiv O \\
i-C_3H_7 & \quad S(\text{CH}_2)_2 \text{N(C}_2\text{H}_5)_2
\end{align*}
\]

27. O-Ethyl S-(2-diethylaminoethyl) n-propylphosphonothiolate

\[
\begin{align*}
C_2H_5O & \quad P \equiv O \\
n-C_3H_7 & \quad S(\text{CH}_2)_2 \text{N(C}_2\text{H}_5)_2
\end{align*}
\]

28. O-Ethyl S-(2-diethylaminoethyl) n-butylphosphonothiolate

\[
\begin{align*}
C_2H_5O & \quad P \equiv O \\
n-C_4H_9 & \quad S(\text{CH}_2)_2 \text{N(C}_2\text{H}_5)_2
\end{align*}
\]

29. O-Ethyl S-(2-diethylaminoethyl) n-hexylphosphonothiolate

\[
\begin{align*}
C_2H_5O & \quad P \equiv O \\
n-C_6H_{13} & \quad S(\text{CH}_2)_2 \text{N(C}_2\text{H}_5)_2
\end{align*}
\]

30. O-Ethyl S-(2-diethylaminoethyl) cyclohexylphosphonothiolate

\[
\begin{align*}
C_2H_5O & \quad P \equiv O \\
\text{H} & \quad S(\text{CH}_2)_2 \text{N(C}_2\text{H}_5)_2
\end{align*}
\]
31. O-Hydrogen S-(2-diethylaminoethyl) methylphosphonothiolate (S 27)

\[
\begin{align*}
\text{HO} & \quad \text{P} \quad \text{O} \\
\text{CH}_3 & \quad \text{S(\text{CH}_2)_2 \text{N(C}_2\text{H}_5)_2}
\end{align*}
\]

32. O-Methyl S-(2-diethylaminoethyl) methylphosphonothiolate

\[
\begin{align*}
\text{CH}_3\text{O} & \quad \text{P} \quad \text{O} \\
\text{CH}_3 & \quad \text{S(\text{CH}_2)_2 \text{N(C}_2\text{H}_5)_2}
\end{align*}
\]

33. O-Isopropyl S-(2-diethylaminoethyl) methylphosphonothiolate (37 SN)

\[
\begin{align*}
\text{i-C}_3\text{H}_7\text{O} & \quad \text{P} \quad \text{O} \\
\text{CH}_3 & \quad \text{S(\text{CH}_2)_2 \text{N(C}_2\text{H}_5)_2}
\end{align*}
\]

34. O-Isopropyl S-(2-dimethylaminoethyl) methylphosphonothiolate

\[
\begin{align*}
\text{i-C}_3\text{H}_7\text{O} & \quad \text{P} \quad \text{O} \\
\text{CH}_3 & \quad \text{S(\text{CH}_2)_2 \text{N(CH}_3)_2}
\end{align*}
\]

35. O-Cyclopentyl S-(2-dimethylaminoethyl) methylphosphonothiolate

\[
\begin{align*}
\text{H} & \quad \text{O} \\
\text{CH}_3 & \quad \text{S(\text{CH}_2)_2 \text{N(CH}_3)_2}
\end{align*}
\]

36. O-Ethyl S-(2-diisopropylaminoethyl) methylphosphonothiolate
37. 0-Ethyl S-(2-diisopropylaminoethyl) ethyl-phosphonothiolate (VS)

\[
\begin{align*}
C_2H_5O & \quad P \equiv O \\
CH_3 & \quad S(CH_2)_2 N\text{(i-C}_3\text{H}_7)\text{}_2
\end{align*}
\]

38. 2-Diethylaminoethylthio diethyl phosphine oxide

\[
\begin{align*}
C_2H_5 & \quad P \equiv O \\
C_2H_5 & \quad S(CH_2)_2 N(C_2H_5)_2
\end{align*}
\]

39. 0-Ethyl S-(2-trimethylammoniumethyl) methyl-phosphonothiolate iodide

\[
\begin{align*}
C_2H_5O & \quad P \equiv O \\
CH_3 & \quad S(CH_2)_2 N\text{(CH}_3\text{)}_3 \quad I^-
\end{align*}
\]

40. 0,0-Diethyl S-(2-trimethylammoniumethyl) phosphorothioate iodide (Echothiophate, Phospholin)

\[
\begin{align*}
C_2H_5O & \quad P \equiv O \\
C_2H_5O & \quad S(CH_2)_2 N\text{(CH}_3\text{)}_3 \quad I^-
\end{align*}
\]

41. 0,0-Diethyl S-(2-triethylammoniumethyl) phosphorothioate iodide

\[
\begin{align*}
C_2H_5O & \quad P \equiv O \\
C_2H_5O & \quad S(CH_2)_2 N\text{(C}_2\text{H}_5\text{)}_3 \quad I^-
\end{align*}
\]
42. 0-Isopropyl S-(2-trimethylammoniumethyl) methylphosphonothiolate iodide

\[
\begin{align*}
(\text{CH}_3)_2\text{CHO} & \quad \text{P} \quad \text{O} \\
\text{CH}_3 & \quad \text{S(\text{CH}_2)_2}^+ \quad \text{N} \quad (\text{CH}_3)_3^- \quad \text{I}^-
\end{align*}
\]

43. 0,0-Dimethyl S-(4-oxo-3-H-1,2,3-benzotriazine-3-methyl) phosphorothioate (Guthion)

\[
\begin{align*}
\text{CH}_3\text{O} & \quad \text{P} \quad \text{O} \\
\text{CH}_3\text{O} & \quad \text{SCH}_2 \quad \text{N} \quad \text{C} \quad \text{C} \quad \text{N} \\
\text{O} & \quad \text{C} \quad \text{N} \quad \text{C} \quad \text{N} \\
\text{CH}_3\text{O} & \quad \text{SCH}_2 \quad \text{S} \quad \text{C}_2\text{H}_5
\end{align*}
\]

44. 0,0-Diethyl S-ethylsulphinylmethyl phosphorodithioate

\[
\begin{align*}
\text{C}_2\text{H}_5\text{O} & \quad \text{P} \quad \text{S} \\
\text{C}_2\text{H}_5\text{O} & \quad \text{SCH}_2 \quad \text{S} \quad \text{C}_2\text{H}_5
\end{align*}
\]

45. 0,0-Diethyl S-ethylsulfonylmethyl phosphorodithioate

\[
\begin{align*}
\text{C}_2\text{H}_5\text{O} & \quad \text{P} \quad \text{S} \\
\text{C}_2\text{H}_5\text{O} & \quad \text{SCH}_2 \quad \text{SO}_2\text{C}_2\text{H}_5
\end{align*}
\]

46. 0-Ethyl S-(ethylthiomethyl) ethylphosphonodithioate

\[
\begin{align*}
\text{C}_2\text{H}_5\text{O} & \quad \text{P} \quad \text{S} \\
\text{C}_2\text{H}_5 & \quad \text{SCH}_2 \quad \text{S} \quad \text{C}_2\text{H}_5
\end{align*}
\]

47. 0,0-Diethyl S-ethyl phosphorothioate

\[
\begin{align*}
\text{C}_2\text{H}_5\text{O} & \quad \text{P} \quad \text{O} \\
\text{C}_2\text{H}_5\text{O} & \quad \text{SC}_2\text{H}_5
\end{align*}
\]
48. O-Ethyl S-(2-ethylthioethyl) methylphosphonothioate

\[
\begin{align*}
C_2H_5O & \quad P \quad O \\
CH_3 & \quad S(CH_2)_2 \quad S \quad C_2H_5
\end{align*}
\]

49. O,0-Dimethyl S-[2-(S'-methyl-S'-ethylsulfonium) ethyl] phosphorothioate

\[
\begin{align*}
CH_3O & \quad P \quad O \\
CH_3O & \quad S(CH_2)_2 \quad + \quad C_2H_5 \\
& \quad C_2H_5
\end{align*}
\]

50. O,0-Diethyl S-[2-(S'-methyl-S'-ethylsulfonium) ethyl] phosphorothioate

\[
\begin{align*}
C_2H_5O & \quad P \quad O \\
C_2H_5O & \quad S(CH_2)_2 \quad + \quad C_2H_5 \\
& \quad C_2H_5 \\
& \quad CH_3
\end{align*}
\]

51. O,0-Diethyl S-[2-(S'-diethylsulfonium)ethyl] phosphorothioate

\[
\begin{align*}
C_2H_5O & \quad P \quad O \\
C_2H_5O & \quad S(CH_2)_2 \quad + \quad (C_2H_5)_2
\end{align*}
\]

52. O-(2-N-methyl-N-phenylamino)ethyl methyl phosphonofluoridate

\[
\begin{align*}
CH_3 & \quad P \quad O \\
& \quad O(CH_2)_2 \quad N \quad CH_3 \\
& \quad C_6H_5
\end{align*}
\]

53. Tetraethyl pyrophosphate (TEPP)
54. Tetraethyl monothionopyrophosphate

\[
\begin{align*}
\text{C}_2\text{H}_5^0 & \overset{\text{O}}{\text{P}} - \overset{\text{O}}{\text{P}} \overset{\text{O}}{\text{C}_2\text{H}_5} \\
\text{C}_2\text{H}_5^0 & \overset{\text{S}}{\text{P}} - \overset{\text{O}}{\text{P}} \overset{\text{O}}{\text{C}_2\text{H}_5}
\end{align*}
\]
II. Verification of super-toxic organophosphorus compounds

1. Various methods of verification which have so far been suggested in working papers and other forms by many countries can be classified and summarized in the following table.
<table>
<thead>
<tr>
<th>Verification modes</th>
<th>Methods of verification</th>
<th>Details of verification technique</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>On-site inspection</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(I) Direct inspection</td>
<td>(1) Investigation of Production, Equipment and Facilities, etc.</td>
<td>Experts from, for example, the IVA, etc., will investigate: the production-process, their equipment and facilities, and production control, etc.</td>
</tr>
<tr>
<td>(II) Indirect inspection</td>
<td>(2) Investigation of safety control on production, etc.</td>
<td>Experts from, for example, the IVA, etc., will investigate: the safety control on production equipment and facilities, and workers' health control, (e.g., measurement of cholinesterase activities), etc.</td>
</tr>
<tr>
<td>(III) Inspection by invitation</td>
<td>(3) Sampling and subsequent analysis</td>
<td>Application of the following analytical techniques: Gas-chromatography, Infrared- and Ultraviolet spectrophotometry, other chromatographic techniques (T.L.C., etc.), nuclear-magnetic resonance, Mass-spectrometry, etc.</td>
</tr>
<tr>
<td><strong>(4) Investigation of records and data</strong></td>
<td></td>
<td>Investigation of the following records and data: (1) the amounts of production, consumption, and loss in industry of the raw materials and intermediates for CW-agents; (2) records of budgets for production; (3) records of accidents in factories.</td>
</tr>
<tr>
<td>(5) Oral inquiry and questionnaires</td>
<td></td>
<td>Oral interrogation of and questionnaires answered by industry workers, managers, administrators, etc.</td>
</tr>
<tr>
<td>(6) Investigation of the surroundings of industries</td>
<td>(1) Sampling and subsequent analysis of the surroundings of industries. (2) Questioning the inhabitants of the surrounding areas of industries. (3) External observation of industries by photographic reconnaissance, etc.</td>
<td></td>
</tr>
<tr>
<td><strong>Verification methods other than on-site inspection</strong></td>
<td>(1) Remote Observation (remote sensors)</td>
<td>Monitoring by satellite and by neighbouring countries, etc.</td>
</tr>
<tr>
<td>(2) Statistical reporting systems</td>
<td></td>
<td>(1) Analysis of economic data involving the amounts of production, consumption, exports and imports for the raw-materials and the intermediates of CW-agents. (2) Analysis of the related data which should be submitted, etc.</td>
</tr>
<tr>
<td>(3) Surveillance of literatures</td>
<td></td>
<td>Surveillance of related information, as well as various literatures, including patent literature, such as chemical engineering, pyrotechnics, meteorology and military equipment, etc.</td>
</tr>
<tr>
<td>(4) Budgetary investigation</td>
<td></td>
<td>Investigation and inquiry of the records and data which the national organ has, and interrogation by questionnaire of all employees, e.g., administrators, managers, technicians, workers, etc., of the national organ, etc.</td>
</tr>
<tr>
<td>(5) Inquiry of records and data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(6) Inquiry by questionnaire</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(7) Others</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2. By choosing a good combination of the verification measures shown above or by taking certain steps which would supplement one verification measure, the most effective results in checking violations will be obtained. This has been recognized by a SIPRI publication as well as by the working papers of Japan (CCD/301), 9/ the United States (CCD/311, 9/ CCD/368 10/), Italy (CCD/373), 10/ Yugoslavia (CCD/377), 10/ Sweden (CCD/395) 11/ and the socialist countries (CCD/403). 11/

However, the crux of the matter lies in the need to satisfy two conflicting requirements: to obtain verification results reliable enough to be able to deter the non-compliance of the Convention and at the same time to minimize the burden of States Parties to the Convention. From this point of view the Japanese draft convention (CCD/420) places its major emphasis upon verifications other than inspection, considering non-intrusive verifications as supplementary measures. As for "Remote Observation (sensors)" in "Verification methods other than on-site inspection", of the table 2 shown above, it depends much upon further technological development. Therefore, of the "verification methods other than on-site inspection", (2) to (6) are expected to play a major role for the time being. An example of verification measures which the Japanese draft convention foresees can be depicted in the following chart.


10/ Ibid., Supplement for 1972, document DC/235, annex B.

Chart of an example of verification measures

(When suspicion of violation of the Convention arises)

- notify of impending inspection
- invite to conduct inspection
- request to conduct enquiries
- request to provide explanations

Main functions of the government:
1. Implementation of legislative and administrative measures;
2. Supervision of manufacture, etc. based on (1).

The Government of the State Party to the Convention

National organ
(data classified and held by the national organ)
1. Amounts
2. Differential amounts of consumption based on the use
3. Amounts of shipment
4. Amounts of stock
5. Amounts of purchase
6. Amounts of sales
7. Amounts of import and export, etc.

Periodic reports

Implementation of inspection by invitation

Other States Parties to the Convention

When necessary, report the results of analysis and evaluation of explanation or enquiry and of inspection

Manufactures
Consumers
Export and import traders
Wholesalers
3. As shown in the above chart, the reporting system of statistical data constitutes the keystone of the draft convention (CCD/420). However, as pointed out in the United States working papers (CCD/311, CCD/368), this reporting system involves the following problems:

(1) Errors of statistical data are unavoidable;
(2) Statistical data vary irregularly in the course of years;
(3) Methods of collecting data differ depending upon countries;
(4) There exists time lag in data collected.

In addition, there is the more important problem of ensuring the credibility of data.

(1) and (2) above are essentially unavoidable and accordingly, have to be left aside tentatively. (3) and (4) can be solved to some extent through the unification by the International Verification Agency (IVA) of the methods of collecting and reporting data. As for the credibility of data, in the field of statistics, the credibility of data is obtained through the method of random check, and hence, it would be necessary to adopt this method in banning chemical weapons. In this sense, it would be necessary to ensure the right of free access by the IVA to various data possessed by the national organ.

In order that the reporting system may be adopted as one of the verification measures, study on its concrete contents must first be made. (For instance, a SIPRI monograph entitled "Chemical Disarmament: Some Problems of Verification" provides excellent guidance as a concrete example of useful verification measures. By the same token, working papers of the socialist countries (CCD/403), the United States (CCD/311) and Italy (CCD/373), etc., contain useful suggestions.) Generally speaking, among activities involving chemical weapons - development, production, stockpiling, destruction, etc., production is considered to be the most susceptible to verification measures. This is because production covers considerably wide areas, normally from the unloading of raw materials or intermediate products to the loading of end products, and also because production contains many aspects which become the objects of verification such as administration of production, safety, and labour and such as measures for preventing environmental contamination. In other words, production contains a variety of elements which can be used for verification. Accordingly, in studying the reporting system on organophosphorus compounds, emphasis should be placed on production. (This assertion is also made in working papers and in suggestions concerning verification so far put forward to the Committee on Disarmament by many countries. Outside the Committee, likewise, detailed study was made regarding the possibility of verifying the production of organophosphorus compounds at the symposium held by SIPRI in 1971.)

Based on these considerations, the report to be submitted from each State Party to the IVA must grasp the movement from the unloading of raw materials or intermediates to the loading of end products - of the following seven substances, which are thought to be closely related to the production of organophosphorus compounds:

-111-
chemical warfare agents (this is also suggested in Japan's working paper CCD/301 of 1970, which proposed verification measures including the establishment of the reporting system):

(1) Yellow phosphorus; (2) phosphorus trichloride; (3) phosphorus oxychloride; (4) phosphorus pentachloride; (5) phosphorus pentasulfide; (6) dimethyl phosphite; and (7) methyl phosphoryl dichloride.

At the Committee on Disarmament in the summer of 1971, Japan submitted a working paper (CCD/344) 12/ introducing statistical data which indicated the amounts of final respective uses of phosphorus trichloride and phosphorus oxychloride as well as their proportions to the whole amount. According to this working paper, the amounts of respective uses of phosphorus trichloride were: agricultural and sterilizing chemicals 2714t; vinyl chloride stabilizer 1229t; dyestuffs 642t; medicine 99t; others 353t. They totaled 5037t. Furthermore, the latest rough figures obtained unofficially and from disclosures at academic symposiums have led to the analysis of the "others" mentioned above as fire-resistant chemicals, antioxidant, catalyst, agent for chlorination, etc., which amounted to 316t-356t, thus identifying more than 90 per cent of the "others".

In view of the above, the Japanese experts propose the formulation of the figure "Differential amounts of consumption based on the use of raw material and intermediates" and table 3 "Statistical data of production, imports, consumption and shipment of raw materials and intermediates". The aforementioned figure would be useful immediately in checking the amounts of raw material and intermediates; how the raw material and intermediates are used is not entirely known. Likewise, table 3 would be useful in checking the balance between the input and output of raw material and intermediates. Logically, this figure and table 3 are mutually related and the overall evaluation of them is expected to strengthen the credibility of the economic data and could serve as an effective means of verification. In order to further increase the credibility, the economic data to be reported from each State Party to the IVA should include, in addition to the items indicated in the figure and in table 3, the list of facilities producing the aforementioned seven types of raw material and intermediates and the production capabilities of States; priority consideration should be given to the inclusion of this list.

Admittedly, more careful study should be made concerning the contents of the report, mainly with a view to increasing the credibility of statistical data. At the same time, the data to be possessed by the national organ in formulating the report must be those which are tenable as the basis of data or items reported to the IVA and which can render the report convincing. Accordingly, the national organ would be required to receive a monthly report containing considerably detailed data from the facilities dealing with the above-mentioned seven types of raw material and intermediates. The minimum content of such a monthly report would be as follows:

(1) Importers; amounts imported.

(2) Producers; amounts produced, amounts loaded, amounts in stock, and production capabilities.

(3) Wholesalers; amounts purchased, amounts sold.

(4) Users; amounts purchased.

(5) Exporters; amounts shipped.

The IVA must be given the right of free access to the national organ so that it may check the above-mentioned records and data.

In order to enhance the verification effects as much as possible, studies should be made as to how these data can be made as detailed and timely as possible and also as to the use of some parameters for the purpose of cross-checking in the fields of software, such as environmental protection, labour administration, etc.
Figure  Differential amounts of consumption based on the use of raw material and intermediates

- **Raw material**
  - phosphorus pentachloride
    - tons
  - phosphorus trichloride
    - tons
  - phosphorus oxychloride
    - tons
  - phosphorus pentasulfide
    - tons
  - red phosphorus
    - tons
  - phophoric acid
    - tons
  - hypophosphites
    - tons
  - others
    - tons

- **Intermediates**
  - dimethyl phosphite
    - tons
  - methylphosphoryl dichloride
    - tons

- **Final products**

---tons: amounts of consumption as elemental phosphorus
(    ): percentage of consumption as elemental phosphorus
[     ]: differential amounts of consumption based on the use of intermediates
[     ]: raw material and intermediates to be reported
Table 3. Statistical data of production, imports, consumption and shipment of raw materials and intermediates

<table>
<thead>
<tr>
<th>Amounts of seven substances</th>
<th>year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X</td>
</tr>
<tr>
<td>yellow phosphorus</td>
<td></td>
</tr>
<tr>
<td>amount of stock at the end of the previous financial year</td>
<td></td>
</tr>
<tr>
<td>amount of production</td>
<td></td>
</tr>
<tr>
<td>amount of imports</td>
<td></td>
</tr>
<tr>
<td>total</td>
<td></td>
</tr>
<tr>
<td>amount of consumption</td>
<td></td>
</tr>
<tr>
<td>amount of shipment</td>
<td></td>
</tr>
<tr>
<td>amount of stock at the end of the present financial year</td>
<td></td>
</tr>
<tr>
<td>total</td>
<td></td>
</tr>
<tr>
<td>phosphorus trichloride</td>
<td></td>
</tr>
<tr>
<td>phosphorus oxychloride</td>
<td></td>
</tr>
<tr>
<td>phosphorus pentachloride</td>
<td></td>
</tr>
<tr>
<td>phosphorus pentasulfide</td>
<td></td>
</tr>
<tr>
<td>dimethyl phosphite</td>
<td></td>
</tr>
<tr>
<td>methylphosphoryl dichloride</td>
<td></td>
</tr>
</tbody>
</table>

*the same as above*
The United States of America and the Union of Soviet Socialist Republics, hereinafter referred to as the Parties,

Declaring their intention to achieve at the earliest possible date the cessation of the nuclear arms race and to take effective measures toward reductions in strategic arms, nuclear disarmament, and general and complete disarmament under strict and effective international control,

Recalling the determination expressed by the Parties to the 1963 Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and under Water in its preamble to seek to achieve the discontinuance of all test explosions of nuclear weapons for all time, and to continue negotiations to this end,

Noting that the adoption of measures for the further limitation of underground nuclear weapon tests would contribute to the achievement of these objectives and would meet the interests of strengthening peace and the further relaxation of international tension,

Reaffirming their adherence to the objectives and principles of the Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and under Water and of the Treaty on the Non-Proliferation of Nuclear Weapons,

Have agreed as follows:

ARTICLE I

1. Each Party undertakes to prohibit, to prevent, and not to carry out any underground nuclear weapon test having a yield exceeding 150 kilotons at any place under its jurisdiction or control, beginning 31 March 1976.

2. Each Party shall limit the number of its underground nuclear weapon tests to a minimum.

3. The Parties shall continue their negotiations with a view toward achieving a solution to the problem of the cessation of all underground nuclear weapon tests.
ARTICLE II

1. For the purpose of providing assurance of compliance with the provisions of the Treaty, each Party shall use national technical means of verification at its disposal in a manner consistent with the generally recognized principles of international law.

2. Each Party undertakes not to interfere with the national technical means of verification of the other Party operating in accordance with paragraph 1 of this article.

3. To promote the objectives and implementation of the provisions of this Treaty the Parties shall, as necessary, consult with each other, make inquiries and furnish information in response to such inquiries.

ARTICLE III

The provisions of this Treaty do not extend to underground nuclear explosions carried out by the Parties for peaceful purposes. Underground nuclear explosions for peaceful purposes shall be governed by an agreement which is to be negotiated and concluded by the Parties at the earliest possible time.

ARTICLE IV

This Treaty shall be subject to ratification in accordance with the constitutional procedures of each Party. This Treaty shall enter into force on the day of the exchange of instruments of ratification.

ARTICLE V

1. This Treaty shall remain in force for a period of five years. Unless replaced earlier by an agreement in implementation of the objectives specified in paragraph 3 of article I of this Treaty, it shall be extended for successive five-year periods unless either Party notifies the other of its termination no later than six months prior to the expiration of the Treaty. Before the expiration of this period the Parties may, as necessary, hold consultations to consider the situation relevant to the substance of this Treaty and to introduce possible amendments to the text of the Treaty.

2. Each Party shall, in exercising its national sovereignty, have the right to withdraw from this Treaty if it decides that extraordinary events related to the subject-matter of this Treaty have jeopardized its supreme interests. It shall give notice of its decision to the other Party six months prior to withdrawal from this Treaty. Such notice shall include a statement of the extraordinary events the notifying Party regards as having jeopardized its supreme interests.

3. This Treaty shall be registered pursuant to Article 102 of the Charter of the United Nations.
Done at Moscow on 3 July, 1974, in duplicate, in the English and Russian languages, both texts being equally authentic.

For the United States of America: The President of the United States of America

Richard Nixon

For the Union of Soviet Socialist Republics:

General Secretary of the Central Committee of the CPSU

L. I. Brezhnev

PROTOCOL TO THE TREATY BETWEEN THE UNITED STATES OF AMERICA AND THE UNION OF SOVIET SOCIALIST REPUBLICS ON THE LIMITATION OF UNDERGROUND NUCLEAR WEAPON TESTS

The United States of America and the Union of Soviet Socialist Republics, hereinafter referred to as the Parties,

Having agreed to limit underground nuclear weapon tests,

Have agreed as follows:

1. For the purpose of ensuring verification of compliance with the obligations of the Parties under the Treaty by national technical means, the Parties shall, on the basis of reciprocity, exchange the following data:

   (a) The geographic co-ordinates of the boundaries of each test site and of the boundaries of the geophysically distinct testing areas therein.

   (b) Information on the geology of the testing areas of the sites (the rock characteristics of geological formations and the basic physical properties of the rock, i.e., density, seismic velocity, water saturation, porosity and depth of water table).

   (c) The geographic co-ordinates of underground nuclear weapon tests, after they have been conducted.

   (d) Yield, date, time, depth and co-ordinates for two nuclear weapon tests for calibration purposes from each geophysically distinct testing area where underground nuclear weapon tests have been and are to be conducted. In this connexion the yield of such explosions for calibration purposes should be as near as possible to the limit defined in article I of the Treaty and not less than one-tenth of that limit. In the case of testing areas where data are not available on two tests for calibration purposes, the data pertaining to one such test shall be exchanged, if available, and the data pertaining to the second test shall be exchanged as soon as possible after a second test having a yield in the above-mentioned range. The provisions of the Protocol shall not require the Parties to conduct tests solely for calibration purposes.
2. The Parties agree that the exchange of data pursuant to subparagraphs (a), (b), and (d) of paragraph 1 shall be carried out simultaneously with the exchange of instruments of ratification of the Treaty, as provided in article IV of the Treaty, having in mind that the Parties shall, on the basis of reciprocity, afford each other the opportunity to familiarize themselves with these data before the exchange of instruments of ratification.

3. Should a Party specify a new test site or testing area after the entry into force of the Treaty, the data called for by subparagraphs (a) and (b) of paragraph 1 shall be transmitted to the other Party in advance of use of that site or area. The data called for by subparagraph (d) of paragraph 1 shall also be transmitted in advance of use of that site or area if they are available; if they are not available, they shall be transmitted as soon as possible after they have been obtained by the transmitting Party.

4. The Parties agree that the test sites of each Party shall be located at places under its jurisdiction or control and that all nuclear weapon tests shall be conducted solely within the testing areas specified in accordance with paragraph 1.

5. For the purposes of the Treaty, all underground nuclear explosions at the specified test sites shall be considered nuclear weapon tests and shall be subject to all the provisions of the Treaty relating to nuclear weapon tests. The provisions of article III of the Treaty apply to all underground nuclear explosions conducted outside of the specified test sites, and only to such explosions.

This Protocol shall be considered an integral part of the Treaty.

Done at Moscow on 3 July, 1974.

For the United States Of America: Richard Nixon

For the Union of Soviet Socialist Republics: General Secretary of the Central Committee of the CPSU L. I. Brezhnev

PROTOCOL TO THE TREATY BETWEEN THE UNITED STATES OF AMERICA AND THE UNION OF SOVIET SOCIALIST REPUBLICS ON THE LIMITATION OF ANTI-BALLISTIC MISSILE SYSTEMS

The United States of America and the Union of Soviet Socialist Republics, hereinafter referred to as the Parties,

Proceeding from the basic principles of relations between the United States of America and the Union of Soviet Socialist Republics signed on 29 May 1972,

Desiring to further the objectives of the Treaty between the United States of America and the Union of Soviet Socialist Republics on the limitation of Anti-Ballistic Missile Systems signed on 26 May 1972, hereinafter referred to as the Treaty,
Reaffirming their conviction that the adoption of further measures for the limitation of strategic arms would contribute to strengthening international peace and security,

Proceeding from the premise that further limitation of anti-ballistic missile systems will create more favourable conditions for the completion of work on a permanent agreement on more complete measures for the limitation of strategic offensive arms,

Have agreed as follows:

ARTICLE I

1. Each Party shall be limited at any one time to a single area out of the two provided in article III of the Treaty for deployment of anti-ballistic missile (ABM) systems or their components and accordingly shall not exercise its right to deploy an ABM system or its components in the second of the two ABM system deployment areas permitted by article III of the Treaty, except as an exchange of one permitted area for the other in accordance with article II of this Protocol.

2. Accordingly, except as permitted by article II of this Protocol: The United States of America shall not deploy an ABM system or its components in the area centred on its capital, as permitted by article III (a) of the Treaty, and the Soviet Union shall not deploy an ABM system or its components in the deployment area of intercontinental ballistic missile (ICBM) silo launchers as permitted by article III (b) of the Treaty.

ARTICLE II

1. Each Party shall have the right to dismantle or destroy its ABM system and the components thereof in the area where they are presently deployed and to deploy an ABM system or its components in the alternative area permitted by article III of the Treaty, provided that prior to initiation of construction, notification is given in accord with the procedure agreed to by the Standing Consultative Commission during the year beginning 3 October 1977 and ending 2 October 1978, or during any year which commences at five-year intervals thereafter, those being the years for periodic review of the Treaty, as provided in article XIV of the Treaty. This right may be exercised only once.

2. Accordingly, in the event of such notice, the United States would have the right to dismantle or destroy the ABM system and its components in the deployment area of ICBM silo launchers and to deploy an ABM system or its components in an area centred on its capital, as permitted by article III (a) of the Treaty, and the Soviet Union would have the right to dismantle or destroy the ABM system and its components in the area centred on its capital and to deploy an ABM system or its components in an area containing ICBM silo launchers, as permitted by article III (b) of the Treaty.

3. Dismantling or destruction and deployment of ABM systems or their components and the notification thereof shall be carried out in accordance with article VIII of the ABM Treaty and procedures agreed to in the Standing Consultative Commission.
ARTICLE III

The rights and obligations established by the Treaty remain in force and shall be complied with by the Parties except to the extent modified by this Protocol. In particular, the deployment of an ABM system or its components within the area selected shall remain limited by the levels and other requirements established by the Treaty.

ARTICLE IV

This Protocol shall be subject to ratification in accordance with the constitutional procedures of each Party. It shall enter into force on the day of the exchange of instruments of ratification and shall thereafter be considered an integral part of the Treaty.

Done at Moscow on 3 July 1974, in duplicate, in the English and Russian languages, both texts being equally authentic.

For the United States of America:  For the Union of Soviet Socialist Republics:

The President of the United States of America General Secretary of the Central Committee of the CPSU

Richard Nixon  L. I. Brezhnev

JOINT STATEMENT ON ENVIRONMENTAL WARFARE

The United States of America and the Union of Soviet Socialist Republics:

Desiring to limit the potential danger to mankind from possible new means of warfare;

Taking into consideration that scientific and technical advances in environmental fields, including climate modification, may open possibilities for using environmental modification techniques for military purposes;

Recognizing that such use could have widespread, long-lasting, and severe effects harmful to human welfare;

Recognizing also that proper utilization of scientific and technical advances could improve the interrelationship of man and nature;

1. Advocate the most effective measures possible to overcome the dangers of the use of environmental modification techniques for military purposes.

2. Have decided to hold a meeting of United States and Soviet representatives this year for the purpose of exploring this problem.
3. Have decided to discuss also what steps might be taken to bring about the measures referred to in paragraph 1.

Moscow, 3 July 1974

For the United States of America:
The President of the United States of America
Richard Nixon

For the Union of Soviet Socialist Republics:
General Secretary of the Central Committee of the CPSU
L. I. Brezhnev

14. FINLAND

Letter dated 12 July 1974 from the Permanent Representative of Finland to the Special Representative of the Secretary-General to the Conference of the Committee on Disarmament transmitting a working paper by the Government of Finland on methodology for chemical analysis and identification of chemical warfare agents - progress of a Finnish research project (CCD/432)

[Original: English]
16 July 1974

Upon instructions from my Government, I have the honour to enclose a working paper by the Government of Finland to the Conference on Disarmament with the request that you would take appropriate steps to have it distributed in the Conference of the Committee on Disarmament.

Enclosed please find also a matrice for the printing of some illustrative figures attached to the working paper.

(Signed) Klaus A. Sahlgren
Permanent Representative of Finland
Methodology for chemical analysis and identification of CW agents

Progress of a Finnish research project

1. In 1972, the Government of Finland announced a project on creation on a national basis of a chemical warfare (CW) control capacity for possible future international use (CCD/361). This working paper noted that at least initially the work would focus mainly on organophosphate nerve agents while some work would also be done on mustards. In a subsequent working paper (CCD/412) the Finnish Government described in some detail the scientific activities connected with the project, the instrumental methods used and the laboratories engaged in this research. One of the goals of the project was to be an analytical handbook for CW verification, a compilation of standardized data for the identification of various CW agents, especially organophosphates and mustards, as well as their precursors, metabolites and degradation products.

This paper presents a more detailed description of the methods chosen and illustrates with a few examples the data obtainable by these methods. The figures included in this working paper also suggest a format for the presentation of such data for verification purposes.

2. The need for national verification activities and their international standardization has been stressed in several working papers of the Conference of the Committee on Disarmament, e.g., the draft convention (CCD/361) and the working paper (CCD/403) submitted by the socialist States, while the need and role of international verification has been stressed, e.g., in the working paper of the non-aligned countries (CCD/400) and the recent draft convention submitted by Japan (CCD/420).

3. Among the different verification methods in the context of a CW-treaty, chemical analyses have obviously an essential role among the verification techniques. For this purpose national and international control laboratories capable of analysing previously unknown components even at ppm or ppb level in multicomponent mixtures are needed. Such requirements can be met by combining the techniques of environmental residue studies with modern methods of structure analyses. Whatever the solution of the verification question or the agreed combination of national and international means of verification, such data must be obtained by internationally agreed, standardized methods and reported in an internationally agreed, unambiguous format to fulfil the requirements of international comparability and criticality.

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13/ Ibid., Supplement for 1972, document DC/235, annex B.
14/ Official Records of the General Assembly, Twenty-eighth Session, Supplement No. 31 (A/9141), annex II.
Concerning the nerve agents (sarin, VX etc.) the enzymatic method for detection of anticholinesterase compounds is the most sensitive indicator. If, however, there is need for more knowledge of the structure of the agent or if some other kind of CW agent (e.g., a mustard) is in question, other methods must apply. In many cases the compound to be identified is not even the agent itself but a metabolite, degradation product or precursor of it. The methods of classical chemical analysis often demand too much time or material, but the modern physical methods - mass spectrometry, infrared spectrometry (IR), and nuclear magnetic resonance spectrometry (NMR) - have been found more suitable.

By preparation of the samples the reactivity of the agents has to be taken into account, so that the extraction and the purification have to be made with caution, the physical methods like chromatography, ion exchange and gel filtration being the methods of choice.

In order to find out the suitability of these analytical methods in respect of CW verification, each research group engaged in the Finnish project has concentrated on the study of one of them. In addition, various organophosphorus esters, halogenides and other model compounds have been synthesized, and the kinetics of the formation and decomposition reactions have been studied.

4. In analysis of CW agents gas, liquid and thin layer chromatography are perhaps the most used methods. The detection level of a picogram may be reached using electron capture and alkali salt flame ionization detectors and also by the use of photoelectric detectors (sensitive to phosphorus and sulphur compounds). Chromatograms are suitable for quantitative evaluation when the agents in question are previously known. The identification of an unknown compound from a chromatogram peak needs more structure analytical measures; the retention time of a component alone is not a very reliable evidence.

5. At present, mass spectrometry connected to gas chromatography is the most sensitive method for structure analysis of components in an unknown mixture of organic compounds; spectra from nanogram quantities are obtainable. By using glass capillary columns in gas chromatograph-mass spectrometer also a very efficient separation of the components can be performed. Time needed for the analysis is quite short if an ON LINE computer connected to the mass spectrometer is available. As an example a spectrum of sarin is presented in figure 1.

6. Nuclear magnetic resonance spectrometry, especially the $^{13}$C and $^1$H resonances, is perhaps the most effective method for obtaining knowledge of the structure of an unknown organic compound without reference material. Concerning nerve gases, also $^{31}$P and $^{19}$F resonances are very valuable. The main limitation of the use of NMP in residue analyses has been the low sensitivity. The present fast progress in this field will remove part of this limitation. At present, proton and fluorine magnetic resonance spectra from microgram samples are obtained by using pulse Fourier techniques with ON LINE computer. As an example $^1$H and $^{13}$C spectra of sarin are illustrated in figures 2 and 3.

7. Infrared spectrometry is an analytical method which gives structural information about skeleton type and functional groups of previously unknown molecules. Alone it is a useful method of identification when large reference
collections like the Sadtler or the Hummell & Scholl Catalogues are available. Without such collections IR often is not able to give the final structural formula but it is a fast and cheap method for fingerprint classification of unknown materials. There are now available data for over 5600 organophosphorous compounds and their empiric correlations. IR gives further straight information on the bonds of molecules in some cases where mass spectrometry and NMR spectrometry can give only second-hand information, for instance in thiono-thiolo isomerism. It is possible to extend the sensitivity of IR spectrometry down to microgram level by using special techniques. Samples of pure components can be collected by preparative chromatography. In addition to low instrumental expenses another advantage of the infrared spectrometry is that it is also suited for the mobile laboratory purposes. In figure 4 the IR spectrum of sarin is presented.

8. For the chemical control work it is extremely important to know how these compounds behave in different open air conditions. Therefore the Finnish project has investigated the hydrolysis and alcoholysis reactions of phosphoromono- and dichloridates after they have first been synthesized. For this purpose a quick, safe and sensitive method was developed, in which conductivity changes caused by hydrogen chloride are measured during the reaction. A model reaction is presented in figure 5, where the shares of different components are plotted against reaction time. It is evident from the figure that the reaction rates of the chlorine atoms are not equivalent. The reaction scheme is given in the figure, too.

9. In respect of the enzymatic detection method for anticholinesterase agents the toxicology-group has confirmed, using the method of Ellman, that in cases of toxification caused by organophosphorus compounds the cholinesterase activity of human blood and cerebellum is remarkably diminished and well verifiable. In animals, the cholinesterase activity of blood is too weak for reliable evaluation of alterations, whereas in small animals as rats and mice, the activity of brain (cerebrum or/and cerebellum) is sufficient for studying the effects of anticholinesterase poisons.

10. It is evident that none of the analytical methods examined will be satisfactory alone. One has to choose several of the best methods, or maybe use all of them to complement each other. In any case, however, a large collection of reference data will be very helpful even if not quite necessary. For this purpose the Finnish project has started to collect all the analytical information obtained during the work concerning chemical agents, e.g., the chromatographic and kinetic information as well as mass-, IR- and NMR-spectra of the compounds. As mentioned earlier (CCD Ul2 of 14 August 1973), a handbook containing such information would be helpful for verification purposes both in its national and international aspects. It is hoped that the Finnish project will make a contribution towards that end.

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Fig. 1. Mass spectrum of the nerve agent sarin with a proposed scheme for the fragmentation.
Fig. 2. $^1$H resonance spectrum of sarin in deuterochloroform

Fig. 3. $^{13}$C resonance spectrum of sarin in deuterochloroform

Fig. 4. Infrared spectrum of sarin, solvent-free film between KBr plates
Fig. 5. Kinetics of the alcoholysis of an alkylphosphonodichloride

\[
\begin{align*}
\text{A} & \quad \text{R}-\text{P}^\text{Cl}_\text{Cl} & \quad \text{R}^\text{'OH} \quad \frac{k_1}{k_1} & \quad \text{R}-\text{P}^\text{Cl}_\text{Cl} & \quad \text{R}^\text{'OH} \quad \frac{k_2}{k_2} & \quad \text{R}-\text{P}^\text{OR}_\text{OR}' \\
& & & & & \\
\text{B} & & & & & \\
& & & & & \\
\text{C} & & & & &
\end{align*}
\]
15. CANADA

The problem of defining compounds having military significance as irritating and incapacitating agents (CCD/433)

[Original: English]
[16 July 1974]

Introduction

1. This paper is to be considered as a supplement to CCD/414 [15] in that the same scheme of definition has been applied to those chemical substances that depend primarily on their irritating or incapacitating effect for their possible military utility.

Non-lethal agents

2. Attention is drawn to the meaning of some of the terms used in this paper:

   harassing or irritating means having a physiological effect which will render individuals incapable of normal concerted physical effort during exposure and only for a very short period of time (minutes) after exposure ceases. These are generally known as riot control agents;

   incapacitating means having physiological or mental effects which will render individuals incapable of normal concerted physical or mental effort or both for a significant period of time after exposure. Such agents resemble riot control agents in that the effects are temporary and without permanent damage but are different in that the effect may last for hours or in extreme cases for days.

3. It is necessary to stress the difference in agents that cause the above effects: the first are those that are immediately and physically irritating (e.g. tear gas), and whose effects last only for a short period after exposure. The second type are those that are mentally or physically incapacitating for a significant period of time after exposure ceases. Because of the lack of perceptible signs of the presence of such agents, the effects of these agents may not be observed until after an incapacitating dose has assimilated.

4. Some agents generally categorized as harassing agents have a toxicity which would place them above the lower threshold of toxicity set out in table I. [16] The

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[15] Ibid.
[16] As in CCD/414 but amended.

-129-
military utility of harassing and incapacitating agents is related, however, not
to their possible lethal effects, but to their irritating and incapacitating
effect. It remains to determine, therefore, a threshold of irritating or
incapacitating effectiveness above which these chemical substances can be
considered as having military utility. 17/

5. Annex III of the report of the Secretary-General of the United Nations
entitled Chemical and Bacteriological (Biological) Weapons and the Effects of Their
Possible Use (A/7575/Rev.1-S/9292/Rev.1) 18/ tabulates the effectiveness of the
irritating agents in terms of a tolerance limit. For the purpose of this paper,
a different quantitative unit is used, the effective median dosage, in order to
be consistent with the dosage used for lethal agents. The dosage of those that
are known is shown in table II. From this it can be seen that a threshold can be
drawn at a value of about 200 mg.min/m³ for the median dosage. Because those at
present available are relatively cheap and simple to manufacture, the incentive
to produce new non-lethal agents may not be great. It cannot be ruled out,
however, that new agents might be discovered that would not be as efficient as
those at present known. To allow for this, it is proposed to lower this threshold
to a value of 500 mg.min/m³, the same level as for the upper threshold of the
lethal agents. Since all these agents are single purpose, this suggests that these
substances could then be described as a class of "super effective" single purpose
non-lethal agents. It is difficult to say whether this threshold value should be
lowered even further. However, it is perhaps instructive to note that 80 proof
whisky has an equivalent median incapacitating dosage of about 1,500 mg.min/m³.
Since alcohol is not an efficient weapon of war, it seems reasonable to state
that the threshold for non-lethal agents is probably somewhere between the values
of 1,500 and 500 and is probably close to 500 mg.min/m³ for practical purposes.

6. Therefore, as a suggested definition, it is possible to state that: a
chemical compound or element can be considered as a potential agent of war if it
has a median incapacitating or irritating dosage of less than 500 mg.min/m³.

Use of agent definitions in establishing scope of prohibition

7. Thresholds have been suggested which separate those chemical substances which
have military potential based on their effectiveness to incapacitate or irritate
from those that do not have such a potential. (Some of the chemical substances
thus defined as being potential agents of war also have recognized peaceful uses.)

8. The non-lethal agents can be defined, according to the duration of their
effects on exposed personnel, as being either irritating or incapacitating.

17/ Non-lethal agents are discussed in the report of the Secretary-General
entitled Chemical and Bacteriological (Biological) Weapons and the Effects of Their
Possible Use, where they are described in the broad category of incapacitating
agents. (This working paper restricts the meaning to that given in the introduction
in which the qualification, "for a significant period of time", is important.)

18/ United Nations publication, Sales No.: E.69.I.24.
9. In the case of harassing or irritating agents which are widely recognized as essential for civil riot control because of their quick reaction and short duration without injury, it is unlikely that Governments would be prepared to ban their continued development, production and stockpiling. It might, on the other hand, be generally accepted that the development, production and stockpiling of incapacitating agents could be prohibited. This acceptance would stem from the unreliability and unpredictable effects of incapacitating agents, particularly the psychochemicals. It would seem unlikely that Governments would wish to retain such agents for civil police use. In the event of there being a disposition to prohibit incapacitating agents but to allow irritating agents for civil use, an expert review committee could determine into which category fell those chemicals above the agreed threshold of effectiveness.
### Table I

Classification of some chemical compounds and elements based on toxicity including subgroups based on purpose

<table>
<thead>
<tr>
<th>Lethal agents</th>
<th>Lct50(^a/)</th>
<th>mg.min/m(^3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VX</td>
<td>10-50</td>
<td></td>
</tr>
<tr>
<td>Sarin</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Soman</td>
<td>50-100</td>
<td></td>
</tr>
<tr>
<td>Tabun</td>
<td>400</td>
<td></td>
</tr>
<tr>
<td>VX</td>
<td>10-50</td>
<td></td>
</tr>
<tr>
<td>Sarin</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Soman</td>
<td>50-100</td>
<td></td>
</tr>
<tr>
<td>Tabun</td>
<td>400</td>
<td></td>
</tr>
</tbody>
</table>

**SUPERTOXIC** (single purpose)

---

**UPPER THRESHOLD**

- Mustard 1,500
- Lewisite 1,500

**Toxic**

- Araine 5,000

**SINGLE PURPOSE**

**DUAL PURPOSE**

**LOWER THRESHOLD**

- 3,200 Phosgene Toxic
- 5,000 HCN
- 11,000 Cyanogen Chloride (CN 11,000)
- 19,000 Chlorine

All other chemicals that have no significant military value

---

\(^a/\) Dosage vapour concentration multiplied by time of exposure lethal to 50 per cent of exposed personnel

\(^b/\) Chemicals having both military and civil use.
### Table II

Classification of some chemical compounds based on irritating and incapacitating dosages

<table>
<thead>
<tr>
<th>Non-lethal agents</th>
<th>Irritating CT$_{50}$(^c/) mg.min/m(^3)</th>
<th>Incapacitating CT$_{50}$(^c/)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS</td>
<td>10-20</td>
<td></td>
</tr>
<tr>
<td>Arsine derivatives</td>
<td>10-30</td>
<td></td>
</tr>
<tr>
<td>CN</td>
<td>80</td>
<td></td>
</tr>
</tbody>
</table>

**Threshold**

Effectiveness of chemicals in this range not of military interest

\(^c/\) Dosage vapour concentration multiplied by time of exposure irritating or incapacitating to 50 per cent of exposed personnel.
Historical background

1. Shortly after the outbreak of the Second World War, many countries, including Canada, produced a supply of chemical warfare agents in anticipation of their possible use during the war in retaliation for enemy gas attacks. Gas warfare was never employed, and while most chemical stocks were destroyed in Canada, some quantities of mustard agent remained in storage.

Present status

2. In Canada approximately 700 tons of mustard agent in bulk liquid form have been retained since 1942 at the Canadian Defence Research Establishment Suffield, at Ralston, Alberta. This material has been stored in reinforced concrete, lead-lined vaults, and no appreciable degradation of the vaults or the mustard has occurred up to the present time. The mustard was primarily HS (2,2'-dichlorodiethyl sulfide) of approximately 70 per cent purity, with a small stock of a more persistent type of mustard referred to as HT. For many years, Canadian Government policy has been to maintain no offensive capability or weaponry in chemical warfare; consequently the mustard was of no use to the Canadian Forces, and a decision was made several years ago to find a safe, effective, clean and economical method of disposing of it.

Methods for destruction of mustard

3. A number of possible methods for disposing of the mustard were considered. These included: burning the mustard in open pits (as was done in a number of countries after the Second World War) - this was environmentally undesirable because of the resultant air pollution; dumping it in the ocean - this was unacceptable for several reasons, including international agreements on ocean dumping; burning the mustard in an existing or specially designed incinerator and scrubbing or dispersing air pollutants from the exhaust gas stream - this was technically feasible, but very costly and involving some handling hazards; and chemical processes to convert the mustard to a less hazardous or innocuous form, and disposal of the resultant product in an acceptable manner.

4. The last approach appeared most promising. In the laboratory, mustard was converted to a solid (dithiane) by reaction with sodium sulfide. The solid was easier to handle and less hazardous, but the process was abandoned because of the cost of the sodium sulfide, the environmental problems of disposing of the...
large volume of dithiane produced, and the engineering problems of avoiding the trapping of unreacted mustard in the solid end product. Conversion of the mustard by hydrolysis to a relatively harmless liquid was also investigated, along with disposal methods for the liquid product. This approach was successful in the laboratory and pilot-plant scale experiments, and was considered technically feasible for bulk destruction.

5. It was generally known that mustard/water mixtures were non-reactive, since hydrolysis did not occur to any significant degree; yet other measurements indicated that mustard which was dissolved in water reacted quickly, with a reaction time equivalent to a mustard half-life of 8-10 minutes at 25°C. A detailed study of this apparent discrepancy led to the discovery that, with the addition of a base to control pH, elevation of the temperature above ambient, and turbulent mixing, water and mustard would react readily to produce a non-vesicant mixture of salts and thiodiglycol. This process was optimized in laboratory experiments, and in pilot-plant scale batch experiments involving up to 50 gallons of mustard per batch. A number of bases were studied for pH control and calcium hydroxide was chosen as the optimum and least expensive. A plant has been designed and built to hydrolyze up to about seven tons of mustard per batch under the control of a two-man crew.

6. This plan is now operational, and mustard is being destroyed. Full-scale trials have demonstrated that the process is non-hazardous and fully effective in destroying the mustard.

Disposal of mustard hydrolysate

7. The hydrolysate produced during experimental destruction of batches of mustard contained water, thiodiglycol, calcium salts (primarily calcium chloride) and some polysulfides. Disposal methods studied for this hydrolysate included: incorporation of the hydrolysate in concrete to form a solid; incorporation in landfill; spreading on soil with natural biodegradation; microbial deterioration in a reaction vessel; and high temperature incineration. While natural biodegradation processes appeared promising, insufficient time was available to optimize and prove the environmental acceptability of the method. Studies were therefore concentrated on thermal destruction processes. Several thousand gallons of hydrolysate were incinerated successfully in an existing high-temperature furnace, which was originally designed to burn DDT (as DDT/kerosene solutions) and which included a scrubbing tower. Using natural gas as an auxiliary fuel, the hydrolysate was incinerated, and the resultant gaseous effluents, except for a small quantity of sulfur dioxide, were removed in the scrubbing tower. A smokestack was erected to disperse the remaining sulfur dioxide into the atmosphere so that clean air standards could be met. The scrubbing tower water was neutralized with calcium hydroxide and recirculated.

Final mustard disposal system

8. In the destruction process which is now under way, the mustard hydrolysis is being carried out in the specially designed remotely controlled facility which has
been mounted directly on top of the storage vaults. The reaction of each batch (about seven tons of mustard) is complete in about six hours. One batch can thus be destroyed in one working day. The process is economical, efficient and non-hazardous.

9. Following laboratory verification of reaction completion, the hydrolysate is drained into an interim storage tank, or directly into trailer-mounted tanks for hauling to the incinerator, which is located approximately one mile from the reactor.

10. At the incinerator, the hydrolysate is pumped under pressure into an atomizing nozzle and dispersed into a natural gas flame. Combustion rates of up to 2-1/2 gallons per minute may be achieved under optimum conditions. Thermal destruction of the hydrolysate at the rate of about 35 tons (mustard equivalent) per week is expected.

17. UNITED STATES OF AMERICA

Working paper on toxicity of chemical warfare agents (CCD/435)

/Original: English/
/16 July 1974/

Modern lethal chemical warfare agents are exceedingly toxic substances, much more toxic for the most part than the chemicals in common industrial use. Because of this difference, it has been suggested that the degree of toxicity is a logical choice as one possible criterion for defining chemical warfare agents for the purpose of an arms control agreement.

As noted in the work programme presented by the United States delegation (CCD/360), 19/ there are several different approaches to the question of definition, each with its own advantages and disadvantages. A criterion based on a toxicity limit would have the advantage of being directly related to the potential danger from a particular substance. It would be applicable to known super-toxic substances or any super-toxic substance discovered in the future. However, compounds which are less toxic might still have utility either as chemical warfare agents or agent precursors. Among these are mustard-type compounds, dual-purpose agents such as phosgene (carbonyl chloride), hydrogen cyanide, and cyanogen chloride, and binary precursors. If a prohibition is to cover all lethal agents it might be necessary to adopt a general-purpose criterion and perhaps other criteria in addition to a toxicity criterion.

Considerable progress has already been made in working out the technical aspects of a practical toxicity criterion. Concrete proposals for a toxicity

criterion have already been presented by the delegations of Japan (CCD/301, 20/
CCD/374 19/) and Canada (CCD/387, 19/ CCD/414 21/). Both delegations adopted a
similar approach by proposing a criterion based on the toxicity of a particular
agent. Soman was suggested as a "boundary agent" by the Japanese delegation
and tabun by the Canadian delegation.

As our delegation and others have noted, a toxicity value for a compound is
meaningful only if the experimental conditions under which it was measured are
specified in detail. For this reason, in order to establish a practical toxicity
criterion, it would be necessary to define not only the toxicity level, but also
the animal to be used for measurement and the route by which the chemical is
administered.

Experimental animal

The military utility of chemical warfare (CW) agents is related to toxicity
to humans. Theoretically a toxicity criterion would be based on human reactions
to chemical agents. Obviously, however, experimental animals must be used instead
to measure the toxicity values. In general, the assumption that a compound that
is super-toxic to experimental animals will also be very dangerous to humans is a
sound one. In toxicological studies, a variety of different animals are commonly
used. As noted in table 1, toxicity values vary somewhat from one species to
another. Therefore, a toxicity threshold must be tied to a specific animal.

Table 1

<table>
<thead>
<tr>
<th>Animal</th>
<th>LD$_{50}$ (mg/kg)$^{a/}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mouse</td>
<td>0.35 - 0.40</td>
</tr>
<tr>
<td>Rat</td>
<td>0.16</td>
</tr>
<tr>
<td>Guinea pig</td>
<td>0.13 - 0.3</td>
</tr>
<tr>
<td>Rabbit</td>
<td>0.3 - 0.5</td>
</tr>
<tr>
<td>Cat</td>
<td>0.10</td>
</tr>
<tr>
<td>Goat</td>
<td>0.3</td>
</tr>
</tbody>
</table>

$^{*}$ Subcutaneous administration: United States Army data.

$a/ $ The LD$_{50}$ is the dose which is lethal to 50 per cent of a group of animals
(median lethal dose).

20/ Ibid., Supplement for 1970, document DC/233, annex C.

21/ Official Records of the General Assembly, Twenty-eighth Session,
Supplement No. 31 (A/9141), annex II.
Route of administration

The toxicity of an agent may vary depending on the route by which it is administered to the test animal. Chemicals are commonly administered orally or by inhalation or introduced directly by injection ("parenteral" administration). The most common parenteral routes of administration are into a blood vein (intravenous), into the abdominal fluid (intraperitoneal), into a muscle (intramuscular) or beneath the skin (subcutaneous). Percutaneous administration involves application on the skin. The variation in toxicity with route of administration is illustrated for tabun in table 2.

<table>
<thead>
<tr>
<th>Route of administration</th>
<th>$LD_{50}$ (mg/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intravenous</td>
<td>0.10 - 0.15</td>
</tr>
<tr>
<td>Intraperitoneal</td>
<td>0.66 - 0.9</td>
</tr>
<tr>
<td>Subcutaneous</td>
<td>0.35 - 0.40</td>
</tr>
<tr>
<td>Percutaneous</td>
<td>1.0 - 2.8</td>
</tr>
</tbody>
</table>

* Taking a mouse as the experimental animal; United States Army data.

Unfortunately, it is not possible to convert the value obtained by one route of administration to an equivalent value for a different route. As shown in table 3, the relative values for different routes of administration vary from compound to compound.

Since the military potential of super-toxic compounds is often closely related to their inhalation toxicity, it would seem logical to establish a criterion based on inhalation toxicity as proposed in document CCD/414. Some chemicals, however, are not super-toxic when inhaled, but would be extraordinarily toxic if they were carried into the body by a projectile which penetrated the skin. Included in this category are super-toxic carbamates. For this reason a criterion based on inhalation toxicity would not be sufficient.

The toxicity criteria proposed in document CCD/374 are based on subcutaneous or intraperitoneal injection. These routes of administration are generally applicable to any compound and are less difficult from a technical standpoint than administration by the respiratory route.

It would be possible to supplement a criterion based on inhalation toxicity with one derived from parenteral toxicity. However, it would be simpler to rely on parenteral toxicity alone, since any compound that is super-toxic on inhalation will also be super-toxic by a parenteral route.
To some extent the selection of a particular experimental animal and a given parenteral route of administration in defining the criterion is arbitrary. The choice might best be made simply according to the relative amount of data available for the different situations. It appears that more data, particularly on known chemical warfare (CW) agents, are available for the mouse (subcutaneous administration) than for other animals and other routes of administration listed in table 4.

Judging from the data in table 4, there appears to be little overlap between single-purpose super-toxic CW agents and dual-purpose chemicals. Ideally, the toxicity criterion should be defined so as to separate the two groups cleanly. It probably will be impossible to do so. However, establishing an LD$_{50}$ value of 0.50 mg/kg (mouse; subcutaneous administration) as the limit, as suggested in document CCD/301, or a value close to 0.50 mg/kg, may be the optimal solution to the problem of selecting a suitable level.

Experimental variability

In order for toxicity measurements from different laboratories to be consistent with each other, the detailed experimental procedures must be standardized. Some of the conditions which would have to be established are listed in document CCD/374. If general agreement were reached to adopt a prohibition based on a specific toxicity threshold, the precise experimental procedures could undoubtedly be worked out by experts in toxicology.
**Table 3**

Relative toxicity values for several results of administration*

<table>
<thead>
<tr>
<th>Route of administration</th>
<th>Procaine $\text{LD}_{50}^\text{50}/\text{kg}$ (Mouse)</th>
<th>Relative value</th>
<th>Isoniazid $\text{LD}_{50}^\text{50}/\text{kg}$ (Mouse)</th>
<th>Relative value</th>
<th>DFP$^a$/ $\text{LD}_{50}^\text{50}/\text{kg}$ (Rabbit)</th>
<th>Relative value</th>
<th>Pentobarbital $\text{LD}_{50}^\text{50}/\text{kg}$ (Mouse)</th>
<th>Relative value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intravenous</td>
<td>45</td>
<td>1</td>
<td>153</td>
<td>1.0</td>
<td>0.34</td>
<td>1.0</td>
<td>80</td>
<td>1.0</td>
</tr>
<tr>
<td>Intraperitoneal</td>
<td>230</td>
<td>5</td>
<td>132</td>
<td>0.9</td>
<td>1.00</td>
<td>2.9</td>
<td>130</td>
<td>1.6</td>
</tr>
<tr>
<td>Intramuscular</td>
<td>630</td>
<td>14</td>
<td>140</td>
<td>0.9</td>
<td>0.85</td>
<td>2.5</td>
<td>124</td>
<td>1.5</td>
</tr>
<tr>
<td>Subcutaneous</td>
<td>800</td>
<td>18</td>
<td>160</td>
<td>1.0</td>
<td>1.00</td>
<td>2.9</td>
<td>130</td>
<td>1.6</td>
</tr>
<tr>
<td>Oral</td>
<td>500</td>
<td>11</td>
<td>142</td>
<td>0.9</td>
<td>4</td>
<td>11.7</td>
<td>280</td>
<td>3.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>to 9</td>
<td>26.5</td>
<td></td>
</tr>
</tbody>
</table>


$^a$/ DFP = diisopropylfluorophosphate.
### Table 4
Mouse toxicity data (subcutaneous administration)

<table>
<thead>
<tr>
<th>Compound</th>
<th>Toxicity (LD$_{50}$, mg/kg)</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>3152 CT (carbamate)</td>
<td>0.005 (i.v., dog)</td>
<td>Funke, Depierre and Krucker, 1952</td>
</tr>
<tr>
<td>VX</td>
<td>0.022</td>
<td>U.S. Army</td>
</tr>
<tr>
<td>VE</td>
<td>0.025</td>
<td>U.S. Army</td>
</tr>
<tr>
<td>VM (edemo)</td>
<td>0.035</td>
<td>U.S. Army</td>
</tr>
<tr>
<td>VS</td>
<td>0.035</td>
<td>U.S. Army</td>
</tr>
<tr>
<td>GB (sarin)</td>
<td>0.04</td>
<td>CCD/374</td>
</tr>
<tr>
<td>GB (sarin)</td>
<td>0.06-0.15</td>
<td>CCD/374</td>
</tr>
<tr>
<td>GD (soman)</td>
<td>0.1</td>
<td>CCD/374</td>
</tr>
<tr>
<td>GF</td>
<td>0.11-0.20</td>
<td>U.S. Army</td>
</tr>
<tr>
<td>GD (soman)</td>
<td>0.125</td>
<td>U.S. Army</td>
</tr>
<tr>
<td>GB (sarin)</td>
<td>0.15</td>
<td>U.S. Army</td>
</tr>
<tr>
<td>VG (amiton, tetram)</td>
<td>0.155 (male)</td>
<td>U.S. Army</td>
</tr>
<tr>
<td>GB (sarin)</td>
<td>0.173</td>
<td>CCD/374</td>
</tr>
<tr>
<td>GB (sarin)</td>
<td>0.2</td>
<td>CCD/374</td>
</tr>
<tr>
<td>GB (sarin)</td>
<td>0.214</td>
<td>Askew, 1957</td>
</tr>
<tr>
<td>GB (sarin)</td>
<td>0.22</td>
<td>CCD/374</td>
</tr>
<tr>
<td>GE (ethyl sarin)</td>
<td>0.301</td>
<td>U.S. Army</td>
</tr>
<tr>
<td>GA</td>
<td>0.35-0.40</td>
<td>U.S. Army</td>
</tr>
<tr>
<td>Neostigmine</td>
<td>0.42</td>
<td>U.S. Army</td>
</tr>
<tr>
<td>(prostigmine)</td>
<td></td>
<td>Schaumann, 1960</td>
</tr>
<tr>
<td>Echothiophate</td>
<td>0.50</td>
<td>Brown et al, 1950</td>
</tr>
<tr>
<td>Neostigmine methylsulfate</td>
<td>0.51</td>
<td>Brown et al, 1950</td>
</tr>
<tr>
<td>Neostigmine iodide</td>
<td>0.55</td>
<td>CCD/374</td>
</tr>
<tr>
<td>Paraoxon</td>
<td>0.6-0.8</td>
<td>Augustinsson, 1953; Schaumann, 1960</td>
</tr>
<tr>
<td>Paraoxon</td>
<td>0.7</td>
<td>Toxic Substances List, 1973</td>
</tr>
<tr>
<td>Neostigmine (prostigmine)</td>
<td>0.8</td>
<td></td>
</tr>
<tr>
<td>Compound</td>
<td>Toxicity (LD&lt;sub&gt;50&lt;/sub&gt;, mg/kg)</td>
<td>Source</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-----------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>TEPP (tetraethylpyrophosphate)&lt;sup&gt;b/&lt;/sup&gt;</td>
<td>0.85</td>
<td>U.S. Army</td>
</tr>
<tr>
<td>HN-1</td>
<td>1.1-2.05</td>
<td>U.S. Army</td>
</tr>
<tr>
<td>Physostigmine salicylate&lt;sup&gt;b/&lt;/sup&gt;</td>
<td>1.24</td>
<td>Brown &lt;i&gt;et al&lt;/i&gt;, 1950</td>
</tr>
<tr>
<td>Paraoxon-ME&lt;sup&gt;b/&lt;/sup&gt;</td>
<td>1.4</td>
<td>CCD/374</td>
</tr>
<tr>
<td>HN-3&lt;sup&gt;b/&lt;/sup&gt;</td>
<td>2.01 (HCl)</td>
<td>U.S. Army</td>
</tr>
<tr>
<td>Colchicine&lt;sup&gt;b/&lt;/sup&gt;</td>
<td>2.3-3.8</td>
<td>U.S. Army</td>
</tr>
<tr>
<td>Metasystox (methyldemeton)&lt;sup&gt;b/&lt;/sup&gt;</td>
<td>2.9-3.3</td>
<td>CCD/374</td>
</tr>
<tr>
<td>Potassium cyanide&lt;sup&gt;b/&lt;/sup&gt;</td>
<td>2.9-6.0</td>
<td>U.S. Army</td>
</tr>
<tr>
<td>DFP&lt;sup&gt;b/&lt;/sup&gt;</td>
<td>3.2-4.7</td>
<td>U.S. Army</td>
</tr>
<tr>
<td>DFP&lt;sup&gt;b/&lt;/sup&gt;</td>
<td>4</td>
<td>Toxic Substances List, U.S. Dept. of Health, Education and Welfare, 1973</td>
</tr>
<tr>
<td>HN-2&lt;sup&gt;b/&lt;/sup&gt;</td>
<td>4.5</td>
<td>U.S. Army</td>
</tr>
<tr>
<td>Methyl fluoracetic acid&lt;sup&gt;b/&lt;/sup&gt;</td>
<td>5-19</td>
<td>U.S. Army</td>
</tr>
<tr>
<td>Sulfotepp&lt;sup&gt;b/&lt;/sup&gt;</td>
<td>8</td>
<td>CCD/374</td>
</tr>
<tr>
<td>Parathion&lt;sup&gt;b/&lt;/sup&gt;</td>
<td>10-12</td>
<td>CCD/374</td>
</tr>
<tr>
<td>Parathion&lt;sup&gt;b/&lt;/sup&gt;</td>
<td>&quot;</td>
<td>Holmstedt, 1963</td>
</tr>
<tr>
<td>Mustard gas (H)</td>
<td>20-30</td>
<td>U.S. Army</td>
</tr>
<tr>
<td>Methylparathion&lt;sup&gt;b/&lt;/sup&gt;</td>
<td>30</td>
<td>Holmstedt, 1963</td>
</tr>
<tr>
<td>Cyanogen chloride (CK)&lt;sup&gt;b/&lt;/sup&gt;</td>
<td>39</td>
<td>U.S. Army</td>
</tr>
</tbody>
</table>

<sup>a/</sup> The structures of military chemical warfare agents listed here are given in document CCD/365 (Official Records of the Disarmament Commission, Supplement for 1972, document DC/235, annex B).

<sup>b/</sup> Commercial chemicals.
However, even if procedures are standardized, there will be a certain amount of variability in the measurements. It is to be expected that two laboratories using identical samples of chemical will still obtain slightly different toxicity values. This is because it is difficult to control precisely all the variables involved in making toxicity tests on animals.

In making toxicity measurements, a range of 20 per cent on either side of the average value is usually considered good. Studies on the reproducibility of oral toxicity values have demonstrated that a broader range should normally be expected. The ratio of the highest to lowest value is likely to be between 1.5 and 3 for oral toxicity values and may be as high as 10. (For parenteral toxicity values, the range may be somewhat smaller.) Usually, the LD<sub>50</sub> value reported is the average of a range of values.

The variability of toxicity values could pose a problem in applying a treaty prohibition in certain cases. Normally only one or two independent values will be available, and it is quite possible that these values will differ greatly from the average value that would be obtained from a large number of independent determinations. For a particular compound, one laboratory might report the compound to be more toxic than the limit while a different laboratory might conclude that it is less toxic.

This difficulty may be illustrated by assuming that the toxicity criterion has been defined to be an LD<sub>50</sub> of 0.50 mg/kg (mouse; subcutaneous administration) and that a standardized experimental procedure has been adopted. For a compound with an average LD<sub>50</sub> value of 0.36 mg/kg, which is below the limit, the possible results from different laboratories range approximately from 0.18 mg/kg to 0.54 mg/kg. If the value reported is greater than 0.50 mg/kg, it might be argued that the compound should not be prohibited. Analogously, for a compound which would have an average LD<sub>50</sub> value of 0.80 mg/kg, which is well above the 0.50 mg/kg limit, a single laboratory might report a value as low as 0.40 mg/kg. In this case, prohibition might well be advocated.

Obviously, some differences may arise about application of the prohibition to a specific compound even if a toxicity criterion is established. One possible way to help resolve such differences would be to have an appropriate independent laboratory measure the toxicity.

**Super-toxic dual-purpose compounds**

As noted above, it is unlikely that a toxicity criterion can be found that will cleanly separate single-purpose super-toxic CW agents from dual-purpose chemicals. A few dual-purpose compounds are likely to be more toxic than the limit established by the toxicity criterion. The data in table 4 indicate that most of these compounds will be drugs. Strict application of the toxicity criterion would lead to a ban on these super-toxic dual-purpose compounds. However, super-toxic drugs are produced in very small quantities and are not well suited as chemical warfare agents. It might be useful to consider application of the criterion in such a way that super-toxic drugs would not be prohibited. This might be accomplished by allowing super-toxic chemicals to be produced in quantities necessary for legitimate use as a drug if the use as a drug had been demonstrated beforehand.
In a previous working paper (CCD/367) the United States delegation described the environmental protection and safety procedures involved in current United States operations for demilitarizing limited quantities of chemical weapons. The example discussed was the planned demilitarization and disposal of nerve agent cluster bombs.

This paper describes in detail the actual procedures employed in disposal of mustard gas at Rocky Mountain Arsenal near Denver, Colorado, an operation that was completed in March 1974. Possible methods of verification of the disposal operation are also discussed. We hope that this information on the characteristics of actual disposal operations will be useful to the Committee in its consideration of verification of chemical agent destruction.

Background

In the fall of 1968 the Department of the Army decided to dispose of certain chemical agents and munition stocks, including the mustard agent stored at Rocky Mountain Arsenal near Denver, Colorado. These mustard stocks amounted to 3,701 tons and were stored as bulk in containers which hold approximately 0.9 ton of agent.

In response to an Army request a proposed plan for disposal at sea was reviewed in the summer of 1969 by a panel of experts under the auspices of the National Academy of Sciences. These experts, drawn primarily from leading industrial, educational and research institutions, recommended that the bulk mustard agent at Rocky Mountain Arsenal be destroyed by incineration.

This recommendation was adopted by the Army. A plan for disposal by incineration was prepared and made public. It was reviewed by interested agencies, as required under the National Environmental Protection Act, and revised. A final statement of the plan was made public in early July 1971.

Small-scale disposal operations were initiated shortly after the final statement was filed. During this stage of the operations, the disposal equipment was tested and minor changes in the disposal plan were made in order to resolve the few difficulties encountered. Full-scale disposal operations began in September 1972.

Outline of the disposal plan

Mustard gas decomposes rapidly at about 425°C to produce three gases - sulphur dioxide, carbon dioxide and hydrogen chloride. In the disposal operation, the mustard was destroyed by incineration. The incineration products were removed from the exhaust stream and converted to harmless salts.

Steps of the disposal plan

(1) Transfer of agent containers. The agent containers were stored in the toxic agent area at Rocky Mountain Arsenal. This area was under continuous security guard surveillance and the mustard containers were visually inspected for leakage by depot personnel (daily during warm weather and every three days during cool weather). Prior to removal from the area, the containers were checked for any possible liquid leakage by using a standard detection paper that changes colour when exposed to mustard. They were then loaded on a flat bed truck and were transported under security guard escort to the mustard plant area for disposal. As a safety precaution a decontamination truck followed the loaded truck.

(2) Unloading and thawing. Upon arrival at the mustard disposal facility, the containers were unloaded and placed in a thaw room where they remained for at least 48 hours at a temperature between 40°C and 60°C. The thaw room, as well as other areas of the facility where a potential hazard from mustard vapour existed, were maintained under a negative pressure. Since mustard gas freezes between 5°C and 15°C it was heated in the thaw room to get as much as possible of the solid residue from the bottom of the container into solution. The rare liquid leaks that occurred during this two-day period were trapped in a sump where they were decontaminated with a standard military decontaminant that reacts rapidly with mustard and achieves complete decontamination in about five minutes. These liquids were subsequently checked to ensure absence of mustard, added to the spent scrubber brine, and spray dried.

Any vapours which were generated were vented through the duct in the floor of the thaw room and removed from the air by an absolute filter system with essentially 100 per cent efficiency.

(3) Draining of containers. From this thaw room the containers were taken to the unloading booths by overhead crane, placed inside the booths and remotely attached to an evacuating hose. The mustard then was drawn off under vacuum. Determination of the quantity of mustard removed from the container was accomplished by weighing the container before and after the operation.

(4) Incineration of agent. The mustard which had been removed from the container was pumped into a holding tank from which it was later pumped to the incinerator. It arrived at the incinerator through double-walled piping and was sprayed into the incinerator where it was heated to temperatures of 750°C to 875°C for 0.3 second, thus thermally decomposing it completely. At peak efficiency the disposal rate was over 7 litres per minute.
(5) Scrubbing of effluent gases. In the incineration process sulphur dioxide and hydrogen chloride are generated. To wash these pollutants out of the effluent gases, the gases were passed through a scrubber system where they were brought into contact with a solution of sodium hydroxide, a strong caustic. This resulted in a brine solution of inorganic salts: sodium sulphate, sodium sulphite, sodium chloride and sodium carbonate. This salt solution was then evaporated to dryness and the residue of salts compacted. A test was performed periodically to verify that the salts contained no mustard.

The effluent gases were then passed through an electrostatic precipitator to remove particulate matter (mostly ferric oxide resulting from corrosion of the steel containers) before being exhausted from the stack.

(6) Disposal of salts. The compacted salts were transported in lined 55-gallon drums to a warehouse where they remain in storage pending final disposition. No decision has yet been made on the best method for disposal of the salts. Approximately 4,000 tons of salt were generated during the operation.

(7) Decontamination and disposal of containers. Prior to removal from the booth where it was emptied, each container was inspected and externally decontaminated if required. It was then moved to a temporary storage area. During the incineration of the bulk agent a separate incinerator furnace was used to decontaminate the containers.

In this process a container was removed from the storage area. Upon arrival at the furnace area, two holes were remotely punched in the container to provide ventilation and release of combustion gases in lieu of removing valves and plugs. Following this operation, the containers were placed in the furnace, where any residual mustard and impurities were incinerated. The amount of time that each container remained in the furnace depended on the amount of residue it contained initially; however, the average was about two hours at temperatures in excess of 425°C. The effluent from the incinerator operation was passed through a scrubber (sodium hydroxide solution) to remove the combustion products sulphur dioxide and hydrogen chloride.

Following cooling, quality control personnel checked the container with standard detection material to assure that all traces of mustard had been removed before it was transported to the holding area. The containers will be recycled as scrap metal.

Verification of agent destruction

In the disposal process described in the preceding sections, opportunities for verification appear to exist at several points. It must be kept in mind, however, that the characteristics of the disposal process may vary according to the type of agent being destroyed, whether the agent is stored in bulk or in munitions, and the safety and environmental regulations which must be followed.
Verification of disposal might be conducted in a variety of ways, depending upon the degree of access accorded verification personnel. At one extreme, verification might be limited to remote observation via closed-circuit television with no access to the facilities themselves. At the other extreme, unrestricted inspection of the disposal site might be permitted, including unrestricted access to all buildings and records and analysis of chemical samples.

In the paragraphs that follow, verification of disposal will be discussed using the United States procedure for disposal of bulk mustard agent as an illustration.

(a) Steps 1 and 2: Transfer of agent containers: unloading and thawing. In these steps there may be several indicators that toxic chemical agents are being handled. A few of the most recognizable indicators are:

a. Decontamination equipment readily available.

b. Workers in protective clothing and equipped with protective masks.

c. Toxic agent warning sign attached to vehicle.

d. Security measures, including a security escort front and rear when travelling.

By their nature these indicators would be easily observed. However, they could also easily be staged and their value for verification is therefore questionable.

(b) Step 3: Draining of containers. This step provides the first opportunity for positive assurance that a toxic chemical agent is present. This assurance can be achieved, however, only if full access to the facility is allowed. During the draining phase of the process, it would be feasible to tap the drain line to the storage tank. A small (10 ml) sample of liquid could be withdrawn and analysed to determine the type and concentration of agent. This would provide positive verification that agent was being drained from the container.

(c) Step 4: Incineration of agent. Verification at this step could provide the best assurance that toxic chemical agent is actually being destroyed. In the destruction of the mustard agent, the agent is transferred from the storage tank to the furnace through a single pipe. A tap valve could be installed in this pipe at the point just before the mustard is injected into the furnace for burning. As in the previous step, a sample could be withdrawn and analysed as to the type of agent and its concentration. Data over a period of time could be compared with data from the previous step to ensure the agent had not been diluted (part diverted and another liquid substituted).

Analysis of the salts could provide another method of verification. This might be considered less intrusive than sampling and analysis of the agent itself.
A mustard gas molecule contains one sulphur atom and two chlorine atoms. No other chlorine of sulphur compounds are involved in the disposal process. As a result, there should be a 2:1 ratio between chlorine and sulphur atoms in the salts. The salts resulting from mustard disposal at Rocky Mountain Arsenal have been analysed and found to have the approximately expected ratio.

A third method of verification might be to try to obtain a materials balance. Records would be needed for the quantity of agent to be destroyed, amount of caustic being added, and total weight of the end product salts. It is possible to calculate the amounts of salts which should be produced from disposal of a given quantity of a specific agent. For this method to work, there would have to be no loss of gases, liquid or solids, from the system. In other words, the system would have to be totally contained. This was not the case at Rocky Mountain Arsenal. As is typical of incineration, minor losses of gases were anticipated and did occur in the process (mostly sulphur dioxide being exhausted from the stack), which altered somewhat the total weight of salts produced as well as the relative quantities of the different compounds.

To assist in the materials balance procedure it would be useful to have a flowmeter in the line transferring agent from the holding tanks to the furnace.

(d) Steps 5-7: Scrubbing of effluent gases; disposal of salts; decontamination and disposal of containers. In the case of mustard disposal, these steps did not appear to provide any important additional opportunities for verification of destruction.

Preliminary comments and conclusions

(1) There are several indicators which could provide some assurance to observers that disposal operations were being carried out.

(2) A number of means for misleading observers exist, including the staging of indicators and substitution of an industrial chemical for agent.

(3) A high degree of assurance that no evasion is taking place during the disposal process could be obtained through technical methods of inspection.
As many delegations, including our own, have noted, there are three major categories of substances related to chemical warfare:

1) **Single-purpose agents.** These agents have no large-scale use for prophylactic, protective or other peaceful purposes. This category includes the super-toxic organophosphorus nerve agents, as well as some less toxic agents which have no important peaceful applications.

2) **Dual-purpose agents.** Chemicals in this category have important civilian applications, but might also be used as chemical warfare (CW) agents. Many of the CW agents used in the First World War are in this group, including phosgene (carbonyl chloride), chlorine and hydrogen cyanide.

3) **Precursors.** Chemical compounds used as intermediates in the production of super-toxic agents may or may not have civilian application. For example, phosphorus trichloride, a key precursor in the production of organophosphorus nerve agents, is widely used as an intermediate in the manufacture of pesticides and plasticisers. On the other hand, another important precursor, methylphosphonic dichloride, is not currently used in producing commercial organophosphorus chemicals (but could be in the future).

This suggests that verification of a ban on production of CW agents has two major aspects: (a) ensuring that single-purpose CW agents and single-purpose precursors are not being produced and (b) making certain that dual-purpose agents and dual-purpose precursors are not being diverted to non-peaceful purposes.

Several delegations have suggested that statistical monitoring of chemical production could play an important role in deterring diversion of dual-purpose chemicals to prohibited military uses. Under this approach, data on the production and consumption of raw materials and intermediates would be analysed to ensure that no diversion occurred. The United States delegation presented some preliminary conclusions and comments on this approach in a previous working paper (CCD/311, 23/25 August 1970). At that time we noted that there were certain problems and disadvantages to be overcome, particularly in regard to identifying deliberate attempts at deception.

The United States has continued its research on economic data monitoring in an effort to overcome some of the shortcomings identified in document CCD/311.

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Control system for phosphorus

Among the potential CW agents, super-toxic organophosphorus compounds are generally considered to pose the greatest danger. The structure of these agents and possible processes for producing them may vary widely; however, phosphorus is the one substance which is a key input for manufacture of any organophosphorus agent. This suggests that production of such agents might be prevented by establishing controls over elemental phosphorus and any phosphorus compounds which could serve as precursors ("divertible" phosphorus compounds). Controls would not cover "non-divertible" compounds.

A control system might be established to monitor the production, storage, transportation and use of all phosphorus compounds which can be used in the production of a nerve agent. The objective would be to ensure that all consumption of divertible phosphorus compounds could be traced to legitimate activities. To accomplish this task, the industrial enterprises which handle these materials would be required to maintain detailed internal records and to prepare periodic reports on all relevant activities. In addition, all transfers between plants of this kind would have to be documented by records prepared by the shipper, the carrier and the consignee. To ensure the accuracy of these industry-level reports, several types of checks would be incorporated into the system.

The administration and operation of the control system could be divided among several levels - industry, national control agencies and an international control agency. Industrial enterprises would be required to follow authorized material handling procedures, maintain adequate accounting records and report to the national control agency. The national body would have primary responsibility for applying the controls to enterprises which are within the territory of the State involved, or are under its jurisdiction or under its control anywhere. Verification that all industrial establishments have complied with all provisions of the control system would be provided by the national body to the international control agency. The international agency would oversee the entire system, analyse and audit reports from each national agency and monitor the international trade of controlled materials.

Verification

In order to provide a reasonable degree of assurance that no diversion is occurring, such a control system would need to be designed so that the accuracy of reports from industrial establishments and from the national control agencies could be verified. There appear to be three basic verification techniques which could be used by the control agencies to determine the accuracy of reports:
(1) analysis of statistical information presented in the reports, (2) examination and analysis of records, and (3) technical inspection. In this paper the discussion will focus on the verification activities of the international control agency.

The first step taken by the international control agency to verify the system's reporting accuracy would be analysis of the reports submitted by the national control agencies and perhaps by certain industrial enterprises. This would include review of the statistical data to ensure that all quantities balanced and that they were in line with those expected.

Periodically the international control agency would audit relevant records of national control agencies. In addition they would have the authority to conduct audits of national control agencies and individual industrial enterprises at any time to resolve discrepancies. While the procedures which would be followed are very similar to those employed in conducting a financial audit, they would, of course, be concerned with quantities of phosphorus and their disposition.

It would be necessary to develop a reliable system based on technical inspection for detecting false records. The types of technical inspection which could be employed are: (1) visits to certain chemical plants, (2) technical analysis of plant operating data, (3) analysis of samples of phosphorus-containing chemicals which are in inter-plant transit, and (4) monitoring of metering devices which provide independent information on plant production rates.

**Evasion**

There are two principal ways in which evasion could occur. Either the phosphorus material would be diverted from within the system or it would be obtained from sources outside the system's control. For evasion techniques which operate within the system, records and reports at the industry and national level would be changed to avoid detection from discrepancies, or imbalances, in the reports. By definition, evasions outside the system have no effect on the records and would have to be detected by other means.

**Possible methods of evasion within the control system**

The possible means of evasion within the control system which have been identified in our studies are summarized below:

1. An elemental phosphorus plant understates the production of phosphorus and diverts the excess to an agent plant.

2. A multi-product plant reports an incorrect production mix between divertible and non-divertible phosphorus compounds.

3. A plant overstates the production of a non-divertible item and diverts an equivalent amount of input material.
4. The amount of phosphorus in a product is overstated by a plant.

5. An establishment reports high loss rates of divertible material or low efficiencies in production processes which use divertible materials.

6. A plant uses wet process phosphoric acid (not produced from elemental phosphorus) to produce material and reports the production as using "furnace acid" (phosphoric acid produced from elemental phosphorus).

7. A country diverts small amounts of phosphorus from a large number of plants.

8. A plant fails to register its phosphorus recovery process.

9. A nerve agent plant registers as a legitimate industrial phosphorus user.

A detailed examination of the United States phosphorus industry has revealed the following concerning potential evasions within the control system:

1. The greatest potential for obtaining phosphorus for CW agent production appears to be diversion of elemental phosphorus. Diversion from the phosphorus production plant would require less record modification and would be more difficult to detect than other diversion methods.

2. Exports of elemental phosphorus and production of white phosphorus munitions, the only major end uses of phosphorus in the elemental (white) form, are also potentially major points for diversion.

3. Recovering significant quantities of phosphorus for agent production by reprocessing chemical end products appears to be the least feasible of the evasion procedures considered.

Evasions outside of the control system

Evasion might occur outside the control system in several ways:

1. An elemental phosphorus plant does not register with the control agency.

2. Nerve agent precursors are produced directly from phosphate rock, rather than from elemental phosphorus.

3. Phosphorus material for agent is recovered from an end use product.

4. Phosphorus material is imported from a country which is outside of the control system.

5. Phosphorus or phosphorus-containing precursors are stockpiled prior to agreement.
6. Demilitarization of obsolete chemical munitions or agents which are not entered into the system.

Preliminary evaluation of effectiveness

The verification technique discussed in this paper differs significantly from the economic data monitoring technique discussed previously (CCD/311) in that provisions for technical inspection have been incorporated. In the new approach, statistical data provide the background for combined use of audit and technical inspection procedures. This technique increases the utility of economic data monitoring since the audit and technical inspection procedures complement one another.

While conventional on-site inspections would be useful in some circumstances, they would not be highly effective in detecting some very important kinds of evasion within the system. For example, diversion of phosphorus from an elemental phosphorus plant is unlikely to be detected by observation of plant activities. At the time of the inspection the plant authorities most probably would not try to divert any phosphorus.

However, an unconventional kind of technical inspection might be effective in detecting certain kinds of diversion, including that illustrated in the previous example. This technique would combine a technical analysis of plant operating records with conventional records auditing procedures. The technical analysis would consist of a correlation of reported production figures with such data as (a) consumption of starting materials, (b) production of by-products, and (c) electrical power consumption. This type of audit would not necessarily be performed on-site; however, access to complete plant records would be required.

Two other kinds of technical inspection could also be very useful: (a) the analysis of samples obtained from inter-plant shipments, and (b) the metering of the production of elemental phosphorus and phosphoric acid. These techniques might help detect certain kinds of diversion that could not be detected any other way. For example, production metering would be the best way to prevent an attempt to divert phosphorus at an elemental phosphorus plant by understating actual production. Chemical analysis of samples of phosphoric acid would help forestall efforts to substitute "wet process" acid (produced from phosphate rock) for "furnace" acid (produced from elemental phosphorus) and then divert the unused phosphorus to agent production. "Wet process" acid contains relatively large amounts of impurities, which are not present in "furnace" acid.

For the control system to provide any deterrent to the diversion of phosphorus to nerve agent production, three specific measures should be provided in the operation of the system. First, the international control agency should have access to reports from individual enterprises. This is important because the statistical analysis of the reports submitted by an individual plant is one of the principal methods of detecting the diversion of phosphorus material. National reports would not contain sufficient detail to enable the international agency to detect statistically the material diverted by several of the possible evasion methods.
Second, the international control agency should be allowed to conduct an investigation of a plant's records. Unless an independent investigation is possible, evasion of the system would not be difficult. The risk of detection by an investigation could substantially increase the deterrent effectiveness of the system.

Third, technical inspection should be an integral part of the data validation procedure. A standard records audit would not be sufficient to verify the accuracy of the records.

A phosphorus control system, with the verification provisions discussed in this paper, could probably ensure that large quantities of phosphorus-containing chemicals were not being diverted from commercial channels to weapons purposes. In itself this capability would not be sufficient to provide adequate assurance of compliance. Diversion of some significant quantities could still be accomplished by a determined evader. In all likelihood, however, phosphorus would not be diverted from commercial channels but rather obtained from sources not subject to the control system.

Phosphorus monitoring could play a useful role in verifying compliance with a production ban, although further verification measures would also be needed.

20. SWEDEN

Underground nuclear test activities in the United States and the Union of Soviet Socialist Republics from 1969 to 1973 (CCD/438)

1. The aim of this working paper is to report on the recent test activities in the United States and the Soviet Union and to discuss the estimated yields of these explosions in relation to the threshold of 150 kt. agreed upon in the Treaty on the Limitation of Underground Nuclear Weapon Tests. The number of announced, or by seismological means detected, underground explosions in the two countries during the years 1969-1973 is presented below, together with yield estimates based on generally available seismological data.

2. The United States has, according to official announcements, carried out 86 underground nuclear explosions during these five years. Three of these explosions were announced as a part of the Plowshare project for peaceful uses of nuclear explosions. The yields and positions of these peaceful explosions have been released. Eighty-one of the remaining explosions have been conducted at Nevada Test Site and two on Amchitka Island. Seismometric data have been obtained and reported from all 86 explosions. Such data also indicate that at least 18 more explosions, which were not officially announced by the United States, have been carried out at Nevada Test Site, thereby bringing the total number of explosions in the United States to at least 104 in 1969-1973.
3. The Soviet Union has not officially announced any nuclear explosion in the years 1969 to 1973. The United States Atomic Energy Commission has announced 56 underground nuclear explosions as having been carried out in the Soviet Union during this time. Seismometric data have been reported from these explosions and such data also indicate that in addition to explosions announced by the United States Atomic Energy Commission, another 26 underground explosions have been carried out in the Soviet Union during these five years. Fifty-four of the total 82 Soviet explosions have been in test sites in Kazakhstan and on Novaya Zemlya. The remaining 28 explosions occurred in different places, mainly in the western parts of the Soviet Union and in the Caspian and Black Sea regions. Because of their locations these explosions are here taken to be part of a Soviet programme for peaceful uses of nuclear explosions.

4. The yield estimates are based mainly on seismometric short period amplitude and period data, reported from globally distributed stations. For a few recent events long period seismic data have been supplemented. The availability of calibration explosions, for which explosion yields and geophysical parameters of the explosion media are announced, is of crucial importance for an accurate yield determination. The availability of calibration explosions is foreseen in the recent threshold test ban treaty, through an exchange of calibration explosion data for each test site. The lack today of such calibration severely limits the accuracy of yield estimates. The need for such calibration explosions is greatest for test sites in the Soviet Union, as no yields whatsoever have been officially announced for the explosions there.

5. The United States has officially announced the yields of 12 underground nuclear explosions at Nevada Test Site in 1966 to 1968, with yields large enough to be observed at an adequate number of seismometric stations. These explosions were used as calibration explosions for estimating the yields of the Nevada Test Site explosions. Yields and other source data have also been published for two large chemical explosions in the Alma-Ata region of the Soviet Union and for two underground nuclear explosions for peaceful purposes in Uzbekistan. These four explosions were used as calibration explosions when estimating the yields of the Soviet explosions. These calibration explosions were, however, not located in any of the Soviet test sites. As the test sites and the other peaceful explosions were distributed over a very large area, considerable systematic uncertainty must be assigned to the yield estimates of the Soviet explosions.

6. The yields of the explosions at Nevada Test Site and at the Soviet test site in Kazakhstan have been estimated by a method described in a scientific report "Seismic source and transmission functions for underground nuclear explosions with known yields at Nevada Test Site", referred to in the Swedish working paper CCD/405. 24/ In the present computations more than 2,000 observations from nearly 100 seismometric stations were used. The yield estimates range by a factor of more than 1,000, from about 1 kt. to more than 1 Mt. The yields of the Soviet explosions outside the Kazakhstan test site were estimated using an mb (NOAA)-yields

24/ Official Records of the General Assembly, Twenty-eighth Session, Supplement No. 31 (A/9141), annex II.
relation obtained from the Kazakhstan explosions and the $M_s$-yield relation reported in the scientific paper "Surface waves from underground explosions", reproduced in the United Kingdom working paper CCD/363/Rev.1, employing $M_s$ observations at the Hagfors observatory in Sweden.

7. The detailed results will be published elsewhere and are only summarized here in table 1. It shows the number of explosions whose yields can be estimated with high confidence to be above respectively below the 150 kt threshold, and also the number of explosions for which reliable statement about the yield is not possible with the present data. This category is considerably larger for the Soviet than for the American explosions. The table shows that most of the explosions appeared to be well below 150 kt. and that only a small fraction of them appeared to be above 150 kt.

8. Improvements of the present estimates should become possible when the results of the yield calibration of test sites, as foreseen in the recent threshold test ban treaty between the United States and the Soviet Union, are made available.

### Table 1

**Summary of estimated yields of underground explosions in the United States and the Soviet Union in 1969-1973**

<table>
<thead>
<tr>
<th></th>
<th>United States</th>
<th>Soviet Union</th>
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<tr>
<td></td>
<td>Peaceful</td>
<td>Weapons tests</td>
</tr>
<tr>
<td>Stronger than 150 kt.</td>
<td>-</td>
<td>7</td>
</tr>
<tr>
<td>Around 150 kt. a/</td>
<td>-</td>
<td>8</td>
</tr>
<tr>
<td>Weaker than 150 kt.</td>
<td>3</td>
<td>86</td>
</tr>
</tbody>
</table>

a/ This line shows the number of explosions for which available seismometric data did not permit confident statements on whether they had yields below or above 150 kt.

b/ The events in this column are listed as peaceful because they occurred in places other than the two main test sites.

Letter dated 6 August 1974 from the leader of the delegation of Mexico to the Special Representative of the Secretary-General to the Conference of the Committee on Disarmament (CCD/439)

Original: English/Russian/Spanish

16 August 1974

My delegation considers that the contents of United Nations General Assembly document A/9293 of 8 November 1973 are of direct interest to the Conference of the Committee on Disarmament, especially in view of the contents of document CCD/431 of 16 July 1974. I should be glad, therefore, if you would kindly have it reproduced as a Conference document.

(Signed) Alfonso GARCÍA ROBLES
Leader of the delegation of Mexico to the Committee on Disarmament

GENERAL AND COMPLETE DISARMAMENT

Letter dated 6 November 1973 from the representatives of the Union of Soviet Socialist Republics and the United States of America to the United Nations addressed to the Secretary-General

We have the honour of transmitting to you the texts of the Agreement between the Union of Soviet Socialist Republics and the United States of America on the Prevention of Nuclear War (annex I) and the Basic Principles of Negotiations on the Further Limitation of Strategic Offensive Arms (annex II), signed by the General Secretary of the Central Committee of the Communist Party of the Soviet Union, L. I. Brezhnev, and the President of the United States of America, Richard Nixon, in June 1973, at Washington.

We request you to circulate the texts of these agreements as an official document of the General Assembly.

(Signed) Yakov MALIK
Permanent Representative of the Union of Soviet Socialist Republics to the United Nations

(Signed) W. Tapley BENNETT, Jr.
Acting Permanent Representative of the United States to the United Nations

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Annex I

Agreement between the United States of America and the Union of Soviet Socialist Republics on the Prevention of Nuclear War

The United States of America and the Union of Soviet Socialist Republics, hereinafter referred to as the Parties,

Guided by the objectives of strengthening world peace and international security,

Conscious that nuclear war would have devastating consequences for mankind,

Proceeding from the desire to bring about conditions in which the danger of an outbreak of nuclear war anywhere in the world would be reduced and ultimately eliminated,

Proceeding from their obligations under the Charter of the United Nations regarding the maintenance of peace, refraining from the threat or use of force, and the avoidance of war, and in conformity with the agreements to which either Party has subscribed,

Proceeding from the Basic Principles of Relations between the United States of America and the Union of Soviet Socialist Republics signed in Moscow on 29 May 1972,

Reaffirming that the development of relations between the United States of America and the Union of Soviet Socialist Republics is not directed against other countries and their interests,

Have agreed as follows:

ARTICLE I

The United States and the Soviet Union agree that an objective of their policies is to remove the danger of nuclear war and of the use of nuclear weapons.

Accordingly, the Parties agree that they will act in such a manner as to prevent the development of situations capable of causing a dangerous exacerbation of their relations, as to avoid military confrontations, and as to exclude the outbreak of nuclear war between them and between either of the Parties and other countries.

ARTICLE II

The Parties agree, in accordance with article I and to realize the objective stated in that article, to proceed from the premise that each Party will refrain from the threat or use of force against the other Party, against the allies of the other Party and against other countries, in circumstances which may endanger international peace and security. The Parties agree that they will be guided by these considerations in the formulation of their foreign policies and in their actions in the field of international relations.
ARTICLE III

The Parties undertake to develop their relations with each other and with other countries in a way consistent with the purposes of this Agreement.

ARTICLE IV

If at any time relations between the Parties or between either Party and other countries appear to involve the risk of a nuclear conflict, or if relations between countries not parties to this Agreement appear to involve the risk of nuclear war between the United States of America and the Union of Soviet Socialist Republics or between either Party and other countries, the United States and the Soviet Union, acting in accordance with the provisions of this Agreement, shall immediately enter into urgent consultations with each other and make every effort to avert this risk.

ARTICLE V

Each Party shall be free to inform the Security Council of the United Nations, the Secretary-General of the United Nations and the Governments of allied or other countries of the progress and outcome of consultations initiated in accordance with article IV of this Agreement.

ARTICLE VI

Nothing in this Agreement shall affect or impair:

(a) the inherent right of individual or collective self-defence as envisaged by Article 51 of the Charter of the United Nations,

(b) the provisions of the Charter of the United Nations, including those relating to the maintenance or restoration of international peace and security, and

(c) the obligations undertaken by either Party towards its allies or other countries in treaties, agreements, and other appropriate documents.

ARTICLE VII

This Agreement shall be of unlimited duration.

ARTICLE VIII

This Agreement shall enter into force upon signature.

DONE at Washington on 22 June 1973, in two copies, each in the English and Russian languages, both texts being equally authentic.

FOR THE UNITED STATES OF AMERICA:

(Signed) Richard NIXON
President of the United States of America

FOR THE UNION OF SOVIET SOCIALIST REPUBLICS:

(Signed) L. I. BREZHNEV
General Secretary of the Central Committee, CPSU
Annex II

Basic Principles of Negotiations on the Further Limitation of Strategic Offensive Arms

The President of the United States of America, Richard Nixon, and the General Secretary of the Central Committee of the CPSU, L. I. Brezhnev,

Having thoroughly considered the question of the further limitation of strategic arms, and the progress already achieved in the current negotiations,

Reaffirming their conviction that the earliest adoption of further limitations of strategic arms would be a major contribution in reducing the danger of an outbreak of nuclear war and in strengthening international peace and security,

Have agreed as follows:

First. The two Sides will continue active negotiations in order to work out a permanent agreement on more complete measures on the limitation of strategic offensive arms, as well as their subsequent reduction, proceeding from the Basic Principles of Relations between the United States of America and the Union of Soviet Socialist Republics signed in Moscow on 29 May 1972, and from the Interim Agreement between the United States of America and the Union of Soviet Socialist Republics of 26 May 1972 on Certain Measures with Respect to the Limitation of Strategic Offensive Arms.

Over the course of the next year the two Sides will make serious efforts to work out the provisions of the permanent agreement on more complete measures on the limitation of strategic offensive arms with the objective of signing it in 1974.

Second. New agreements on the limitation of strategic offensive armaments will be based on the principles of the American-Soviet documents adopted in Moscow in May 1972 and the agreements reached in Washington in June 1973; and in particular, both Sides will be guided by the recognition of each other's equal security interests and by the recognition that efforts to obtain unilateral advantage, directly or indirectly, would be inconsistent with the strengthening of peaceful relations between the United States of America and the Union of Soviet Socialist Republics.

Third. The limitations placed on strategic offensive weapons can apply both to their quantitative aspects as well as to their qualitative improvement.

Fourth. Limitations on strategic offensive arms must be subject to adequate verification by national technical means.

Fifth. The modernization and replacement of strategic offensive arms would be permitted under conditions which will be formulated in the agreements to be concluded.
Sixth. Pending the completion of a permanent agreement on more complete measures of strategic offensive arms limitation, both Sides are prepared to reach agreements on separate measures to supplement the existing Interim Agreement of 26 May 1972.

Seventh. Each Side will continue to take necessary organizational and technical measures for preventing accidental or unauthorized use of nuclear weapons under its control in accordance with the Agreement of 30 September 1971 between the United States of America and the Union of Soviet Socialist Republics.

Washington, 21 June 1973

FOR THE UNITED STATES OF AMERICA: FOR THE UNION OF SOVIET SOCIALIST REPUBLICS:

(Signed) Richard NIXON (Signed) L. I. BREZHNEV
President of the United States General Secretary of the
of America Central Committee, CPSU

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Introduction

1. In the United Kingdom's working papers, (CCD/401 and CCD/402), tabled on 28 June 1973, reference was made to the possibility of reducing the number of seismic disturbances which cannot be identified - or which may be wrongly identified - by the method of comparing the seismic magnitudes of the body wave and surface wave signals; the $m_b : M_s$ criterion. This criterion has been effective in discriminating between earthquakes and explosions but, in a large sample, there are a number of earthquake signals with $m_b : M_s$ characteristics more akin to those of explosions and this raises doubts as to the true nature of their sources. There is also the possibility of detonating a carefully planned sequence of explosions so as to produce seismic signals with earthquake-like $m_b$ and $M_s$ values.

2. In an attempt to improve discrimination in these instances, the United Kingdom initiated research programmes on seismogram modelling and on improving methods of depth estimation and, in this working paper the progress which has been made is reported.

Seismogram modelling

3. The nature of a seismic disturbance would be determined if it were possible to demonstrate that the waveforms recorded at a number of widely spaced stations could be matched by waveforms computed from an assumed source mechanism. Seismograms are relatively complex and, if it were possible to achieve a good match for a set of them from widely spaced stations, the likelihood of there being an alternative source mechanism solution giving as good a match is very small. Only in recent years have digital computers and automatic methods of presenting results in graphical form become fast enough to make attempts at modelling seismographs a practical proposition.

4. In the early days of seismogram modelling, the observed seismograms were matched by using a computer to generate sets of seismograms derived from a wide range of source models and then selecting that model which gave the best fit. This procedure was, however, very wasteful in computer time. With experience, it is now found that a rough model can be deduced from visual examination of the seismograms and an interpretation of them in terms of an earthquake or explosive source combined with geological and geophysical information on the source region. This initial model can then be refined by introducing minor adjustments.

An example of seismogram modelling

5. The value of seismogram modelling can best be illustrated by an example. The one chosen is a seismic event where the application of other criteria led to some uncertainty as to the nature of the source. On 1 May 1969, a seismic event occurred in East Kazakhstan for which the measured body wave magnitude, $m_b$, was 4.9 and the measured surface wave magnitude, $M_s$, was 2.5 giving an $m_b - M_s$ difference of 2.5. For earthquakes, $m_b - M_s$ is usually less than one magnitude unit and hence on the $m_b : M_s$ criterion the event would appear to be an explosion.

6. The attached figure shows the seismograms observed for the event at Yellowknife, Canada (YKA) (seismogram b) Warramunga, Australia (WRA) (seismogram e) and Gauribidanur, India (GBA) (seismogram h). The YKA and WRA seismograms show two arrivals separated by 7.5 seconds but whereas, at WRA, the second pulse appears to have reversed polarity relative to the first, at YKA no such reversal is obvious. However, if the effects of anelastic attenuation and of the recording system characteristics are removed by calculation, i.e. by "spiking", as in (a) and (d) in the figure, the reversal of the second arrival relative to the first is clearly observed. Consequently, the second arrival is probably the surface reflection, $pP$, of the first direct P-wave as described in document CCD/402, (the time interval of 7.5 seconds corresponds to a depth of focus of 25 Kms) rather than the result of two explosions separated by 7.5 seconds in time.

7. The seismogram (h) at GBA also shows, despite the relatively high background noise, two arrivals but these are separated by about 10 seconds. If the second arrivals at YKA and WRA have been correctly identified as $pP$ waves, the second arrival at GBA cannot be the $pP$ signal; $pP$ at GBA is either absent or, at least very small. Because of noise, the "spiked" GBA record, as in (g) in the figure, is difficult to interpret but there is a suggestion that the second arrival is reversed relative to the first.

8. The reversed polarity of the second arrivals in the seismograms indicating a deep focus for the source led to the tentative conclusion that the event was an explosion despite the contrary indications from the $m_b : M_s$ criterion, and this was confirmed by the subsequent modelling of the seismograms. The seismograms calculated from a conventional earthquake model with a source depth at 25 Km and suitably oriented with respect to the three recording stations are shown at (c), (f) and (i) in the figure. The agreement between the observed and calculated seismograms is clearly good. In particular, the model produces a large $pP$ signal at YKA and WRA and a small $pP$ signal at GBA. The model also produces a large arrival at GBA some 10 seconds after the arrival of the P-wave and this is evidently an $sP$ wave (a surface reflection of an initial shear wave).

9. The shapes of the P and $pP$ pulses at YKA (see (a) in the figure) are different; for the P pulse the leading edge is steeper than the trailing edge whereas for the $pP$ pulse the reverse is true. The earthquake model used to model the seismogram at (c) reproduces this observed characteristic. An explosive source in the model would have produced P and $pP$ pulses of similar shapes.

10. The correlation between the relative amplitudes and the polarities of the P,
pP and sP pulses at YKA, WRA and GBA and between the pulse shapes of the P and pP pulses at YKA in the observed and modelled seismograms therefore reinforces the conclusion that the event of 1 May 1969 was an earthquake rather than an explosion or two explosions.

11. In two respects the modelled seismograms fail to reproduce characteristics in the observed signals. The signal labelled PcP in seismogram (e) at WRA is not reproduced in the modelled seismogram. In fact a PcP pulse is to be expected at WRA whatever the nature of the source and it could have been included in the model. It was not so included in this case and hence its presence should be ignored in comparing the observed and derived seismograms. Second, the differences in pulse shapes at YKA should be seen in reverse at GBA which, being on an opposite azimuth from the source, should have trailing edge of the P pulse sharper than the leading edge and vice versa for the sP pulse. The simple source model on which the calculated seismograms are based fails to reproduce this particular feature; however this minor discrepancy certainly does not invalidate the conclusion that the event was of earthquake origin.

Some implications

12. A number of events, some more complex than the example described, have been modelled with satisfactory results. The analysis effort is much greater than that for reading arrival times, polarities, periods and maximum amplitudes which are the factors required for applying the currently accepted criteria for identifying seismic events. However, for the relatively few events which cannot be identified with adequate certainty by the application of current criteria, there appears to be no alternative but to make use of all the information available in the observed seismograms. It is considered that the modelling technique has now been developed to the stage where it can be included in the list of discrimination criteria. It has an advantage that it can be applied to events of smaller magnitude than those which can be reliably identified with the $m_b : M_s$ criterion.

13. As indicated in the example which has been described, an aid to arriving at a starting model is the application of the "spiking filter" technique to eliminate transmission and instrumental effects from the observed waveforms: this technique was described in document CCD/402 in connexion with the identification of the depth estimator, pP. In effect, the application of this technique broadens the response of the seismograph so that information about the source may be more readily deduced. Plans for a wider study, using a specially designed array of broad-band seismographs, were announced in document CCD/401. The application of known techniques for predicting and then decreasing the high level of background microseismic noise common to these seismographs, has produced results which will be reported when a substantial body of data has been accumulated.
YKA
\[ \Delta = 73.3^\circ \]
Azimuth = 6.0°
\[ m_b = 4.8 \]

WRA
\[ \Delta = 81.6^\circ \]
Azimuth = 127.6°
\[ m_b = 4.8 \]

GBA
\[ \Delta = 30.3^\circ \]
Azimuth = 180.8°
\[ m_b = 4.3 \]
This working paper presents the results of a joint Japanese-Swedish study of multistation \( m_b \) \( (M_g) \) discrimination, carried out within the framework of the agreement on co-operation between the two countries in the field of detection seismology (CCD/376). 27/

The thus far most powerful and generally accepted seismic method to discriminate between underground nuclear explosions and earthquakes utilizes the ratio of the radiated body and surface wave energies. The discrimination is in practice usually carried out in terms of the body \( (m_b) \) and surface \( (M_g) \) wave magnitudes and has in most cases been carried out using data from only one station. The explosion source is by its very nature symmetric, whereas the earthquake source generally is much less so. Differences in the propagation paths to different seismic stations may also affect the body and surface waves in different ways. Considering the differences in signal generation and propagation it seems possible to improve the discrimination capability by using data from more than one station and to interpret the multistation data in an optimal way.

In this working paper \( m_b \) \( (M_g) \) data obtained at the Matsushio Observatory in Japan (MAT) and the Hagfors Observatory in Sweden (HFS) for 30 events in the USSR have been used in a joint study to improve the discrimination capability.

Common data base

The events discussed in this study are restricted to mainland USSR, a region of significant interest in the discrimination discussion. Both HFS and MAT have good detection capabilities for events coming from this region. The common data for the presumed explosions cover the period January 1969-September 1972; for the earthquakes the corresponding period is January 1971-September 1972.

Earthquakes with depths greater than 70 kilometres are not included in this study. The HFS data for this study are selected from the event catalogues compiled at the Hagfors Observatory. The MAT data are obtained through a systematic search of the recordings covering the time intervals mentioned above. The numbers of events with \( m_b \) \( (M_g) \) at the two stations alone and in common are summarized below:

The number of common events is only about 25 per cent of the number of events with $m_b (M_s)$ data at either of the two stations. This reduction illustrates the difficulty of establishing significant common data bases. The source parameters of the common events are listed in table 1.

The map in figure 1 shows the relative locations of the events and of the two stations. For most of the events the two stations are in almost opposite directions. Most of the earthquakes are clustered in the Caucasus and Hindu-Kush. The explosions are located in Western and Eastern Kazakhstan, the Ural Mountains and at Novaya Zemlya. The epicentral distances between the stations and the events range from 2,000-5,500 kilometres for HFS and 2,000-7,500 kilometres for MAT. The magnitudes are in the range 5.6 $m_b (NOS) \leq 6.1$ and $4.8 m_b (NOS) \leq 6.0$ for explosions and earthquakes respectively.

Almost equivalent procedures are applied at the two stations to compute the magnitudes which are based on short- and long-period vertical component recordings.

**Discrimination**

The $m_b (M_s)$ data obtained at the HFS and MAT stations for the 30 common events are given in table 1 and shown in figure 2. In general the $m_b (M_s)$ data for the explosions and the earthquakes are separated, although the MAT data seem to merge at low magnitudes. Trendlines estimated for the explosions and the earthquakes using all available data at each station are also drawn in figure 2. These lines have quite different slopes for the two stations illustrating the different receiving conditions at the two places. The equations of these lines are as follows:

**EXPLOSIONS**

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<tr>
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<th>HFS: $m_b = (0.42 \pm 0.17) M_s + 4.59 \pm 0.62$</th>
<th>MAT: $m_b = (1.55 \pm 0.16) M_s - 1.63 \pm 0.79$</th>
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**EARTHQUAKES**

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<th></th>
<th>HFS: $m_b = (0.53 \pm 0.06) M_s + 2.79 \pm 0.24$</th>
<th>MAT: $m_b = (1.11 \pm 0.40) M_s - 0.37 \pm 2.03$</th>
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It might be noted that fortuitously the $m_b (M_s)$ values at HFS for the explosions used in this study all fall below the estimated trendline, which means that these explosions are more earthquake-like than can be expected on the average.
A linear discriminant, $D$, is defined for each station as $D = a_Q + b_Q M_s - m_b$ where $a_Q$ and $b_Q$ denotes the intercept and slope of the estimated earthquake trendline respectively. The mean values of $D$ for the earthquakes will thus be zero.

The $D$ (HFS) and $D$ (MAT) values plotted in figure 3 show that the discrimination capability increases considerably when data from both stations are considered simultaneously compared to what can be achieved by the individual stations. Various other ways of combining the $m_b$ ($M_s$) data have been tested but no further significant increase in discrimination capability could be achieved for this limited data set.

The promising improvements of the discrimination capability obtained in this study by combining data from two stations and similar results of a Canadian-Swedish study (CCD/380) 28/ of the combination of short period identification parameters might hopefully be the impetus to further multistation studies to consolidate these results. The acquisition of adequate common data bases is of crucial importance for the realization of multistation identification studies. Computation and exchange on a routine, and globally accessible, basis of seismological identification parameters from the most sensitive stations on the globe would facilitate the collection of the large common data basis necessary for the evaluation of the joint identification capability of the highly sensitive seismological stations operating today. Such a routine exchange of identification parameters would not only facilitate an international monitoring of the recently signed threshold treaty, but also provide data for the achievement of a generally acceptable monitoring capability for a comprehensive test ban.

28/ Ibid.
Table 1

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* Source data reported by the United States National Oceanic and Atmospheric Administration.
Figure 2

MS - MB AT HFS

MS - MB AT MAT
1. Introduction

Two basic factors in detecting and discriminating underground explosions are (1) the lowest threshold of the magnitude of seismic events that can be detected and (2) the accuracy with which the events can be located (epicentre and depth). This study considers the latter. If an event was located with a depth of more than several tens of kilometres with a sufficient accuracy, it cannot be regarded as an explosion. Or, if an event was located near populated areas or under the sea, it can be excluded from the discrimination process. The number of events that must be processed will, therefore, be considerably decreased.

In Japan, the location accuracy for local seismic events is very high on account of a dense network of seismic stations and also because of the adopting of the special travel times which have been constructed in accordance with the crustal structure in and near Japan. Especially, the Matsushiro Earthquake Swarm was located with very high accuracy as natural events because of the many temporary stations in the region. In this study, using these earthquakes of Ms larger than 5 as master events, the comparison was made between Japanese locations, which depend only on local data, and those by the International Seismological Centre (ISC) and the United States Geological Survey (USGS), which employ global data. Furthermore, in considering the detection and discrimination procedure for underground explosions, which probably cannot use local data, the teleseismic location accuracy is examined when only data at more than 2,000 kilometres in epicentral distance are used.

2. Locating method

To locate the Matsushiro Swarm Earthquakes by local data, the method called "geiger" or "Hodgson" was employed, and the travel times were constructed so as to fit the data obtained from many explosion experiments in and near Japan at near distances and to tend to those of Jeffreys-Bullen at epicentral distances of more than 2,000 kilometres.

3. Master events

Earthquakes of Ms larger than 5.0 among the Matsushiro Earthquake Swarm of 1966 and 1967 (table 1) were employed as master events. The accuracy of epicentre determination is ± 1 km. Figure 1 shows differences between epicentres given by ISC and by JMA (Japan Meteorological Agency) for the master events. Most of them are within ± 10 kilometres. ISC uses global data including local data given by
JMA, and this may seemingly mean that the accuracy of ISC location for these master events is higher than that of JMA. In fact, however, if ISC locations are adopted, the serious unreasonableness arises that observations in the near field deviate largely from the standard travel time curve. For instance, ISC origin times are later than Matsushiro arrival times. This is due to the fact that the far-field data subject to the heterogeneity in the crust and mantle of the earth distort the location and origin time when the least squares method is applied for a single standard travel-time curve.

Figure 2 shows differences between epicentres given by USGS and by JMA. The location accuracy of USGS is much lower than that of ISC. This is because USGS uses data from fewer stations, and the global coverage is also not very good. Especially for the Matsushiro Swarm the near-field data are much less than in the ISC location.

To examine the accuracy of location only by far-field data, such data from stations at more than 2,000 km from the epicentral region, which are shown in figure 4, are selected from the ISC Bulletin, and epicentres are recomputed. Figure 3 shows differences in this case and the result is the worst of all. This corresponds to the detection procedure for underground explosions, in which near-field data may not be available.

To compute the origin elements with better accuracy, (1) improvement of the standard travel-time curve, and (2) determination of station corrections, which compensate irregularities near stations and along the seismic path, are considered. In this working paper, method (2) is examined to see how much the accuracy can be improved. First, the mean deviation at each station from the standard travel-time curve of P waves was calculated and shown in figure 5, using the origin elements of master events obtained by very local data alone. Solid circles indicate the mean value with smaller standard deviations, and small open circles, those with comparatively larger standard deviations. Depending on the epicentral distances, stations corrections from -1 sec to as large as -5 sec were obtained. These station corrections are added to the observation data at corresponding stations, and the origin elements are recomputed again using only data at stations with more than 2,000 km in epicentral distance. The result is shown in figure 6. When figures 3 and 6 are compared, it is noticed that the result is much improved, 40-50 km of location error being reduced to less than 20 km.

4. Conclusion

This working paper indicates that the master event method is very useful in improving location accuracy. It must be understood, however, that a set of station corrections obtained from a master event is applicable only to that particular region. If other unknown regions are to be considered, a new set of corrections will have to be obtained, for the effect of the irregularities in the earth is different depending on different seismic paths. It was, accordingly, an important decision to mention in the Protocol to the Treaty between the United States and the Soviet Union on the Limitation of Underground Nuclear Weapon Tests that explosion data be exchanged for calibration purposes and that all nuclear weapon tests be conducted solely within the testing areas for the purpose of ensuring verification.
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Figure 1. Location differences between ISC and JMA.

Figure 2. Location differences between USGS and JMA.

Figure 3. Location differences between far-field data only and JMA.
Figure 4. Distribution of stations at more than 2,000 km. from the epicentre region
Figure 5. Station deviations from the standard travel-time curve.

Figure 6. Location differences between corrected stations and JMA.
25. MEXICO

Working paper on the practical application of article VI of the Treaty on the Non-Proliferation of Nuclear Weapons (CCD/444)

/Original: Spanish/
/22 August 1974/

At the 627th meeting of the Conference of the Committee on Disarmament, held on 16 April 1974, the Chairman of the delegation of Mexico made a statement (CCD/PV.627, pp. 25-26) on the subject indicated in the title of this working paper, the text of which is now being circulated in this form since there is no trace of it in the draft report prepared by the Co-Chairmen (CCD/443).

Concerning the cessation of the nuclear arms race, the information summarized below, which is taken from the most serious and trustworthy publications on the subject, is in itself adequate evidence of how the commitment undertaken in 1968 in the Treaty on the Non-Proliferation of Nuclear Weapons has been fulfilled - or, rather, not fulfilled.

(a) The most modern nuclear submarine in existence in 1968 cost $180 million. The one which has now replaced it costs $1,300 million.

(b) One of the super-Powers has substantially increased its stock of land-based ballistic missiles, while in the case of the other, there has been a qualitative increase through the development of the so-called "multiple independently targeted re-entry vehicles (MIRV)." The end result is, however, the same: the number of nuclear warheads with which the two super-Powers have equipped their intercontinental missiles, in a constant state of readiness for firing, from land bases, from submarines or from long-range bombers, which in 1968 came to a total, for both of them, of 3,700, will probably by 1975, still for both the super-Powers together, come to around 15,000.

(c) The military budget of one of the super-Powers, estimated at $68,000 million in 1968, is estimated at around $100,000 million for the current year. Similarly, the military budget of the other super-Power, which in 1968 was reckoned to be $40,000 million, appears to have increased in the same proportion, since it is reckoned at about $60,000 million for 1974.

Between 1968 and 1974 the cost of a nuclear submarine rose by more than 700 per cent, which alone is eloquent evidence of the enormous increase in its destructive power, while there was an increase of 400 per cent in the number of intercontinental missile nuclear warheads for firing from land bases, submarines or long-range bombers, and an increase of 50 per cent in military budgets.

This is how the nuclear super-Powers have interpreted their "intention to achieve" ... "the cessation of the nuclear arms race" and "nuclear disarmament" which they undertook in 1968 in the non-proliferation treaty.
ANNEX III

List of verbatim records of the meetings of the Conference
of the Committee on Disarmament

Verbatim records of the 627th to 638th meetings,
held from 16 April to 23 May 1974
CCD/PV.627-638

Verbatim records of the 639th to 654th meetings,
held from 2 July to 22 August 1974
CCD/PV.639-654

-180-