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in

SECOND PUGWASH CONFERENCE OF NUCLEAR SCIENTISTS

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Statement from the Second Pugwash Conference
Held at Lac Beauport, Quebec, March 31 - April 11, 1958

During the past two weeks an international conference of scientists has taken place at Lac Beauport, Quebec, to discuss the dangers resulting from the present atomic arms race, and means of diminishing them. A list of those attending is given below:

Professor M. L. Cliphant, Australia
Professor Cyrias Ouellet, Canada
Sir Robert Watson-Watt, Canada
Professor Chou Pei Yuan, People's Republic of China
Professor Bernard Gregory, France
Professor C. F. von Weizsäcker, Germany
Sir Charles G. Darwin, Great Britain
Professor C. F. Powell, Great Britain
Professor J. Rotblat, Great Britain
Professor C. H. Waddington, Great Britain
Professor A. M. Kuzin, Soviet Union
Academician D. F. Skobelzyn, Soviet Union
Academician A. V. Topchiev, Soviet Union
Academician A. P. Vinogradov, Soviet Union
Professor John Edsall, United States
Professor Morton Grodzins, United States
Mr. William A. Higinbotham, United States
Col. Richard S. Leghorn, United States
Professor Linus Pauling, United States
Professor Eugene Rabinowitch, United States
Professor Leo Szilard, United States
Professor Jerome B. Wiesner, United States

The Conference was made possible by the generous hospitality and assistance of Mr. and Mrs. Cyrus Eaton, and it originated in the following way:

In 1955, a public statement was issued by Lord Russell, Albert Einstein, and nine other scientists, directing attention to the dangers which had arisen as a result of the development of weapons of mass destruction, and calling for a meeting of scientists which would make a true and independent assessment of the

hazards. A meeting for this purpose was held in Pugwash, Nova Scotia, in July, 1957, which was attended by 22 scientists. That meeting published a statement concerning the dangers arising from test-explosions of nuclear weapons and the consequences which would arise from their use in warfare; the problems of control of nuclear weapons; and the responsibilities of scientists.

The meeting at Pugwash set up a Continuing Committee of which Lord Russell was the Chairman, and Professor Powell, Professor Rotblat, Professor Rabinowitch, and Academician Skobelzyn were members. The Committee was instructed to call further meetings, should they appear desirable.

Since the meeting in Pugwash, there has been a further intensification of the arms race. At a meeting of the Continuing Committee in London in December last, it was decided to call the present Conference. All the scientists invited warmly supported the objectives of the meeting, although some were unable to attend.

In calling the present Conference, the aim was to provide an opportunity for private discussion in which there could be a frank and friendly exchange of views on the many difficult issues which stand in the way of a general settlement among the powers and the establishment of a lasting peace.

Most of the discussions of the Conference were grouped under three main headings: the dangers of the present situation; means of diminishing the immediate dangers; and means of relaxing tension.

The topics discussed included: Dangers of wars arising from technological accidents or as a result of conflicts between small nations; the biological

hazards consequent on fall-out; the problems arising from the possibility of the acquisition of nuclear weapons by additional nations; problems posed by the development of long-range rockets; problems of bases on foreign territory; problems of large conventional forces; the political and technological aspects of a ban on tests; the problems of general political and military stabilization; short- and long-term policies aimed at establishing peace; the cooperation between nations in joint projects of a constructive nature; exchange of students and scientists; and measures for promoting international trust.

The Conference showed that in spite of different approaches to particular problems, there was a common agreement on the nature and magnitude of the grave dangers of our present situation, and a common desire to contribute to their removal by bringing about lasting peace through political settlements, and ultimately through far-reaching disarmament. The friendly atmosphere of the meeting, and a sense of common purpose, contributed greatly to the usefulness of the discussion.

Even in a short conference, it was found possible to make a serious appraisal of some of the decisive problems of our times. In a period of technological and scientific advance of unprecedented speed, we believe that scientists have a special responsibility and a special competence to promote informed opinion. With this aim in mind, the materials of this Conference will be made available to interested governments. It is not our intention, however, at this time to publish the details of our discussions and conclusions. Rather, each of us will seek to present the results of the Conference to scientists and others who may be interested.

The Conference recognizes the need to hold further meetings, some of which may differ from the present one in the number of participants and in general type. It favours the plan presented by the Continuing Committee to hold another Conference in September, probably in Austria, which will be more broadly representative and with a larger number of participants. In addition to discussing the findings of the present Conference, the next meeting will deal with the long-term problem, "Peace in the Atomic Age."

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PUGWASH CONFERENCE

Physicist Critical Of U.S. State Department

A distinguished American physicist, who had a leading role in the development of atomic energy, criticized here today at an international meeting of nuclear scientists the United States State Department's questioning of the good faith of the Russians in stopping bomb tests.

Professor Leo Szilard, of the University of Chicago, emphasized that he is in favor of the United States continuing its bomb tests for the purpose of developing "clean" bombs, but he added "that unjustified distrust is responsible for far more misfortunes in this world than is unjustified trustfulness."

Dr. Szilard, who is responsible for the letter written by the late Albert Einstein to President Franklin D. Roosevelt which started the U.S. Government on its development work on atomic energy, is attending the Second Pugwash Conference of Nuclear Scientists, which is meeting in a ski lodge at Manoir Saint-Castin, as the guests of Cyrus Eaton, Cleveland industrialist. The thirty top scientists from a dozen nations of both the East and the West will meet until April 11. The main discussions began this afternoon with the arrival of a four-man Russian delegation.

The scientists are meeting to attempt to reach agreement on practical suggestions for the statesmen of the world on how to end the nuclear deadlock facing the world. Earl Bertrand Russell, the English philosopher and Nobel prizewinning mathematician, has taken the lead in calling the conference.

Dr. Szilard, who was born in Hungary, came to this country in 1938, and became associated with the late Enrico Fermi, at Chicago University, where the first chain reaction took place in 1942. The basic patent issued on the atomic reactor used at Hanford for the production of plutonium was issued in the names of Fermi and Szilard.

SCIENTIST'S STATEMENT

Dr. Szilard's statement, delivered at a session of the conference today, follows:

"I rise to speak on a matter of personal privilege. I understand that while this conference has been in progress, Mr. Gromyko has issued a statement

saving that Russia is unilaterally halting the testing of bombs, and I am told that a spokesman of our State Department has responded to this statement by questioning whether it was made in sincerity and good faith. Those of us who are American citizens by accident of birth need not feel that they have any responsibility whatever for what the State Department may say, or do. But I, who am an American citizen, not by accident, but by choice, feel that I must apologize to my Russian colleagues — present at this conference — in the name of all scientists who are naturalized American citizens, and happen to think like I do.

"As you may know, I am not one of those who believe that the stopping of bomb tests, or even the stopping of the manufacture of bombs, will accomplish very much, and therefore I have never suggested that bomb tests be stopped. I believe, rather, that if disarmament is the answer to the problem created by the bomb — and I am not certain that it is — then nothing short of eliminating the stockpiles of bombs, as well as eliminating the means suitable for their delivery, may be regarded as an adequate measure.

"The American government might have some good and sufficient reasons for continuing the testing of bombs, and I, myself, am in favor of continued testing for the purpose of developing the clean bomb. However, the American government could very well continue with the testing of bombs, without attempting to cast doubt on Russia's sincerity. I, personally, believe that unjustified distrust is responsible for far more misfortunes in this world than is unjustified trustfulness.

"On the last day of the First World War, a friend of mine — a cavalry officer in the Austro-Hungarian army — was on patrol duty in the Carpathian Mountains. The patrol had been advised, on the eve of that day, that official notification of the conclusion of an armistice was expected to come through during the day. While he was riding through the forest at the head of his patrol, he suddenly found himself face to face with a Russian patrol, in the command of a Russian officer. Both officers reached for their guns and stood frozen, in silence, for a few seconds. Then, suddenly, the Russian officer smiled, let go of his gun, and saluted.

"I shall regret as long as I live," said my friend to me, when he told me of the events of that day, "that it was not I who saluted first."

DULLES TOPIC

"American, Russian and English scientists — present at this conference — are going to discuss many topics on which they are likely to disagree. They should also be able to find a few topics on which they are able to agree. There appears to be one topic, Mr. Chairman, on which most well informed Americans, Russians and Englishmen can be counted upon to agree, and which I therefore commend to your attention; that topic is: "John Foster Dulles."

Earlier, host Cyrus Eaton welcomed the scientists in the following words:

"My few simple words ought not to be called an address. When you profound men get together, you prepare what you are going to say with great care. But you do not expect that of me, because my part in this gathering is relatively humble and obscure.

"We had such a happy time at Pugwash that I wish you could have joined us there again for this Conference. As you know, however, we have no central heating in our summer buildings. So we came here to Lac Beauport, a spot to which my grandchildren and I have come skiing for several years, and which we have greatly enjoyed. Mr. Plamondon, the proprietor of the Manoir Saint-Castin, is the most gracious of hosts, who will do everything to make you feel at home.

GOOD RECEPTION

"What impressed me most about last summer's Pugwash Conference was the reception your findings received from the rest of the world. Thousands of letters have come to me from citizens in all walks of life in every part of the world; they all endorse the purpose of that meeting and rejoice in its findings. Timid statesmen have taken courage from Pugwash. More significant than this universal lay approval, however, is the fact that no scientist has raised his voice in disagreement with the Pugwash conclusions.

~~"This new meeting looms even more important than Pugwash, because the dangers appear more imminent than they were then. Certainly the world is watching with deep interest what you may think and suggest here. Hopefully the intelligence that produced the miracles of nuclear science may well also arrive at helpful solutions in the realm of politics. If the spirit of compromise can prevail here, then the world will strive to profit by your example.~~

~~"With Lord Russell, I am more than gratified that you busy men with so many urgent things to do and think about, could take the time to come the distance it has meant for all of you, to give earnest attention to the crucial problems you will consider.~~

MANY SPONSORS

~~"There is one thing that I know you will be pleased with. It was decided, after consultation with the Continuing Pugwash Committee, to suggest to a group of outstanding Canadians that they lend their names to this undertaking as sponsors. Of the fairly large group invited, only four were unable to comply, three of them for urgent personal reasons. Only one took exception to the purpose of the meeting. This I consider a tremendous tribute to the aims of this Conference. It not only shows the profound interest of outstanding people of Canada, but also would, I think, be typical of the world's attitude toward the grave problems you are to consider.~~

~~"Speaking of frankness, I hope that all who are here will feel free to be completely frank in expressing their own points of view on any subject that is under discussion. Your talks here will be entirely private. Not only can you express your deepest convictions here with safety, but if you want to go further and speculate a little, you can do so without being accused of having adopted what you tentatively suggest as final conclusions.~~

~~"I am fascinated with the purpose of this Conference. I am grateful that you should have come these far distances. I cannot tell you how eagerly I look forward to the results of your deliberations together."~~

(For release on April 1st, 1958.)

STATEMENT made by LEO SZILARD on APRIL 1st, 1958.

Mr. Chairman,

I rise to speak on a matter of personal privilege. I understand that while this conference has been in progress, Mr. Gromyko has issued a statement saying that Russia is unilaterally halting the testing of bombs, and I am told that a spokesman of our State Department has responded to this statement by questioning whether it was made in sincerity and good faith. Those among us who are American citizens by accident of birth need not feel that they have any responsibility whatever for what the State Department may say, or do. But I, who am an American citizen, not by accident, but by choice, feel that I must apologize to my Russian colleagues - present at this conference - in the name of all scientists who are naturalized American citizens, and happen to think like I do.

As you may know, I am not one of those who believe that the stopping of bomb tests, or even the stopping of the manufacture of bombs, will accomplish very much, and therefore I have never suggested that bomb tests be stopped. I believe, rather, that if disarmament is the answer to the problem created by the bomb, - and I am not certain that it is - then nothing short of eliminating the stockpiles of bombs, as well as eliminating the means suitable for their delivery, may be regarded as an adequate measure.

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American, Russian and English scientists - present at this conference - are going to discuss many topics on which they are likely to disagree. They should also be able to find a few topics on which they are able to agree. There appears to be one topic, Mr. Chairman, on which most well informed Americans, Russians and Englishmen can be counted upon to agree, and which I therefore commend to your attention; that topic is: "John Foster Dulles".

April 9, 1958.

Type of Communique Proposed by Leo Szilard.

In the following I am submitting, as a basis for discussion, a first rough draft of a communique which is limited to a listing of the topics discussed at the conference. We could attempt, by careful choice of the topics listed, to convey to the public the impression that we have focused our discussion on topics which are really relevant and that we are aware of the difficulties which are slowing down progress towards reaching an agreement among the Great Powers. The list of topics given in my draft is selected with this view in mind.

The list includes a few topics which have been discussed in private only, but which have so far not been discussed at any of the official meetings. If the conference believes that the list of topics listed by me would particularly well fulfill the purpose that we want to accomplish by releasing a communique, then I would propose that (at one of the next few sessions) we devote, say, two hours to the discussion of those of the topics listed below which have not as yet been discussed at the official meetings: -

1st ROUGH DRAFT OF TEXT OF COMMUNIQUE
PROPOSED by LEO SZILARD

We have tried to discover at our conference what the most important issues may be that are relevant to the reaching of an international agreement, among the nations of the world, aiming at establishing peace on the basis of arms limitations and political settlements.

1. We have discussed the proposal that has been made by the Soviet Union to prohibit the use of atomic weapons. Such a prohibition could be accomplished by unilateral declarations of the Great Powers to the effect that they will not resort to the use of atomic weapons in case of war as

long as no such weapons are used against them. In this connection we discussed the reasons which might be responsible for the reluctance of America and Great Britain to accept this proposal.

We also discussed the possibility of unilateral pledges relating to the use of atomic weapons in case of war, which would stop short of the Russian proposal for absolute prohibition of the use of atomic weapons, but which might impose nevertheless some, perhaps important, limitations on the use of atomic weapons.

2. We have discussed the possibility of stopping the bomb tests at this time.

We have examined the arguments of those who wish these bomb tests to be stopped mainly because of the ensuing radioactive contamination of the atmosphere, and also the arguments of those who wish these bomb tests to be stopped because they think that this would be a good first step towards achieving far-reaching disarmament.

We have also listened to arguments put forward against the stopping of the bomb tests at the present time on the grounds that, as long as Russia and America retain large stockpiles of hydrogen bombs, it would be desirable to replace the powerful "dirty" hydrogen bombs in these stockpiles by powerful "clean" hydrogen bombs. These arguments were based on the belief that it will take further tests before America and Russia may be able to build powerful hydrogen bombs that are "clean", and yet small and light enough to replace the comparable powerful "dirty" hydrogen bombs that may now be stockpiled in America and in Russia.

We have also discussed the possibility of a limited prohibition of bomb tests in the sense that only bomb tests may be prohibited which spread

radioactive dust outside the territory of the nation conducting the tests. Such tests are, on the one hand, particularly objectionable, and on the other hand, easily detectable without an elaborate inspection system extending into the territory of the nation which conducts the tests.

We have further discussed in what way - if there should be an absolute prohibition of bomb tests - Russia, America and Britain might convince each other that the prohibition was not secretly violated.

3. There is a school of thought, particularly influential in the United States, which holds that even though Russia and America may possess large stockpiles of powerful hydrogen bombs - either "clean" or "dirty" - a local war may be fought with small atomic bombs used against soldiers in combat, or for disrupting communication lines on both sides of the pre-war boundary, without incurring an appreciable risk that the local war may turn into an all-out atomic war. Many adherents of this school of thought also believe that the powerful bombs which both countries possess will remain unused and will not effect either the course or the outcome of the local war. - We have discussed whether or not these beliefs are valid.

4. We have discussed the policy, stated in a recent British White Paper, according to which "...if Russia were to launch a major attack upon them (the democratic western nations), even with conventional forces only, they would have to hit back with strategic nuclear weapons." - We have discussed whether or not such a policy is acceptable from a moral point of view, and we have also discussed whether or not such a policy is likely to achieve the purpose for which it was intended.

5. We discussed the possibility that America, Russia and Britain might

be able to agree, in the not too distant future, on freezing the size of the stockpiles of large H-bombs (as well as, perhaps, also the stockpiles of the smaller bombs) that they may retain in their possession. In this connection, we have examined ways and means through which these nations could convince each other that there is no valid reason for either of them to fear any secret violation by the others, of the limitations agreed upon.

6. As long as large stockpiles of powerful hydrogen bombs are retained by the Great Powers, they represent inherently a menace to mankind, and the ultimate elimination of all hydrogen bombs as well as atomic bombs -- together with the means suitable for their delivery, such as jet bombers and long-range rockets -- is therefore a goal which is probably regarded as desirable by all.

It may be assumed, however, that between the limitation of the size of the bomb stockpiles and the step of the total elimination of the bombs from national armaments (which is the crucial step from the point of view of achieving far-reaching disarmament), there might be a time interval which we may estimate to be quite short or very long, depending on our appraisal of the willingness of the governments to take this crucial step. During that time interval, there might be a stalemate between the strategic striking power of America and Russia.

7. While such a stalemate is being maintained an atomic war might break out that neither Russia nor America wants, either more or less accidentally due to flaws in technical arrangements, or else for political reasons through the intervention of America and Russia in some local conflict on opposite sides.

We have discussed both what kind of an understanding between the Great Powers that relates to technical matters, and what kind of an understanding between them relating to political matters, might be required in order to diminish the danger of the outbreak of an atomic war which neither of them want.

Concerning the political settlement, the question was raised whether Russia and America might not reach an agreement to the effect that (perhaps after an initial readjustment) they will discourage, and perhaps in certain cases actively oppose, the changing of the status quo through military action on the part of one nation or a group of nations, which results in the violation of the territorial integrity of any of the existing nations. This would not necessarily mean that America and Russia would agree to the freezing of the status quo in all areas of the world, but it would mean that any change in the status quo would have to be made with the agreement of the nations involved, as well as the consent and approval of America and Russia.

The question was raised whether, in certain areas of the world, peace among the nations of that area might not be stabilized by maintaining in that region an armed force, under the command of a regional, inter-governmental organization, equipped only with conventional weapons and restricted in its responsibility to protect the nations of the region against violations of their territorial integrity through military action by any other nation of the region provided that such armed forces were set up with the consent and approval of both America and Russia (either within or without the framework of the United Nations Organization).

In this connection, the question was raised whether such regional forces - which would be established with the consent and approval of America, as well as of Russia - might not be set up under the auspices of the United Nations. It was pointed out that at the end of the last war, it was generally believed that as long as the Great Powers act in concert with each other, the United Nations Organization may be able to guarantee the security of the smaller nations, and may make it un-

necessary as well as impossible for them to go to war with each other. Attempts to use the United Nations for purposes other than those for which it was designed have weakened - in the past 10 years - this organization. The question was raised whether these attempts may have damaged this organization beyond repair, or whether - assuming a political settlement among the Great Powers - it might be possible to utilize the United Nations for the purpose for which it was originally created. In the latter case, maintaining regional armed forces, under an inter-governmental command, under the auspices of the United Nations or outside the authority of the United Nations, might be practicable in certain areas of the world, but still impracticable in others.

One of the areas which are very important from the point of view of the preservation of peace is the Continent of Europe. We have discussed what the consequences might be if the Great Powers decided to freeze the status quo in Europe, and we have discussed the difficulties that stand in the way of changing the status quo, with the agreement of the nations of Europe, as well as with the consent and approval of Russia.

We have discussed the advantages and risks that would be involved in creating, on the Continent of Europe, an extended area free of atomic weapons and generally at a low level of armaments. We have also discussed whether such a solution is compatible with freezing the status quo, and whether there are any changes in the status quo that might make such demilitarization of the Continent
more
of Europe/acceptable to the nations of Europe as well as to America and Russia.

7. We have examined the nature of the stalemate between the strategic striking forces of America and Russia, as it exists at present. We have also tried to

look into the future and to examine in what respect the nature of this stalemate will change when both America and Russia may possess a stockpile of intercontinental ballistic missiles carrying a warhead of large hydrogen bombs, either "clean" or "dirty". We have examined to what extent it would be correct to assume that in a stalemate based on such intercontinental ballistic missiles it will be technically possible to protect the launching sites from being knocked out through an aerial attack, and to what extent it would be justified to assume that, for a while at least, there will be no possibility of destroying either the launching sites or the intercontinental ballistic missiles themselves while they are in flight towards their destination.

The question was raised whether if a strategic stalemate came into existence, based on intercontinental ballistic missiles - as described above - it might be possible for the Great Powers to cooperate in preventing a further arms race aimed at developing weapons suitable for the destruction of the launching sites, or of the intercontinental ballistic missiles themselves while in flight.

We discussed a number of possibilities through which an atomic war might break out more or less accidentally through the imperfections of the technical arrangements and against both the desires and interests of the powers possessing atomic weapons. We further discussed ways and means how this danger could be diminished through an understanding between Russia and America relating to the technical problems involved.

From The London Times
Saturday, March 22, 1958

DEBATE ON THE
BOMB
WHAT A SCIENTISTS
THINKS

TO THE EDITOR OF THE TIMES

Sir, - Perhaps as a result of the successful launching of the "sputnik" by the Russians, scientists are not considered expendable in the United States at the present time. This makes it easier for them publicly to state disagreeable political truths.

Since no other groups exist which can indulge in stating such truths with quite the same degree of impunity, perhaps there now devolves upon us scientists the duty of playing, in this respect, the role of the ancient prophets. Impelled by these considerations, I wish to say the following:-

The British Government, in a recent White Paper, have stated that" ... if Russia were to launch a major attack upon them (the democratic western nations), even with conventional forces only, they would have to hit back with strategic nuclear weapons." Since one can hardly doubt that Russia would retaliate in kind, this declaration may be regarded as a threat of murder and suicide. A threat of murder and suicide, made by an individual, would be wholly ineffective unless that individual were thought to be "crazy". Clearly, the Cabinet would have to follow up the publication of the White Paper by a policy deliberately aimed at creating the impression of being "crazy", in order to render their otherwise ineffective threat sufficiently believable to have a "deterrent" effect. (At this point, the Editor of The Times omitted, with my consent, the following sentence: - Sir Anthony Eden's cabinet very nearly created such an impression -- in Russia as well as in America -- through their armed intervention in Egypt; there is no reason

why their successors should not be able to do equally well, or better, in this regard, if they put their minds to it.)

I trust that most of your readers will agree with me that the issue of the H-bomb is far too serious to be treated in a "letter to the Editor" in any but such a whimsical manner. Still, in order to make certain that I may not be misunderstood, let me add the following: I have no quarrel with those who say that Britain cannot protect her so-called "vital interests" in the world by leaning on her own military strength, if she is not basing her strategy on her stockpile of H-bombs. However, they frequently also imply that Britain could, in fact, safeguard her vital interests by leaning on the H-bomb - which, unfortunately, does not follow. Are the grave dangers to which Britain exposes herself through the possession of H-bombs truly outweighed by good and sufficient reason for basing her strategy on the H-bomb? My British colleagues may be in a better position to give an answer to this question than I am.

I am not one of those who believe that much of importance may be accomplished by halting the bomb tests, or even the further manufacture of bombs. I believe rather that if the solution of our problem can be achieved through disarmament at all, then nothing short of getting rid of the stockpiles of bombs, as well as the means suitable for their delivery, can be regarded as an adequate measure. However, even if America and Russia both ardently desire to rid the world of the bomb, they might still find it impossible to attain this goal. It might thus very well be that we shall have to live with the bomb for a long time to come, whether we like it or not.

It is well to keep in mind that the situation of America and Russia, with respect to the bomb, is very different from that of Britain. There might be a transitional period in which Russia will have a superiority in rockets, but it is reasonable to assume that, before long, a real stalemate will exist

between the strategic atomic striking forces of the United States and those of the Soviet Union. Such a stalemate will be instable and sooner or later erupt in an all-out atomic war (that neither Russia nor America wants) unless constructive measures are taken, by the Governments of these two nations, aimed at eliminating the causes of this instability.

So far, neither of these two Governments appear to have given adequate consideration to the requirements of stability in an atomic stalemate. Moreover, I fear that they are not going to buckle down to thinking over these requirements in detail until they actually begin to discuss with each other the technical and political aspects of the issues involved. The sooner they do this the better off we shall all be.

Yours very truly,

LEO SZILARD

The Enrico Fermi Institute for
Nuclear Studies,
The University of Chicago,
Chicago, March 17, 1958.

The following reply by Lord Halsbury appeared in The Times a few days later.

NUCLEAR DILEMMA

TO THE EDITOR OF THE TIMES

Sir, - In stating his views on the political and military wisdom of developing H-weapons, in his letter on March 22, Professor Szilard adds that the services of us scientists are now available in the role of the ancient prophets. Whether their mantle has descended on Canon Collins or Father Coplestone, I know not; but it is undetectable on the shoulders of Professor Szilard, whose views reflect expediency rather than morality.

I am sure that the great majority of scientists would claim no status more exalted than that of citizens with as difficult a decision before them as before others. A training in physics entails no exceptional insight into moral or political questions and "we scientists" should not be tempted into so foolish a conceit.

Yours faithfully,

HALSBURY,
1, Tilney Street, W.1.

CONTROL AND LIMITATION ON THE USE OF WEAPONS

We would all readily agree, I am sure, that the starting point for seeking a solution to the world's most crucial problem is a correct definition of that problem. I respectfully submit for your consideration (1) the proposition that we have not yet properly defined the problem (2) a suggested statement of the problem, and (3) a preliminary sketch of the approaches to be followed in deriving a solution, and a few tentative notions about the solution.

I What The Problem Is Not

We have spent a lot of time discussing the chicken-and-egg question: which comes first, political settlements or disarmament? The discussion has led, if anywhere, to a vague consensus that perhaps we must pursue both at the same time. The reason we do not get solutions with such discussion is that neither of these issues represents the problem.

Political conflicts of interests -- whether their origins are historical, economic, psychological, ideological, geographical, or what have you -- will always be with us. Conflict of interest is in the very nature of life.

We must of course make continuous exertions to solve ^{outstanding} ~~understanding~~ political issues. And we must work steadily to develop techniques and institutions for the peaceful resolution of international political conflicts of interest, and for peaceful change. But in these pursuits, we must never assume that all conflicts can be resolved for all time, or that new conflicts of interest won't arise as we resolve the old.

"Disarmament" is an equally false statement of our objective. Peace is

not a vacuum. Among groupings of humans and nations there will always be aggressive inclinations in some. Temptation to violent action will never be missing.

They are more correct who say that the means of war cannot be reduced or eliminated until the causes of war are reduced or eliminated. And when one says "Let us disarm," what does he mean? To rid the world of nuclear weapons? rocket missiles? aircraft, tanks, and submarines? pistols and machine guns? bows and arrow? sticks and stones?

Thus man can neither look forward to abolishing conflict of interest nor the means of conflict. And yet man desperately needs protection from organized violence by his fellow-men. If the pursuit neither of political settlements nor disarmament offers sufficient promise, where can he turn?

II The Problem Facing Us

The real problem with which this group should be coming to grips is the following: ~~the~~ design of a world security system that meets the following specifications: (1) it must deter small or large armed aggressions, (2) it must deal with the valid security fears of all nations to their reasonable satisfaction; (3) it must minimize the dangers of and from accidental, fanatical, or catalytic wars; (4) it must liberate a substantial percent of the vast economic and technological resources of the world, now enslaved by the arms race.

As a part of the world security system, we must study and define the rules of the world security game, as well as the tools of the system. Furthermore, I believe it might be realistically stated that this system could be designed by the U.S. and U.S.S.R., taking account of the advice of their respective allies but

proceeding regardless of their consent. A world security system that provided for U.S. and U.S.S.R. security would, I believe, turn out to provide pretty well for the security of their allies, and of other nations. Later, if special modifications need be made to accommodate special problems of other countries, they could readily be sorted out as refinements to the world security system. But to attempt to deal initially with all the special security apprehension of U.S. and U.S.S.R. allies is to bog progress down in a morass of details.

For the U.S. and U.S.S.R. have all they want -- except peaceful security. Both countries at this moment of history are relatively self-sufficient in resources, in land, in production and technological capabilities. Psychologically, neither needs to prove any longer that it is a first class world power. Both can readily renounce the use of force and are strong enough in modern weapons to impose such a renunciation on all other countries of the world who, if they attempt force in seeking national objectives, may well present undesirable risks to the Big Two. The enforcement of world peace is not only the price of world leadership, but is in the mutual interest of the U.S. and U.S.S.R.

There is another interesting way to regard the present moment in human history. Humanity is presented not only with its greatest threat, but also with its greatest opportunity to eliminate the institution of war. For modern weapons, if they can but be placed under proper control in a sensible world security system, incorporating appropriate safeguards against accidents and fanaticism, -- then modern weapons can provide an efficient, low-cost system to take the profit out of war by anyone -- to reduce to the vanishing point for every nation the probability of war for gain. As in particle physics, if we but search hard

enough, we can find the positive opportunity which exists along with the negative threat from modern weapons.

I would like to elaborate a little on specifications (1) and (2) for our world security system -- (3) was dealt with in my paper a few days ago on the problem of accidental war, and (4) hardly needs clarification.

A deterrent to war consists of three parts -- (1) the military capability to present a potential employer of military force with a probability of loss far in excess of his probability of gain, (2) the will to use this capability, if necessary, and (3) sure knowledge by the nation who might be tempted, of the capability and will to use the deterrent power. These deterrents must consist not only of military capabilities in being, but also of tacit or explicit rules for their use which not only do not weaken the will that they be used, if necessary, but which also are well known and understood by nations that might be tempted to use force to achieve national objectives. The design of the tacit or explicit rules of the security game are every bit as important as the design of the tools. Security strategies are as much a part of the problem as deterrent or inspection devices.

Specification (2) for our world security system was that it should meet valid security fears principally, at first, of the U.S. and U.S.S.R. These I take to be as follows:

Valid U.S. Security Fears

1. Aggressive action by massed conventional Soviet and Chinese forces.
2. Possible future Soviet armed supremacy because of lack of information that might have warned of an impending build-up or technological

break-through.

Valid U.S.S.R. Security Fears

1. U.S. military bases on foreign soil
2. A reunited Germany armed with modern weapons
3. Distribution of atomic and rocket weapons to European nations

Valid Mutual Security Fears

1. Mass surprise attack
2. Accidental war
3. Spread of modern weapons to many other powers

III Tentative Gropings Toward A Solution

If I were the systems engineer that was assigned the problem of designing a world security system to these specifications, I believe I would begin to test with operations analyses and gaming techniques certain tentative solutions. The ones I have been weighing in recent years during the odd moments I am able to devote to this, my avocation, I would like to attempt to summarize briefly, without attempting to spell out the rationale behind these tentative conclusions.

A. Strategic Component of the Security System

First, and most importantly I envision a stabilized retaliatory stand-off between the U.S. and U.S.S.R., comprised of relatively invulnerable one and/or two stage intercontinental weapons delivery systems, equipped with "clean" thermonuclear warheads.

Sufficient mutual and/or UN arms controls would be in effect to stabilize these retaliatory strengths and prevent their developing into a counter-force capability. Such controls probably would include:

- (a) ground control posts to warn of surprise attack particularly while retaliatory bases are relatively vulnerable.
- (b) a controlled "production cut-off" immediately and the controlled gradual transfer of weapons materials to peaceful stocks
- (c) a controlled ban on detectable dirty nuclear weapons tests immediately and "clean" weapons tests once adequate clean weapons know-how were available to both countries
- (d) limitations on long-range military rocket tests, adequate to prevent development of delivery accuracies which might tempt counter-force ambitions, and adequate to maintain the infeasibility of ballistic defenses
- (e) limited conditions on the use of long-range rockets against each other, such as (1.) unless the other party initiates their use, or (2.) in numbers actually used by the other, or (3.) not to use "dirty" retaliatory weapons unless the other initiates such action.

We should note particularly that the characteristics of hard bases and clean weapons provide opportunities to strengthen deterrence by enhancing the will to use deterrent forces if necessary. Clean weapons in the relatively small numbers required for retaliation without counter-force actions virtually eliminate the risks of a radioactive boomerang. And hard bases provide the opportunity to delay retaliatory blows to permit evacuation of populations from cities. Thus retaliation could and should in my view be brought to the state where its blows are aimed only at city structures, and both military and civilian populations are spared.

This situation also offers possibilities for the use of the strategic retaliatory force as a deterrent to local wars; Prof. Szilard first suggested

something of this sort several years ago, and he has developed these ideas further in his accompanying paper today.

And I would also again call your attention to the Fort Knox analogy I drew the other day; although not a state of disarmament, the world would have a very tolerable low-cost security system against the remote possibility of direct U.S. or U.S.S.R. aggression.

B. Local Component of the Security System

I envision local national forces to be only conventional forces under arms controls previously discussed, to prevent the atomic and rocket nth country problems. They would be further limited by a manpower control that would keep the number of military effectives to a reasonable figure, but as this is not a critical aspect of the proposed security system, I will not elaborate the point here. These national security forces would be supplemented by U.S., U.S.S.R., or U.N. defensive atomic capabilities supported by air or naval lift to provide a fast response time.

The key feature of this local deterrent would be the condition governing use of these defensive atomic capabilities. The rule of this component of the world's security system would be as follows:

Atomic weapons would be made available to nations requesting security help for use only in strictest self-defense; that is, only on that nation's side of the de facto, pre-aggression political boundary.

From a moral and legal standpoint there is ample support and precedent throughout history to justify the use of the best weapons available purely in self-defense. Retaliation is an unstable concept of limited moral depth, but I do not

see how it can be avoided for the strategic component of the system, pending development of world law enforceable on individuals. But the local component of the system can readily provide security through self-defense, rather than security through retaliation for military reasons I shall endeavor to explain.

A conventional defense can successfully hold against a conventional offense provided it is not outnumbered by more than 2 - 5 to 1, depending on a number of other variables. But if the defense is now given a major technological advantage, i.e., atomic weapons even if used purely defensively, the number jumps maybe to the range of 10 - 50 to 1. It will require much gaming and some actual field maneuvers to provide reliable data from which to design the details of these security forces. I am merely attempting to illustrate and outline the principle here, for our subsequent debate and exploration.

Conventional U.N. forces, of course, can provide useful and possibly controlling amounts of local deterrence in many situations. But the big stick of atomic defensive power must be available to back up conventional power in the local deterrent structure.

Whether the local deterrent structure can ever be supplemented or replaced by the system proposed by Prof. Szilard will require, for me, further pondering. But it is clearly an interesting proposal.

C. European Component of the Security System

The European problem has been well clarified in earlier discussions. Her security choices, if I may state them in terms of my own proposals, are three:

- 1.) to continue the current course toward many national rocket-atomic forces;

2.) to construct one or two (Western and possibly Eastern European) supra-national rocket-atomic retaliatory forces;

3.) to opt for the local deterrent structure outlined above

Clearly, as the responsible systems design engineer on this self-assignment, I would recommend the third possibility. I believe I would also conclude that the second possibility is tolerable, but that the first alternative, which is the course on which Europe is currently embarked, will prove thoroughly unsatisfactory

D. Open Arms Information System

Without having made a detailed analysis of all aspects, I strongly suspect that self-interest, properly encouraged, will lead to behavior in the above system whereby open arms information is better for all parties (except a potential aggressor) than secret intelligence. I referred to some of the reasons for this in my earlier paper on a U.N. Arms Information and Research Agency. Such an Agency of course would be an ideal way to start the ball rolling away from secretness toward openness.

Deterrence requires sure knowledge of the consequences of military action. Also, it is in the interest of each nation, in order not again to be caught in a costly arms race, to demonstrate to all other nations that it is abiding by the rules of the world security game. All peace-loving nations will find it to their own advantage openly to give the world evidence of their good faith and support for stability in the world's security arrangements. Open arms information is the key to stability and control of the world security system.

Conclusion. While the components of a world security system suggested above may not be optimum, I believe they are suggestive of the type of answers

that will fall out when we start working on the right problem. The specification and design of a world security system, it would seem to me, is the proper mission of the Pugwash Conferences -- the chicken-and-egg aspect of the settlements/disarmament maze makes these matters subordinate to the central problem of designing a world security system.

Suggestion. If my colleagues accept this basic point, then I would be emboldened to suggest that we organize a small, American-Russian, systems design team as a sort of sub-committee to take a more refined cut at the problem and prepare a report before the next full Conference.

Remarks by Leo Szilard
April 8, 1958

I believe we ought to have a summit meeting soon where Russia and America should agree on a number of steps to be taken that could be taken almost at once. These measures would represent first steps to the establishment of a world at peace.

What could be these first steps?

Colonel Leghorn and I came independently to the conclusion that there is one very important first step that America and Russia could take, and moreover either of them could take this step unilaterally.

After I shall give you a short description of the present situation -- as I see it -- Colonel Leghorn will speak on the subject of this first step.

There might be a set of first steps, and it is conceivable that the group here assembled might be able to agree amongst themselves what these steps might be. But subsequently, of necessity, we shall come at some point to the parting of the ways. Some of us are inclined to think that before long America and Russia may reach an agreement that will provide not only for the cessation of bomb tests and the cessation of the manufacture of bombs, but also -- and this is the crucial point -- to the elimination of the stockpiles of bombs, jet bombers, and long-range rockets. Others, like Colonel Leghorn and I, believe that this will not happen, and that we shall have to live with the bomb for a long time to come.

After Colonel Leghorn finishes his first address at today's meeting, I shall try to give you my reasons why I believe that we shall not be able to get

rid of the bomb.

Colonel Leghorn will then, in his second address at today's session, give you his picture of the world of arms towards which we are moving at present. When he is through with this, then I shall try to say why I think that we might be able to stay alive in such world, and what we must do in order to stay alive in it. I shall try to convince you that if we did what we could and must do, then this world would be more peaceful and secure than the world has ever been in the past. Right now, war has become impossible, but it is by no means improbable. In the ^{world} ~~war~~ that Colonel Leghorn and I envisage, war in the ordinary sense of the term would be wholly unnecessary, and therefore improbable.

In the past 12 years most of us were aware of the fact that we have gotten the world into a mess by producing the bomb. Most of us thought that the way out of this situation must lie in turning the clock back by getting rid of the bomb. Perhaps the time has now come to ask whether we were right, and whether it might not be easier to get out of the present situation not by attempting to turn the clock back -- which might be impossible -- but by turning the clock as fast as we can - foreward.

As I shall try to show towards the end of the meeting, this could be accomplished if Russia and America cooperated in this matter in an intelligent as well as rational fashion, and it cannot be accomplished in any other way.

Assumption: ~~say~~ for 15 years at least we shall have the bomb around.

Michel Magat
Department of Chemical Physics
Paris
April 9, 1958

Notes on some of the topics for discussion
at the "Manoir Saint Castin" Meeting

Although the problem of experimental explosions is not on the agenda, I think, after the last Russian move, it will be discussed. Since it is a topic on which I thought mostly in the last months, I would like to throw in for discussion a few points.

I think a kind of Operational Research analysis of the problem would be useful. I shall on purpose take a "neutral" position, weighing only the gain to be obtained from a continuation of experiments against the price. However, I consider from the beginning on, that A and even more so H bombs are strategic and not tactical weapons in the sense that they cannot be used on the scale of say a batallion operation. Their main applications are: wide spread destruction of built up area and transport facilities -- highway cross-roads, harbors, air-fields and killing in one single explosion of a large number of the enemy -- be they in uniform or not. Their ulitization for these purposes ought to be known by now, unless all the previous experiments were badly devised, in which case nothing would be learned from further experiments either.

A reduction of power below a certain limit, even should it be technically possible is of no interest because then they can be replaced by conventional weapons. The progress can be made in two directions, increase of the explosive power and cleanliness.

Now, already the first H-bombs tested proved that it is possible to

destroy a city of the size of Paris by one bomb. Only four cities and one city complex are significantly larger, and may require more than one bomb. I think of London, New York, Moscow, Chicago and the Ruhr. Of these five objectives only Moscow is in the East. In other words, Russia is more interested in such an "improvement" than is the West. For the West, the gain to be expected is less than marginal -- it is a nonsense to develop a bomb that would be useful only in one case and would simply overdestroy all the other objectives.

A "clean" bomb is supposed to have a small fall out, relative to the explosion power. Now the fall out occurs usually at distances which are of the order of a few hundred miles from the impact point. In other words, the "fall out" from a bomb dropped in any important Russian center would probably occur in Russia, or at the utmost in one of the Democratic Republics. The number of people harmed would be at any rate smaller than by the explosion.

Conversly, a bomb dropped on Chicago could produce a fall out say over New York or Los Angeles, i. e., again in "enemy territory". In both cases it will harm people that would normally be exposed to a bombardment. Does it really matter if people are killed by fall out or by the next "clean bomb"?

The only situation where the reduction of the fall out may be a gain, is when enemy territory is bordering on neutral countries or allies, i. e., in Europe. Since at the beginning of a war at any rate, West European countries will be objectives for U.S.S.R. rather than for U.S.A., and since a bomb on say Prague will be reciprocated by a bomb on Munich or Dusseldorf, real neutrals, i. e., Sweden and Switzerland are the only ones who may gain if "clean" bombs are used by both sides. They may also be of interest if directed

against "temporarily occupied" allied territory, but I doubt if even clean bombs will be welcomed. Hence, there again the "improvement" is marginal. We are already in the stage of "ever diminishing returns" from experiments and I think these are the considerations that more than anything else have prompted Russia's decision. The gains were considered small enough to be overbalanced by the propaganda effect. It is astonishing that this part of diminishing returns obviously never occurred to the industrialists running the American policy. On the cost side I shall neglect the financial and manpower aspects, although they are definitely not negligible.

The main price paid for the "improvements" is the world wide increase of radioactivity. The first point to be stressed and impressed on people is that we do not know what the actual "tolerance limit" is, except for immediate effects. It is probable that such a tolerance limit does not exist for many effects -- such as leukemia and genetic effects. We are paying each experiment by a certain number of additional deaths and of additional idiots. It is a moral problem of course, how many people we are willing to sacrifice for the marginal gain. My answer is zero. The tolerance dose is even less known for the increase of radioactive Sr in children's bones. Even if the supposed tolerance dose is according to the American A.E.C. far from being reached yet in the average, what about local levels? I read in today's newspaper, that in Sweden, according to the Army Research Institute which can hardly be labeled as a Communist Propaganda Agency, the tolerance level is reached already. Now we have seen that Sweden was one of the few possible beneficiary of the "cleanliness" of the bombs to be used in a war...

In other words, further tests by U.S.S.R. and U.S.A. and probably by U.K. will bring no important advantage to any of the two big powers and no reasonable argument can be put forward in favour of their continuation. On the other hand they can do a lot of harm.

This makes the control problem a lot easier. Indeed it is well known that the Russian experimental explosions are usually announced by U.S.A. and that 8-10 days after an American test in the Pacific the radioactivity in Paris increases. This shows that at least a vast majority of tests can be detected if they are done above ground. A fraud is always possible, even if there is a police to enforce the law. But it is done only if the possible benefit is large and the chances of detection small. In the case we are interested in, the reverse is true -- chances of detection are large, the benefit marginal, and punishment - effect on the public opinion -- severe. It can thus be reasonably assured that no fraud attempts will be made on either side even without additional control. A self-imposed stopping of experiments will thus probably be faithfully observed and could bring in a relatively short time a very noticeable decrease of international tension.

So far as underground explosions are concerned, their military value is questionable and at any rate a recent experiment has shown that even a "weak" explosion can be detected at a distance of at least 2500 miles. A look at the map shows that no point of U.S.S.R. is at a significantly larger distance from a non-communist country. U.S.A. is a more favorable position because of the surrounding seas.

I shall now consider more briefly some other points.

1) Agreement not to use atomic weapons in war.

I do not think that in the case of major war the agreement will be kept in the long run. It is the war which has to be prevented. Carthage was as well destroyed as Hiroshima without using A bombs. It is to be assumed that because of the horror of atomic weapons, a major war will hardly be started by responsible people. The question is of course if people in the governments everywhere are really responsible people -- aware of their responsibilities. But the main danger are irresponsible people and they may be the easier prompted into action the higher the political tension. It is thus of paramount importance to decrease this tension, and this can be achieved by an agreement on atomic disarmament. I do not consider a control as of paramount importance because if it is impossible to control the production of fissile material, it seems to me impossible to control the stockpile. But the problem is not to attain a 100% security. At any rate an International Agency if proposed ought to be a post-facto Control Agency, because no country could accept that an International body controls its industrial development. Let us not forget that it was this part that made the Lilienthal plan unacceptable to Russians.

2) New candidates to the suicide club.

- (a) It ought to be considered that a country becomes a candidate to this club not the moment it has an atomic bomb, but the moment it sides with one of the Big Two and allows the installation of bases and launching sites on its territory.
- (b) My confidence in the French militaries is neither lower nor higher than my confidence in the American, British, Russian or German militaries, because $0 = 0$. I am utterly opposed to the building of a French Atomic Bomb for a variety of reasons -- as a thinking man because of my hostility to atomic

weapons in general, as a Frenchman because I consider that the money and the manpower wasted could be much better utilized working say on^a fusion pile project. But as long as other nations build and test bombs it is impossible to discriminate against the French. Statements like those of C.C. Price, if done publically, do no good, on the contrary. The French in general and the French Army in particular are suffering from inferiority complexes and it is not by doubting their "reasonableness" that one will cure them. Since the possession of the bomb was made a symbol of big power, of full manhood, they just want their bomb, as boys of 13 want to shave. Nothing can be done about it but changing the value of the symbol.

Mueckling

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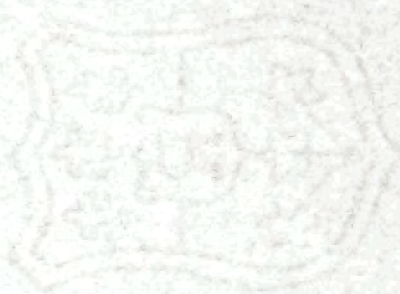
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4/18/58

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DISARMAMENT DOCUMENT SERIES

REF #1

April 16, 1958

FOUR-POWER DISARMAMENT
PROPOSALS OF AUGUST 29, 1957

Attached is a copy of the Four-Power disarmament proposals of August 29, 1957.

Ronald I. Spiers
Officer-in-Charge, Disarmament Affairs
Room 7273
Department of State

Attachment:

August 29, 1957 proposals.

SUB-COMMITTEE ON THE DISARMAMENT COMMISSION

CANADA, FRANCE, THE UNITED KINGDOM AND THE UNITED STATES OF AMERICA

Working Paper: Proposals for partial measures
of disarmament

I. The Limitation and Reduction of Armed Forces and Armaments

A. Within one year from the entry into force of the convention, the following States will restrict or reduce their armed forces respectively to the maximum limits indicated below:

France	-	750,000
United Kingdom	-	750,000
Soviet Union	-	2,500,000
United States	-	2,500,000

The definition of the armed forces will be annexed to the convention.

B. During this same period, these States will place in storage depots, within their own territories, and under the supervision of an International Control Organization, specific quantities of designated types of armaments to be agreed upon and set forth in lists annexed to the convention.

C. The relation of other States to the convention, including the agreed levels of their armed forces, will be determined later.

D. The States listed in paragraph I A will be prepared to negotiate on a further limitation of their armed forces and armaments upon condition that:

1. Compliance with the provisions of the convention has been verified to their satisfaction.
2. There has been progress toward the solution of political issues.
3. Other essential States have become parties to the convention and have accepted levels for their armed forces and armaments, fixed in relation to the limits set out in paragraphs A and B above.

E. Upon the conditions cited above, negotiations could be undertaken by France, the Soviet Union, the United Kingdom and the United States on a further limitation of their armed forces which would involve agreed reductions for the United States and the Soviet Union to not less than 2.1 million men each. The agreed level of forces for France and the United Kingdom, corresponding to this figure, would be 700,000 men each. The levels of other essential States would be specified at the same time through negotiation with them.

F. Thereafter, and subject to the same conditions, negotiations could be undertaken on further limitations to not less than 1.7 million men each for the United States and the Soviet Union. The agreed level corresponding to this figure for France and the United Kingdom would be 650,000 men each. The levels of other essential States would be specified at the same time through negotiations with them.

G. Upon the conditions cited in D above, these States will also be prepared to negotiate on further limitations of armaments. The calculation of any such armament limitations will be in agreed relation to the armed forces determined in paragraphs E and F above and will be completed prior to the application of the further limitations in armed forces. The parties must be satisfied before such further limitations of armaments are undertaken and at all times thereafter that the armaments at the disposal of any party to the convention do not exceed the quantities thus allowed in each category.

H. No measures for the reduction and limitation of armed forces and armaments beyond those provided for in paragraph A and B above will be put into effect until the system of control is appropriately expanded and is able to verify such measures.

II. Military Expenditure

In order to assist in verifying compliance with the provisions of paragraph I, and looking forward to the reduction of military expenditures, France, the Soviet Union, the United Kingdom and the United States agree to make available to the International Control Organization information about their military budgets and expenditures for the year preceding entry of the convention into force and for each year thereafter. The categories of information to be supplied will be agreed in advance and annexed to the convention.

III. Nuclear Weapons

Each party assumes an obligation not to use nuclear weapons if an armed attack has not placed the party in a situation of individual or collective self-defence.

IV. The Control of Fissionable Material

A. The parties to the convention further undertake:

1. That all future production of fissionable materials will be used at home or abroad, under international supervision, exclusively for non-weapons purposes, including stockpiling, beginning one month after the International Board of Control described in paragraph VIII has certified that the installation of an effective inspection system to verify the commitment has been completed.

2. That they will co-operate in the prompt installation and in the maintenance of such an inspection system.

3. That for the purpose of accomplishing the above undertakings, the five Governments represented on the Sub-Committee will appoint a group of technical experts to meet as soon as possible to design the required inspection system, and to submit a progress report for their approval within the first ten months after the entry into force of the convention.

B. The parties which are producers of fissionable material for weapons purposes at the time of cessation of production for weapons purposes undertake to provide, under international supervision, for equitable transfers, in successive increments, of fissionable materials from previous production to non-weapons purposes, at home or abroad, including stockpiling; and, in this connexion

1. To fix the specific ratios of quantities of fissionable materials of comparable analysis to be transferred by each of them, and

2. To commence such transfers at agreed dates and in agreed quantities at the fixed ratios following the cut-off date for production of fissionable materials for weapons purposes.

C. From the date of the cessation of production of fissionable material for weapons purposes provided in paragraph IV A 1:

1. Each party undertakes not to transfer out of its control any nuclear weapons, or to accept transfer to it of such weapons, except where, under arrangements between transferor and transferee, their use will be in conformity with paragraph III.

2. Each party undertakes not otherwise to transfer out of its control any fissionable material or to accept transfer to it of such material, except for non-weapons purposes.

V. Nuclear Weapons Testing

A. All parties to the convention undertake to refrain from conducting nuclear test explosions for a period of twelve months from the date of entry into force of the convention, provided that agreement has been reached on the installation and maintenance of the necessary controls, including inspection posts with scientific instruments, located within the territories of the Soviet Union, the United Kingdom, the United States, the area of the Pacific Ocean and at such other places as may be necessary, with the consent of the Governments concerned.

B. A group of technical experts appointed by the five Governments represented on the Sub-Committee will meet as soon as possible to design the inspection system to verify the suspension of testing.

C. Upon termination of the twelve months period, the parties will be free to conduct tests unless they have agreed to continue the suspension for a further period under effective international inspection.

D. If the inspection system referred to in paragraph V A is operating to the satisfaction of each party concerned and if progress satisfactory to each party concerned is being achieved in the preparation of an inspection system for the cessation of the production of fissionable material for weapons purposes agreed to under Paragraph IV A 1 above, all parties to the convention undertake to refrain from conducting nuclear test explosions for a further period of twelve months. Such an extension will be made only with the understanding that testing may at the discretion of each party be conducted twenty-four months after the entry into force of the convention if the inspection system for the cessation of production for weapons purposes has not been installed to the satisfaction of each party concerned before the end of the twenty-four months and if the cessation of production for weapons purposes has not been put into effect.

E. If tests are resumed, each party undertakes to announce and register in advance the dates of each series and the range of total energy to be released therein; to provide for limited observation of them; and to limit the amount of radioactive material to be released into the atmosphere.

VI. The Control of Objects Entering Outer Space

All parties to the convention agree that within three months after the entry into effect of the convention they will co-operate in the establishment of a technical committee to study the design of an inspection system which would make

it possible to assure that the sending of objects through outer space will be exclusively for peaceful and scientific purposes.

VII. Safeguards Against the Possibility of Surprise Attack

A. From the entry into force of the convention the parties concerned will co-operate in the establishment and maintenance of systems of inspection to safeguard against the possibility of surprise attack.

B. The establishment of such systems will be subject to agreement on the details of its installation, maintenance and operation. It is proposed as a matter of urgency that a working group of experts appointed by the five Governments represented on the Sub-Committee be set up at once to examine the technical problems and to report their conclusions which could form the basis for an annex to the agreement.

C. With regard to inspection in the Western Hemisphere and in the Soviet Union the Governments of Canada, France, the United Kingdom and the United States propose the following:

1. That all the territory of the continental United States, all Alaska including the Aleutian Islands, all the territory of Canada and all the territory of the Soviet Union will be open to inspection.

2. If the Government of the Soviet Union rejects this broad proposal, to which is related the proposal for inspection in Europe, referred to in paragraph D below, the Governments of Canada, France, the United Kingdom, and the United States (with the consent of the Governments of Denmark and Norway) propose that:

All the territory north of the Arctic Circle of the Soviet Union, Canada, the United States (Alaska), Denmark (Greenland), and Norway; all the territory of Canada, the United States and the Soviet Union west of 140 degrees West longitude, east of 160 degrees East longitude and north of 50 degrees North latitude; all the remainder of Alaska; all the remainder of the Kamchatka peninsula; and all of the Aleutian and Kurile Islands will be open to inspection.

D. With regard to inspection in Europe, provided there is commitment on the part of the Soviet Union to one of the two foregoing proposals, the Governments of Canada, France, the United Kingdom and the United States, with the concurrence in principle of their European allies and in continuing consultation with them, subject to the indispensable consent of the countries concerned and to any mutually agreed exceptions, propose that an area including all of Europe, bounded in the south by latitude 40 degrees North and in the west by 10 degrees West longitude and in the east by 60 degrees East longitude will be open to inspection.

E. If the Government of the Soviet Union rejects this broad proposal, then, under the same proviso expressed above, a more limited zone of inspection in Europe could be discussed but only on the understanding that this would include a significant part of the territory of the Soviet Union, as well as the other countries of Eastern Europe.

F. The system of inspection to guard against surprise attack will include in all cases aerial inspection, with ground observation posts at principal ports, railway junctions, main highways, and important airfields, etc., as agreed. There would also, as agreed, be mobile ground teams with specifically defined authority.

G. Ground posts may be established by agreement at points in the territories of the States concerned without being restricted to the limits of the zones described in paragraphs C 1 and 2, but the areas open to ground inspection will not be less than the areas of aerial inspection. The mobility of ground inspection would be specifically defined in the agreement with in all cases the concurrence of the countries directly concerned. There would also be all necessary means of communication.

H. Within three months of the entry into force of the convention, the parties will provide to the Board of Control inventories of their fixed military installations, and numbers and locations of their military forces and designated armaments, including the means of delivering nuclear weapons located within an agreed inspection zone or zones, and within such additional area or areas as may be agreed.

I. Any initial system of inspection designed to safeguard against the possibility of surprise attack may be extended by agreement of all concerned to the end that ultimately the system will deal with the danger of surprise attack from anywhere.

VIII. The International Control Organization

A. All the obligations contained in the convention will be conditional upon the continued operation of an effective international control and inspection system to verify compliance with its terms by all parties.

B. All the control and inspection services described in the convention and those which may be created in the course of its implementation will be within the framework of an International Control Organization established under the aegis of the Security Council, which will include, as its executive organ, a Board of Control in which the affirmative vote of the representatives of the Governments represented on the Sub-Committee and of such other parties as may be agreed will be required for important decisions.

C. All parties to the convention undertake to make available information freely and currently to the Board of Control to assist it in verifying compliance with the obligations of the convention and in categories which will be set forth in an annex to it.

D. The functions of the International Control Organization will be expanded by agreement between the parties concerned as the measures provided for in the convention are progressively applied.