

To

Feynman

(First rough draft prepared to be submitted to friends for criticism)

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ON THE POSSIBILITY OF A PAX RUSSO-AMERICANA

IN A STABLE ATOMIC STALEMATE

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The Strategic Stalemate -- Where it Stands at Present,
and What Form it May Take in the Foreseeable Future

We have at present a sort of stalemate between the strategic atomic striking forces of Russia and America, essentially based on America's and Russia's ability to destroy each other to any desired degree. Both Russia and America have apparently learned by now how to make powerful "dirty" hydrogen bombs - bombs of the fission-fusion-fission type. Such bombs could be transported today by jet bombers to almost any point of the earth.

The American Strategic Air Force operates from bases inside America and also from bases maintained by America on foreign soil. All these bases are vulnerable and could be knocked out by a single sudden attack. For this reason America has been forced to adopt as her defense policy, the principle of "instant counterblow". If warning is received, that foreign planes have crossed, what America regards as her air defense perimeter, American jet bombers carrying hydrogen bombs of a "dirty" or "clean" variety are supposed to take off. They are not supposed to continue their flight into Russian territory unless subsequent information appears to confirm that an attack against American bases, or American cities, is impending.

Such a stalemate would have to be regarded as inherently unstable, if it were possible for either of these two nations to cripple in one single sudden attack, the ability of the other nation to strike back. This is not the case at present, but there are elements of this kind of instability contained in the present form of the stalemate.

Maintaining the present form of stalemate is an exceedingly costly operation and a drain on the economic resources of both Russia and America. We might soon be going through a transition period in which America might be forced to keep about one-third of its bombers loaded with hydrogen bombs in the air, which would further greatly increase the cost involved. There might be a further transition period in which America would partially rely on submarines capable of firing intermediate range rockets equipped with hydrogen bombs. Also, for a while America might partially

rely on low-flying pilotless bombers, which would be launched from dispersed bases, and which could be effective

for a period of years - until Russia develops appropriate counter measures.

Because I propose to discuss here mainly policies which would be desirable from the long-term point of view, I shall disregard, in my discussion, all these transitional phases of the rapidly changing stalemate and focus my attention on what might be called the second stage of the stalemate, towards which both Russia and America are moving at present.

In this second stage of the stalemate, solid-fuel-long-range-rockets will be available in large numbers to both Russia and America. Both Russia and America will have available "clean" hydrogen bombs, of high power, of a type that can be produced in adequate quantities, ^{and} that is compact as well as light enough, to be carried by long-range rockets.

At this second stage of the stalemate there will be no need for America to have bases on foreign soil. The second stage of the atomic stalemate, is characterized by solid-fuel-long-range-rockets which could be launched from bases inside of America and inside of Russia -- bases which can be made invulnerable to an aerial ^{In this stage, of these two} attack, ^{neither/nations} needs to fear that a sudden attack on her bases might appreciably diminish her ability to strike a counter-blow. Therefore, this stage of the stalemate will not be inherently unstable, and should there occur through accident, or some mistake in judgment, an unfortunate incident, there would be no need ^{for either} to respond with "instant/ ^{counter-}blow".

The elements of technological instability which are contained in the present -- the first-stage of the stalemate, may thus be absent in the second stage of the stalemate.

When the second stage of the stalemate is approaching, then America and Russia ^{should be able} to agree to limit the number of powerful hydrogen bombs in their stockpiles, and they ^{should be able to} also agree to eliminate from their stockpiles the "dirty" hydrogen bombs, the fission-fusion-fission bombs. The number of "clean" hydrogen

however,
bombs they may both wish to retain might/be fairly large -- just
how large may depend on factors other than purely military.

In saying all this, I have tacitly assumed, and I had better make this assumption explicit, that neither America or Russia are in the process of successfully developing an effective defense against long-range rockets, that would permit them to destroy such rockets in flight. Further below, I shall discuss in detail why it would be important for America and Russia to agree to refrain from entering this third phase of the arms race/aimed at the development of such a defense.
which would be

Present

Is the Basic Premise of the American Military Policy Valid?

I propose to discuss now, whether or not the premise upon which the present American military policy is based may be valid in the second stage of the atomic stalemate, i.e., when powerful "clean" hydrogen bombs and solid-fuel-long-range rockets may be available in adequate quantities both to Russia and America. I shall try to show, that irrespective of whether or not the basic premise of the policy ^{may} be valid today, it could not be valid in the second stage of the stalemate.

What is the present American military policy, and what is the premise upon which it is based?

If there is an armed conflict in any area of the world, and if America and Russia intervene militarily on opposite sides, then America proposes to use atomic bombs in combat. America ^{also} may use atomic bombs to a depth ^{perhaps} of several hundred miles behind the pre-war boundary, for the purpose of disrupting communications and destroying supply and air bases. Most of those who advocate this military policy believe, that even though there will be a strategic stalemate in which both America and Russia will have large stockpiles of "clean" hydrogen bombs, these stockpiles will somehow neutralize each other, because neither side could possibly use hydrogen bombs of high power against the territory of the other without provoking an all-out atomic war that neither of them want. Therefore, so the military experts argue, the course of the war and its outcome will remain unaffected by the existence of these bombs.

I shall try to show later why this premise is invalid, but for the moment, I propose to let it stand for the sake of argument. I shall also accept, again merely for the sake of argument, ^{the thesis} that a local war, which is fought with atomic bombs, may remain localized. On the basis of these premises, we may now raise ^{the} question: How will a localized atomic war ever end if Russia and America fight on opposite sides?

We saw in the case of the Korean War, in which no atomic bombs were used, how difficult it was to end the war, long after

it became clear that the war will end with the restoration of the status quo (except, of course, for the extensive destruction which has been wrought in both North and South Korea). If atomic bombs are used on both sides, the war might still end with the restoration of the status quo, but only in the unlikely case that both Russia and America are equally well supplied with atomic bombs. Otherwise, either America or Russia may have to yield ultimately and the area will ^{then} be conquered by one of them, but probably not until it has been devastated to the point where only a few scattered buildings remain standing and only a small fraction of the population surviving. Clearly, only after the area is devastated could America or Russia withdraw from the fight without conceding victory to the other, or at least without conceding ^a victory that is worth having.

The architects of the present American Military Policy, which centers on American preparedness for fighting a localized atomic war, were not primarily concerned with the possibility that America proper might be invaded by a Russian Army. They were primarily concerned about America's ability to live up to her moral, or legal, commitments to protect certain remote areas against military invasion. Just how likely is it that, in the prevailing circumstances, America may be called upon ^{at a future date} to live up to some such commitment? ¶ It seems to me that given enough time, for the people everywhere in the world to understand what fate would be in store for them if they were "protected" in the manner described above, people everywhere may demand from the governments that America be relieved of any obligation to "protect" them.

¶ Still America may come to the defense of an invaded area, even if her doing so may be unwelcome to the people who live in that area and because of this possibility, as well as for other reasons, it is imperative to examine the validity of the premise upon which ^{present} the American Military Policy is based.

I shall leave out of consideration, as extremely unlikely, a conceivable ^{wanton} invasion of America proper by Russian troops, and

I shall only discuss what may happen if war breaks out in an area in which both America and Russia have so-called "vital interests" to protect.

In the atomic stalemate,
/ any commitment that Russia or America may assume for protecting such areas will turn out -- when the chips are down -- to be, of necessity, a limited commitment. America may be willing to pay a certain price to keep^a Russian supported invasion out of such an area, and Russia may be willing to pay a certain price to keep an American supported invasion out of it. Clearly, to the limited extent to which America may be willing to pay a price, she may^{also} exact a price from Russia and vice versa, and this price may have a deterrent effect.

Keeping this concept of reciprocal limited prices in mind, we may now ask the following pertinent question: What may actually happen in the second stage of the^{atomic} stalemate, if there is an armed conflict in an area in which both America and Russia have a vital interest causing them to intervene on opposite sides?

According to the present American Military policy, America may be prepared to fight a local war with atomic weapons within the area and perhaps within a zone of several hundred miles beyond the pre-war boundary of the area. It is by no means clear, however, why Russia must necessarily accept to battle on these terms. Why should Russia not instead -- at least in some of the foreseeable contingencies -- follow an entirely different tack?

Let us assume -- to take a concrete example -- that Turkey feels menaced by the growing power of the Arab states and that Turkish troops invade Syria. Under Paragraph 51 of the United Nations Charter, which allows for collective defense in case of an armed attack against a member of the UN, Russia would be within her legal rights to take armed action against Turkey. But in accordance with the pattern established in the post-war years, she might^{perhaps} prefer to let an army of volunteers invade Turkey. If the Turkish armies are in danger of being defeated, America might -- disregarding the letter of the law -- intervene in order to save her ally from being militarily defeated.

Let me then further assume that America would either ^{plan to} supply the Turkish Army with atomic weapons or that American troops would actually land in Turkey and ^{begin to the} fight Russian volunteers with atomic weapons. Assuming American superiority in atomic weapons, these ^{could} be used not only in combat on the Turkish side of the pre-war boundary, but also beyond the pre-war boundary in a zone of perhaps a few hundred miles depth within Russia proper, for the disruption of communications and for the destruction of supply and air bases.

With such a turn of the war impending, it might be logical for Russia to send a note to America, advising her that if America were to fight with atomic weapons, or if she were to supply such weapons to Turkey, Russia would demolish one of ten American cities listed in the note. These cities might be of a size ^{ranging} from one-half million to one million inhabitants; Russia might assure the United States that upon deciding which ^{one} of the ten cities she is going to demolish, she would give the selected city four weeks' warning in order to permit an orderly evacuation of the city and to enable the American Government to provide for the housing and feeding of the refugees. Russia might further make it clear in her note that she would be willing to tolerate America's demolishing one of her ^{own} cities -- a city of equal size -- that America may select, but would ^{also} expect four weeks' warning.

To this the Secretary of State might, of course, reply with a note threatening that America would demolish two cities in Russia for each city which Russia might demolish in America.

Russia might, however, answer such a ^{threat} by speaking as follows: "The Russian Government has adopted the principle of tolerating the destruction of one of her cities for one American city which she may demolish. She is determined to adhere to this principle of one for one. Therefore, if America should demolish two Russian cities in exchange for the first American city ^{then} demolished, Russia will demolish one additional ^{city.} American/ If America should retaliate -- as she

threatens to -- by demolishing two further cities in Russia,
Russia ^{would} / again demolish one American city for each of these
two Russian cities, etc., etc. "

It would be quite obvious

that if America adheres to the principle of two
for one, while Russia sticks to the principle of one for one,
in time all American cities and all Russian cities would be
demolished. Because the Russian government has no reason to
assume that the American government has gone insane, or that if
it were insane the American people would tolerate such a govern-
ment to remain in office ^{for long,} she ^{safely} could/disregard the threat of two
for one and could, if necessary, go through with her threat to
demolish one American city.

I believe that this example demonstrates that in the second
stage of the stalemate, Russia could invoke the clean hydrogen
bombs of high power, threaten
to use them, and conceivably actually use them without risking
an all-out atomic war. Therefore, it ^{would} / not lie within the
choice of America alone to decide whether a local ^{conflict} / may or may
not be ^{decided} / by means ^{of} / ^{fighting with} small atomic bombs .

The assumption that

America's choice
this lies in/is the basic premise of the present American Military
Policy, and I have tried to show -- on hand of a perhaps not too
realistic example -- that this premise ^{will be certainly} / invalid. in the second
stage of the stalemate, towards which the world is rapidly moving.

POLITICAL SETTLEMENT IN THE ATOMIC STALEMATE

There may be some risk that during the present stage -- the first stage of the stalemate -- an all-out atomic war might break out as a result of an accident, or a serious error of judgment. It appears very unlikely, however, that such a war would break out as a result of a wanton attack by the American Strategic Air Force against Russia's cities, or by the Russian Strategic Air Force against America's cities. Therefore, in the immediate future, the greatest danger for the outbreak of an all-out atomic war lies in the possibility of a local conflict which leads to armed action, American and Russian military intervention on opposite sides, and the use of atomic weapons in such a war, arousing emotions which may make it impossible to localize the conflict.

From this point of view it would seem important for Russia and America to reach -- as soon as practicable -- a political settlement, which will make reasonably sure that there will not occur, in any of the foreseeable contingencies, an armed conflict in which America and Russia may intervene on opposite sides.

The closer we come to the second stage of the strategic stalemate, the less important become the controversial issues which have arisen in the post-war period between America and Russia. Most of these issues had some strategic relevance and were not negotiable in the post-war period because, had they been settled one way, the settlement would have increased America's chances to win the war, if war came; and had they been settled the other way, it would have increased Russia's chances. Clearly, the issue of who is to win the next war is not an issue on which a compromise is possible, and thus most of the issues had to remain unsettled.

There is a vicious circle operating in a power conflict of this type. For few of the conflicts which have strategic significance can be settled, and new such conflicts of this nature arise from time to time. Thus, conflicts which cannot be resolved, accumulate, and as time goes on, war appears to be more and more probable, and accordingly, the chances of settling conflicts get smaller and smaller.

Such a vicious circle operated in the power conflict between Sparta and Athens just prior to the Pelopponesian War.

In the strategic stalemate, particularly as we approach the second stage, none of these controversial issues have any longer a bearing on who is going to "win" the war. When Russia and America can destroy each other to any desired degree, the overriding issue becomes the stability of the stalemate, and on this issue, Russia's and America's interests coincide. This is the reason, why in the strategic stalemate, it becomes less important whether any one of the old controversial issues is settled one way, or whether it is settled the other way; what is important is only that it be settled one way or another.

What kind of political settlement between Russia and America would be needed to stabilize the strategic stalemate?

America and Russia may recognize a few areas as lying in each other's sphere of influence in the sense that ^{either} / America or Russia may be willing alone to assume the responsibility for preserving the peace within those areas.

In some other areas it might be possible to freeze the status quo by setting up a regional inter-governmental armed force, with the consent and approval of Russia and America, as well as the other major nations which are involved. Whether or not these inter-governmental armed forces should operate under the auspices of the United Nations is discussed below.

In any case the sole function of such regional armed forces would be to prevent any nation of the area from violating the territorial integrity of another nation, and it should not be the function of regional forces to prevent governmental changes in a country by internal revolution, as long as no military forces cross the country's frontier.

The regional inter-governmental armed forces should not be equipped with atomic weapons, but they could be highly mobile, and could be equipped with high firepower so that they might be militarily stronger than any one nation within the area, partic-

ularly if the arms level of the nations within the area is kept low.

In those areas where the status quo can be frozen in this manner, the nations of the area may thus be given the security which they need, so that it will not be necessary for them to divert a substantial fraction of their economic resources into military expenditures.

Would it be desirable to set up these regional armed forces under the sponsorship of the United Nations?

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 unnecessary, as well as impossible, for them to go to war with each other. Attempts made in the past ten years to use the United Nations for purposes other than those for which it was designed, have weakened this organization, and it remains to be seen whether they have damaged it beyond repair. Only if it were possible to restore the United Nations to its original function would it be able to serve as an agency to which the organization of the regional inter-governmental armed forces might be entrusted.

There are other important areas of the world where it may not be possible to protect the status quo by maintaining an inter-governmental armed force, and perhaps one of the most important areas of this kind may be the Continent of Europe. It is almost self-evident that it would be impracticable to freeze by such means the status quo in Europe, in the absence of a political settlement which is satisfactory to America and Russia as well as the nations of Europe. But even if such a political

settlement may be achieved, the maintaining of an inter-governmental armed force in Europe would remain an inappropriate way of dealing with the problem of European security. I am returning to the problem of European security in one of the later sections of the present paper.

THE CASE FOR ATOMIC DISARMAMENT

Russia has unilaterally stopped her bomb tests, and it is conceivable that America may follow suit once she has tested most of the bombs that she needs to test. It is also conceivable that America and Russia, when they have enough bombs stockpiled to destroy to any desired degree each other, as well as the rest of the civilized world -- might agree to freeze the size of their stockpiles. But clearly, from the point of view of the danger of an atomic war, not much would be accomplished by stopping the bomb tests or by freezing the stockpiles in this manner. If far-reaching atomic disarmament at an early date is a solution to the problem posed by the bombs -- and it is possible to doubt this -- then nothing short of destroying the stockpiles of bombs, as well as eliminating the means suitable for the delivery of such bombs, may be regarded as a measure adequate for eliminating the danger of an atomic war.

This is precisely what the Russian Government is proposing. The position of the Russian Government has on account of its great simplicity the virtue of being easily understandable and because of this it deserves, and will undoubtedly get, strong popular support. The existence of the bomb is inherently a menace to mankind, and the elimination of all bomb stockpiles, as well as all effective means for the delivery of bombs, is therefore a goal which all sane men ^{must} regard as desirable.

The present official Russian position is almost identical with the position taken by most Atomic Scientists in America in the months that followed the Second World War.

The objection which one hears most frequently advanced against this position is based on the doubt that major secret violations of an agreement providing for the elimination of the bombs might remain undetected. If one thinks in terms of a continued ~~of the~~ cold war and of inspectors of a UN agency roaming up and down the countryside in Russia trying to discover bombs buried in the ground, then indeed one might be skeptical whether inspection can be relied upon to discover major secret violations.

There is no need, however, to take such an unimaginative approach to a problem of inspection; rather if one visualizes the political setting in which an arrangement providing for the elimination of bombs could be presumed to operate, it is reasonable to assume that Russia, as well as America, could find ways and means to convince each other that neither need to fear major secret violations of the agreement. I personally am rather convinced that such difficulty as may exist in detecting secret violations is not a valid objection to atomic disarmament. It must be admitted, however, that there has been so far no adequate public discussion of this issue in the United States and, as far as I know, there has been no public discussion whatsoever of this issue in the Soviet Union.

There may be other, more valid, objections to atomic disarmament at an early date, and I am inclined to take some of these much ^{more} / seriously. If we were to rid the world of the bomb, we should be essentially back to where we were in the period between the two world wars, and it is difficult to see what would prevent -- except perhaps the memory of the bomb -- wars from occurring for exactly the same reason for which they have occurred in the past. Unless one were to assume that ^{one} / not only rids the world of the bomb, but also of the knowledge how to make ^{the} / bomb -- a major war would of necessity end up as an atomic war. ~~P~~ Even though I am inclined to take this argument very seriously, I personally should be reluctant to oppose getting rid of the bomb if America and Russia were willing to take this crucial step towards far-reaching disarmament at an early date. ^{Rightly or wrongly,} / I should pin my hope on the possibility that if the world may go through another 25 years without a major war, in that period of time -- which after all represents a whole generation -- it might be possible to build up a world community that will make it unnecessary to resort to the threat of the use of force. or the threat of the use of force.

But ~~are~~ ^{well as} Russia as / America willing to rid the world of the bomb in the near future? I believe it should be possible by now to answer this question with a reasonable degree of assurance,

and if the answer is in the negative, then we should lose no time to see how it may be possible to make a virtue out of necessity.

HYDROGEN BOMBS OF HIGH POWER MAY REMAIN WITH US

FOR A LONG TIME TO COME

I shall now attempt to appraise the chances that an agreement, to rid the world of the bomb, might be reached, in the foreseeable future, by Russia and America.

In principle, almost everybody in America is in favor of disarmament -- scientists, the general public, the Administration, and Congress. I believe that at present the Administration might be divided on the issue of far-reaching disarmament which would include the elimination of the bomb. Sometimes I have the impression that there may be, within the Administration, powerful influences at work in favor of such far-reaching disarmament, and that these influences might include the President himself. But even if the Administration were ^{now} veering towards full-scale atomic disarmament, we must remember that the Administration is only one branch of the government; Congress is another branch. I might, of course, be wrong, but the way I assess the balance of forces, the outcome of the struggle inside the American Government is going to be won by those who -- while they might be in favor of some sort of disarmament -- would wish to stop short of the elimination of the bomb, as a major factor in the power balance.

I am basing this prediction on the record of the post-war period. ^{Governments being what they are,} it is quite understandable that at first, as long as Russia did not have the bomb, considerations of expediency were given more weight than moral considerations, and ^{that} the American Government found it expedient to rely on the threat of "mass retaliation" in order to counter the desire for expansion which it imputed to Russia. For this reason, the fact that during those early years no progress was made in any of the disarmament negotiations affords no basis for concluding that atomic disarmament may not become acceptable to

America in the near future. ^R But since 1949, it was clear that Russia knows how to make atomic bombs, and since 1954, it was clear that she knows how to make hydrogen bombs of high power. Thus, at least since 1954, the American Government had a strong incentive for discussing with Russia in earnest ways and means for getting rid of the bombs. It is obvious that if these discussions were moving ^{forward} at all, the arms race was going ahead much faster.

Therefore,
/ I believe that more likely than not, the world will not rid ^{itself} of the bomb in the ^{foreseeable} future, and if this appraisal is correct, then we had better begin to think in earnest of how to live with the bomb.

Scientists are keenly aware of the need of stopping the arms race somewhere and the need to begin to reach ^{some} agreement with Russia on arms limitations. But I submit that the present stage of the stalemate is a precarious stage and that it is just about the worst point at which "to stop" the arms race. Having gotten the world in a mess by producing the ^{most} bomb / ^{scientists} thought -- in the past 12 years -- that the way to get the world out of this mess may lie in turning the clock back, by getting rid of the bomb. I submit that the time has now come to ask whether we were right and whether it might not perhaps be easier to get the world out of its present predicament not by attempting to turn the clock back -- which might be impossible -- but by doing just the opposite, i.e., by advancing the clock just as fast as we can.

As I stated above, such elements of inherent stability, which are contained in the first stage of the atomic stalemate, may be absent when the second ^{of the atomic stalemate} stage / is reached. It is within the setting of this second stage that I propose to discuss -- what ^{one must} / now regard as the overriding problem: What policy ^{may} / America or Russia adopt in order to render the atomic stalemate stable? ^R Since one may expect several years to pass between the first tentative formulation of ^{probable} a / policy and its public discussion, until such ^a / policy may be understood and / adopted by either the Russian or American Government, and since

we are now moving fairly rapidly towards the second stage of the atomic stalemate, it would seem reasonable to discuss the problem of ^{the} /stability/ ^{of the stalemate not} on this occasion /in the setting of the present stage of the stalemate, but in the setting of the approaching/ ^{second} stage.

In that setting the power conflict in which Russia and America found themselves caught in the post-war years, may have entirely disappeared. While America and Russia may each still desire to bring about certain changes in the present status quo, neither of them may be willing to make substantial economic sacrifices in order to bring about, forcibly, any of these changes. Therefore, they may both be content with modifying the status quo, where this is desirable, only with the approval and consent of both nations, as well as with the consent of the other major powers involved. ^{setting of the second} My main point is, that in the /stage of the stalemate, America's and Russia's real interests will closely coincide; these will consist in preserving the status quo, eliminate all risks of an atomic war, and maintain or achieve economic prosperity.

But if it be true that Russia and America will have nothing to fear from each other at this stage, there will still remain fear to be feared. Such fear must necessarily be engendered by the existence of large stockpiles of "clean" hydrogen bombs of high power, at least in the absence of a satisfactory philosophy as to how such bombs might be employed in any hypothetical -- and be it ever so unlikely -- eventuality.

Could this fear be removed by the adoption of a satisfactory rule of behavior by Russia or America?

HOW EITHER AMERICA OR RUSSIA COULD, BY UNILATERAL DECLARATION, ENSURE THE STABILITY OF THE SECOND STAGE OF THE STALEMATE

Let us examine now what would happen if either America or Russia were to adopt a satisfactory rule of ^{behavior} / and were to proclaim it by unilateral declaration. Let us assume, for instance, that Russia were to issue a proclamation of the following sort:

"There are certain areas in the world which Russia is committed to protect from armed action directed against the

the area. In the atomic stalemate, any such commitment must of necessity be a limited commitment, Russia and America

are in a position to destroy each other / and to any desired degree cannot be expected

Russia / to enter into a commitment that would involve her total destruction. Russia is in a position, however, to live

a limited and yet to extend up to / commitment / effective protection

because she is / willing to pay a reasonable price in economic sacrifice, and is able to exact a similar price in economic sacrifice from America.

"Moreover, Russia can do this without resorting to atomic war, and she is renouncing such a war as a means of fulfilling her commitments. Russia will not use atomic or hydrogen bombs against soldiers in combat or as a means to crush

the civilian population by dropping bombs on non-evacuated cities. But she may use "clean" hydrogen bombs, if need be, for the purpose of demolishing American cities. Any such city singled out for destruction would be given four weeks' warning in order to permit an orderly evacuation of the population and in order to allow the American Government to make provisions for the housing and feeding of the refugees.

"Accordingly, Russia is issuing a price list and for each protection, she will specify area under her / ~~xxxxxx~~ a minimum, as well as a maximum, price in terms of / number and size of the American cities to be demolished.

"Attached to the price list is a list of American cities divided into ten different categories, according to size, as represented by the number of inhabitants,

"Russia believes that this matter may be perfectly well handled by means of unilateral declarations, and sees no reason for ~~xx~~ ^{ing} proposing that America and Russia enter into an agreement in regard to it. However, for the sake of the stability of the stalemate -- which to maintain is as much to the interest of America as it is in the interest of Russia -- Russia proposes to reach an amicable understanding with America on the division of the Russian and American cities into equivalent size categories. This should ~~xxxx~~ be done to avoid the danger that a dispute may ~~xxxxxxxxxxxxxxxx~~ arise over the size category to which a ~~xxxxxxxxxx~~ city that is to be demolished belongs. Clearly, such dispute might ~~xx~~ endanger the stability of the atomic stalemate.

~~xxxx~~ "Russia knows that the American people would not / particularly cherish losing any of their cities, she proposes, ~~xxxxxxxxxxxxxxxxxxxxxxxx~~ therefore, a conflict arise that should/threatensto engulf an area protected by Russia, ~~xxxxxxx~~ Russia would name / several American cities, from among which the cities singled out for destruction will be selected. In this manner the inhabitants of the several cities named by Russia will have an opportunity to make ~~xx~~ known to their government what they think of the merits of American ~~xxxxxxxxxxxxxxxx~~ getting involved in the ~~xxxxxxxxxxxx~~ conflict that ~~xxxxxxxxxxxx~~ has arisen. ~~xx~~

"Russia is not prepared to divert an appreciable fraction of her national income into arms expenditure, ~~xxxx~~ and she is, ~~xxxxxxxxxxxx~~ greatly reducing her army, navy, and air force. Russia may, therefore, not be in a position to defend an area she is committed to protect, by fighting a war in the ~~xxxxxxxxxxxx~~ ordinary sense of the term. Accordingly, all ~~xxxx~~ that Russia may commit herself to do is to exact from America a reasonable price for which Russia, ~~xxxx~~ in turn, ~~xxxx~~ is willing to pay an equal price.

"In these circumstances, ~~xxxxxxxxxxxxxxxx~~ America could -- if indeed she were willing to pay the specified price -- conquer (or have an ally of hers conquer) ~~the~~ ^{some} specific area under Russian protection. America and Russia would/both lose an equal number of cities, ~~xxx~~ then America would derive no benefit from having demolished cities in Russia/ ~~xxx~~ ^{and} ~~xxxxxxxxxxxxxxxx~~ therefore, America would have to balance - the gain of the conquest of ~~the~~ ^{a given} area ~~xxxxxxxxxxxx~~,

against the loss which she would incur, by having a certain number of her cities demolished. Russia does not believe that America has an interest in any of the areas listed by Russia, which is sufficiently great to justify ^{her} taking the loss of even one city, of half a million inhabitants, for the sake of gaining possession (or having an ally of hers gain possession) ~~of any~~ of the areas ~~xxxxxxx~~ ^{which is under Russian protection.} For this reason, Russia believes that the price list proclaimed by her affords ~~xxxxxxx~~ adequate protection to all the areas listed."

~~xxxxxxx~~ ^{If} Russia were to issue a proclamation of this sort, it would be greatly to America's interest to adopt the same philosophy concerning the potential use of her "clean" hydrogen bombs of high power. Evidently, if both America and Russia adopt this philosophy, the stalemate will be ^{at least} stable / in the sense that no initial disturbance would lead to a chain of ever-increasing destruction. Moreover, it would be ~~exceedingly~~ ^{very} unlikely that any city would ever be actually demolished, if this philosophy were adopted.

Quite similarly, if America were to issue a proclamation of this sort, it would be in the interest of Russia to embrace the same philosophy.

It is my contention that in the second stage of the atomic stalemate -- even in the absence of any ^{verifiable} limitation on the number of bombs ^{available to} that America and Russia ~~may stockpile, that could be verified with reasonable accuracy~~ -- the stalemate ^{could} ~~xxxxx~~ be stable.

Americans might want to know what assurance they would have that Russia would not be tempted to resort to the dropping of hydrogen bombs on cities that have not been evacuated, in deviation from her ^{But just} proclaimed intentions. ~~what~~ what interest would Russia have to do such a thing? Leaving aside the condemnation of the whole world, which she would incur, and leaving out of consideration the possibility of American retaliation in kind, Russia may be assumed to be aware of the following fact: If Russia were to drop hydrogen bombs on a few American cities

without warning, demolishing the city as well as killing the inhabitants, she would thereby not create as much trouble for the American Government as if she were to demolish the same cities without killing the inhabitants. Just imagine the position facing the American Government if a few large cities were demolished, and the Government would have to house and feed millions of refugees. Why should the Russian Government oblige the American Government by sparing her ~~the coping with the facing of~~ such a calamity?

It is conceivable that were the Russian Government to issue the kind of proclamation I described, the American Government, because of the ~~proposed~~ ^{somewhat} American emotional/attitude towards property, would revise ~~her~~ ^{its} position on atomic disarmament and prefer to reach an agreement with Russia on ridding the world of the bombs.

Russia may or may not have a similar emotional attitude towards property, and might or might not also prefer to rid the world of the bomb, ~~rather than render the stalemate stable by adopting the philosophy here described. It is sure, it would not~~ ~~xxxx~~. All I can say with reasonable assurance is that the choice lies between ridding the world of the bomb and rendering the atomic stalemate stable. ~~xxxxxxx~~ The "rule of conduct" here presented would render the stalemate stable, and at the same time, eliminate ~~ingxxxxxxx~~ atomic war as a means of resolving conflicts. ~~xxxxxxx~~

~~The rule of conduct here proposed~~ ^{It also} suffers from a serious defect -- it is unprecedented; so, of course, is the atomic stalemate. And if I were asked to propose a rule of conduct which would not suffer from this defect and yet ~~xxxxxxx~~ ^{solve the problem that} the bomb poses to the world ~~xxxxxxx~~, I should have to reply: "I regret I am unable to oblige."

A proposal that is unprecedented is not easy to accept, and a rule of conduct must be politically acceptable if it is to be adopted by the Government. But fortunately, measures that may not be acceptable to the people today, may become acceptable to them tomorrow, when they ~~xxxxxx~~ have had enough time to see the necessity of these measures.

The thought that cities might be demolished is, of course,

hard to take. And it will not be easy to explain to the public, and possibly even harder to explain to statesmen, that ^{actually} no cities need to be demolished if the rule of conduct here proposed were adopted. The stability of a mechanical system which is subjected to certain constraints, is determined by the conceivable motions which are permitted by these constraints, But if the system is ^{fairly} stable, it remains at rest and the conceivable motions do not actually take place. This is, of course, something that the physicists learn in the freshman course; But will ^{they} be able to explain to statesmen, that in a stable stalemate, cities might be conceivably demolished, but no city ^{need} ~~xxxx~~ be actually demolished?

Let me now, for ~~xxxxxxx~~ the sake of argument at least, assume that the atomic stalemate has been rendered stable by the adoption of ^{some} appropriate ~~rules~~ of conduct, and then try to visualize the kind of a world we should have.

Clearly, it shouldn't take long until Russia and America would discover, that ^{even though} ~~xxxx~~ they ^{may} ~~xxxx~~ remain free to maintain an air force, an army, and a navy, these would not add appreciably to their security, ^{while} ~~xxx~~ they would add appreciably to their ^{then} military expenditure. Before long, America and Russia could ^{And} be expected to reduce these forces, ~~xxxx~~ if the second stage of the stalemate continues in existence for an appreciable period of time, the arms expenditure of these two nations should fall to a small fraction of its present level.

Let us now compare for a moment such a stable form of the atomic stalemate with the situation ^{that} ~~xxxx~~ would prevail in the world if America and Russia had agreed to rid the world of the bomb at an early date.

It is my contention that unless, in addition to doing away with the bomb, the world somehow also did away with the knowledge of how to make the bomb, ^{then if there} ~~xxx~~ should ~~xxxxxx~~ be another war, ~~xxxxxxx~~ it ~~xxx~~ would be fought, after a comparatively short period of conventional warfare. with atomic bombs.

In the absence of general principles universally acceptable to all nations, it is not possible to adjudicate conflicts between nations, and it is not even possible to put forth reasoned arguments that may appeal uniformly to the sense of justice of the people of all nations. ~~xxxxxxx~~ Suppose we got rid of the bomb, what would then prevent nations from attempting once more to settle conflicts by resorting to arms, except perhaps the memory of the bomb? Would the memory of the bomb be strong enough and just how long could this memory be kept alive?

It is true that the great powers, if they act in concert with each other, might use something like the machinery of the United Nations organization for preventing the smaller powers from disturbing the peace. But the United Nations organization cannot keep the peace among the great powers. For the time being, ~~xxxxxxx~~ at least Russia and America could perhaps protect their possessions without having to ~~xxxxxxx~~ use arms. But England and France just recently resorted to the use of force ~~xxxxxxx~~ against Egypt in order to protect what they regarded as their vital interests. Is it not likely that if the bomb is abolished, armed conflicts may continue to occur between nations, that such armed conflicts may threaten to change the power of balances adversely, either from the point of view of Russia or from the point of view of America, and that these two nations might then be drawn into the conflict? If this should happen, before long atomic bombs would reappear on the scene and at that point ~~xxx~~, all hell might break loose.

In this century the United States entered the war twice against Germany, not in order to make the world safe for democracy, nor in order to establish the Four Freedoms in the world, as some might choose to believe, but mainly ~~xxxxxxx~~ for the ~~sole~~ purpose of preventing a German victory. The United States was forced to enter the war for this reason, since a German victory would have produced a major shift in the power balances, ~~xxxx~~ that ~~shift~~ would have threatened America's security. Indeed, had Germany won either the First or the Second World War, ~~xxxx~~ she ~~would~~ ^{might} have become

militarily so strong as to be able to vanquish the United States --
if no atomic bombs existed -- in the event of ~~another~~ ^{another} World War.

~~On the basis of similar considerations,~~ ^{Similarly,} Russia was
impelled to go to war with Finland just prior to the onset of
the Second World War in order to improve her strategic position
in the next war, the war with Germany.

If Russia and America are able to maintain the atomic stale-
mate in a stable form, then neither of them ~~will~~ ^{need} to be con-
cerned about their security or fight a preventive war again for
the sake of their security. China might become a great indus-
trial power; Germany might become economically far stronger than
England or any other nation on the Continent of Europe; Japan
might become a great industrial nation with an orientation of her
trade towards China. -- none of this need to concern either
Russia or America from the point of view of their security. In
the setting of ~~the~~ ^{a stable atomic} stalemate, ^{an increase in} the so-called war potential
of any nation or combination of nations, resulting from their
industrialization, ^{and} ^{perhaps} accompanied by a conspicuous rise of their
production of steel, coal, or oil, becomes irrelevant from the
point of view of the security of Russia, America, and such other
nations which in time might acquire a position similar to that
of Russia and America in the setting of ~~the~~ ^{the} ~~stalemate.~~ stalemate.

Britain, The "nth" Power Problem, and the Security of the
European Continent

We have so far not discussed the effect on the stalemate of nations other than Russia and America, which may have available "clean" hydrogen bombs of high power or may acquire such bombs in the ^{foreseeable} ~~xxx~~ future. In polite diplomatic language, this problem is sometimes referred to as the "Nth" power problem.

At the moment the only power falling in this category is Great Britain. In a recent white paper the British Government has indicated that in case of a major war in which Russia is involved, England would use hydrogen bombs against Russia -- presumably dropping them on Russian cities and killing millions of civilians, men, women, and children, even if Russia were willing to fight the war with conventional weapons. Since there is no reason why England should not expect Russia to retaliate in kind, the statement of the British white paper is tantamount to a threat of "murder and suicide". ~~Without entering into the ques-~~

~~The threat of murder and suicide might or might not be be-~~
~~lieved, and such a threat can therefore not serve the purpose~~
~~of stabilizing the stalemate.~~
~~effectively, it ventur~~ ~~es to predict that with the advent of the second~~
~~stage of the strategic stalemate and in case of the kind of Pax~~
~~Russo-Americana which have been discussing, any nation threatening~~
~~murder and suicide would automatically place itself in the position~~
~~of a xxxxxx enemy of Russia and America.~~

This does not mean, however, that England would have to deprive herself of the protection which the possession of "clean" hydrogen bombs of high power and solid-fuel-long-range rockets might afford her. England might well retain the bomb as an instrument of power if she adopts the same rule of behavior concerning the hypothetical use of her bombs as Russia and America. England might well proclaim a price list and set a reasonable price on each of the territories, which she is committed to defend. It is true that the loss of a city of a half-million inhabitants would be a far greater loss ^{to} ~~xxx~~ Britain than, say, for Russia, but on the other hand, it is also true that ^{being deprived of} ~~losing~~ the possession of some of her colonies would be a far greater loss to Britain than

would be the gain that the acquisition of such a colony would represent for Russia -- and I am adopting here for the sake of argument, the manifestly absurd premise that some of the British colonies ~~are~~ ^{may be seriously} coveted by Russia.

Perhaps Britain, by threatening "murder and suicide" in the recent white paper, has rendered a service to the world; for by doing so, she drew attention to a danger that still lies in the future, but nevertheless may require watchfulness and early action on the part of the great powers. Britain did not threaten murder and suicide for the purpose of acquiring new possessions. She has used this threat only for the sake of preserving what she now possesses. But why shouldn't in the future some small nation, under a government more irresponsible than that of Britain and perhaps ruled by a dictator -- about whose mental sanity the world may have legitimate doubts -- use the threat of murder and suicide for the purpose of acquiring a coveted possession of some other nation?

I have discussed ^{the probability} above/that in some regions of the world the status quo may be preserved by maintaining an inter-governmental armed force equipped with conventional weapons. The nations located in such areas do not need atomic or hydrogen bombs for their security, and the great powers have means to bring, in such circumstances, pressures on such nations to renounce the possession of such bombs. ¶ But what about the nations of Europe, such as France or Germany? If any of these need ~~atomic~~ hydrogen bombs for their security, or if they have some other strong incentive for having such bombs available to them, it will be very difficult, and perhaps impossible, ^{in the long run} to prevent them from acquiring such bombs.

Prior to the onset of the atomic stalemate, both Russia and America had a vital and opposite interest in the distribution of military power on the Continent of Europe. This made it impossible to bring about in the post-war period, any changes in Europe with the consent and approval of both America and Russia. At the same time, the nations in Europe did not lack security,

for the map of Europe was frozen just because Russia and America had vital, and opposite, interests.

In the atomic stalemate, and particularly as the second stage of the stalemate approaches, America and Russia are going to be increasingly indifferent to any of the changes that might take place on the Continent of Europe. In this stage of the stalemate, there is no important reason why the United States should wish to maintain any military bases on foreign soil, and a military alliance with the nations of Western Europe would no longer add much to the security of the United States. The United States may continue to maintain an alliance with the nations of Western Europe, but she would increasingly regard these allies as expendable.)

Similarly, Russia may become increasingly indifferent to what happens in Europe.

At this point, it may become possible to bring about changes in Europe with the consent and approval of both Russia and America, as well as the nations directly involved. What might these changes be?

One of the hopeful signs in Europe at the present is the ^{moving} ~~the~~ of Western Europe towards a customs union. The present movement toward an economically united Western Europe would be probably severely disturbed if a united, disarmed, neutral Germany were created where France remained armed and an ally of the United States. The French military needs are closely tied to her African possessions, and it is conceivable, that if the Algerian War is brought to an end, most of the continent of Europe might become an area in which arms ^{may be} ~~are~~ maintained at a low level. If it were possible to accomplish this, Europe could reach an unprecedented level of prosperity very fast.

If a nation can divert 10% of its national income from military expenditure to the ^{increasing} ~~xxxxxxx~~ of its production capacity, this shift alone will ^{result in} ~~xxxxxxx~~ a 3% increase in the annual national ^{product (and if} ~~xxxxxxx~~ the population ^{remains} ~~xxxxxxx~~ stationary to a 3% increase in the standard of living).

Russia would greatly profit through a flourishing East-West trade from such an improvement in the economy of Europe, and it is conceivable that Russia and America, acting in concert with each other, would want to facilitate such a development in the foreseeable future.

But one must not disregard the political problems with which Europe may be faced in the not-too-distant future. Right now, the nations of Europe are all tired of war and at this time, people in Western Germany are more interested in increasing their prosperity than in the problem of unifying Germany. But human memory is short, and the time might come when unifying Germany may become the one over-riding political issue on which all Germans may unite. Furthermore, once Germany is unified, the problem of recovery of territories lost to Poland might ^{similarly} ~~become~~ ^{the} ~~an~~ over-riding issue. Therefore, if it becomes possible to change the map of Europe with the consent and approval of Russia, as well as America, it would be very desirable to create, right from the start, a situation which is politically stable. Only in that case will it be possible to freeze the status quo without having to lean on ^{force or the} ~~a~~ threat of force.

Perhaps it might be possible to provide Poland with an adequate compensation to induce her to agree to the return of former German territories -- possibly according to some gradual but fixed schedule. If this could be done, then one of the valid reasons for maintaining Germany divided would disappear.

There would still remain a major difficulty. Russia can agree to the unification of Germany, only when she is ready to abandon her political friends in Eastern Germany, who could not be expected to retain political office, if Germany were reunited. True enough, the political party at present in power in Western Germany would presumably not remain in office either, if Germany were united. But whether Russia would, or should, regard the replacement of Adenauer's party by the German Social Democratic Party as a ^{major} ~~a~~ change for the better, is by no means clear.

Should a political settlement be obtainable on the Continent

of Europe that is satisfactory to all nations in that area, then the security of the nations which make up the Continent of Europe may perhaps not present a major problem. But if no fully satisfactory settlement can be achieved, then inter-European security might well represent^a serious problem.

There are two different approaches to the solution of ~~the~~ ^{this} problem. ~~of inter-European security.~~ Both of these approaches are based on the premise that in the second stage of the stalemate, neither Russia nor America can be expected to take ^{any} action at an appreciable cost to themselves, ~~in order to prevent~~ ^{for the sake of preventing} changes in Europe, ~~which may~~ ^{which may} changes were to come about, through one nation in Europe taking armed action against another nation in Europe.

One of ^{the} two possible approaches to the problem of freezing ^{of the Continent of Europe} the map/would consist in providing the nations ^{of} ~~of~~ Europe -- or at least some of the nations of Europe -- with a limited number of "clean" hydrogen bombs of high power. The map of Europe could then be stabilized through exactly the same kind of mechanism through which Russia and America may protect -- in the second stage of the stalemate -- those areas of the world in which they have a vital interest.

Because in the second stage of the stalemate America and Russia may have only a very limited interest in the distribution of power in Europe, neither of them can be very well expected to protect any nation in Europe against any other nation in Europe that has "clean" hydrogen bombs of high power available and solid-fuel-long-range rockets which can hit either America or Russia.

It might very well be, of course, that the nations of Europe would prefer another approach to the problem of inter-European security and that they would want no hydrogen bombs available to any of the nations on the Continent of Europe. In this case, ^{and Russia,} America, ^{each other,} acting in concert with ~~each other,~~ would enter into a commitment to protect the nations on the Continent of Europe against each other. Clearly, no nation on the Continent of Europe ~~would~~ ^{would} be going to accept the loss of ~~an appreciable~~ ^{an appreciable} fraction of her cities for the

sake of achieving any territorial ambitions that she may have.
Russia, as well as America, could^{effectively}/threaten to do just that ~~xx~~^{provided}
^{that}
/the offending nation is in no position to exact from America and
Russia the same price.

If this approach to the problem of inter-European security
were preferred by the nations of Europe, then Europe would become
part of the security system based on a Pax Russo-Americana.

found if we^{only}/remember that an agreement of this sort is not enforceable and that, therefore, it will remain in force only as long as America and Russia wish to keep it in force. It might, therefore, be best if the agreement were to provide that both America and Russia have the legal right openly to abrogate the agreement at any time if they, rightly or wrongly, suspect that major secret violations have remained undetected.

If one approaches the problem in this manner, then it may be seen that the pertinent question is not what kind of an inspection system the agreement should specify, but ~~what the pertinent question is~~ rather this: "By what means could America and Russia convince each other that there are no major secret violations of the agreement occurring?" (For clearly unless they both may accomplish this, one or the other of them will be forced to abrogate the agreement and neither of them would want this to happen).

If the question is posed in these terms, then one might perhaps arrive at the answer along the following lines:

Research and development work on a major scale, aimed at an effective defense against long-range-rockets, could not successfully be carried out either in America or in Russia without the enthusiastic cooperation of many thousands of scientists and engineers. Should any agency of either the Russian or American Government keep on with such research and development work in violation of the agreement, thousands of engineers and scientists would know about this violation.

Both the American and Russian Governments might obtain reasonable assurance that violations occurring would be detected, if it were possible to develop between individual Russian scientists and individual American scientists a relationship of mutual trust. This would have to come about by a deliberate effort on the part of their Governments, and might involve the creation of suitable inter-governmental/^{research}institutions that would have to operate on a rather large scale.

The word "trust" denotes relationship between human beings.

Governments are not human beings; they cannot be expected to trust each other, and they rarely do. But scientists are human beings, and moreover they are drawn to each other by their passionate interest in their work. In the post-war years, as long as America's interests and Russia's interests were in conflict with each other, the relationship between American and Russian scientists was of necessity troubled also because both the Russian and American scientists found themselves in a conflict of loyalties. But as we now move into the second stage of the atomic stalemate, America's and Russia's interests begin more and more to coincide, and scientists, Russians as well as Americans, will be quick to perceive that in this stalemate the over-riding interest of America and Russia is to make the stalemate stable.

Let us try to visualize the President of the United States addressing the American people and speaking as follows: "America and Russia have just concluded an agreement for the purpose of stabilizing the atomic stalemate. To this end it is necessary for both America and Russia to refrain from developing a system that may provide for an effective defense against long-range-rockets in flight.

America hopes that Russia may be able to convince her, that no such work is being carried out any longer in Russia, and America has reserved the right legally to abrogate the agreement, unless Russia succeeds in convincing her of the absence of such secret violations. Until such time as America may openly abrogate the agreement, America is pledged to tolerate no ~~xxxxxx~~ violations of the agreement occurring in America.

It is my duty to see to it that America may honor this pledge. I am, therefore, appealing to any American scientist and engineer, to report such violations if they ~~xxxxxxx~~ discover that some ill-advised official of the American Government is bent on evading the provisions of the agreement, ~~to~~ ~~xxxxxxx~~ Such violations may be reported to an inter-governmental control commission set up for the purpose, or preferably, directly to the Russian Government which, in turn ^{may} ~~xxxx~~ inform the inter-governmental commission. America and Russia have jointly set up a fund out of which high rewards may be paid for

information leading to the discovery of a violation of the agreement. These rewards, because they are paid by an inter-governmental agency, would be free from U. S. income tax."

I have added the last lines for the benefit of those, who believe in the irresistible power of monetary inducements. I, myself, believe that in this case monetary inducements could do no harm, but that they would not be necessary.

The agencies of the American Government have trouble enough as it is to recruit the ablest among scientists and engineers for the research and the development work which is needed at present. What success would any of them have in ~~xxx~~ recruiting the engineers and scientists they ~~xxxxx~~ need if the recruitment is for a purpose which has been expressly disavowed by the President? And how would such an agency keep its illicit activities secret?

After the First World War, the Treaty of Versailles^s provided for the disarmament of Germany. This Treaty was imposed upon Germany, and ~~xxxxxx~~^{she} did not consider it in her interests to adhere to its provisions. So, while Germany^{had} signed the Treaty of Versailles, she never revoked the ~~xxx~~ Espionage Law of Imperial Germany, which thus remained on the statute books. German citizens who informed the inter-allied control commission of secret violations of the disarmament clauses of the Treaty of Versailles, could be sentenced to prison terms under the German Espionage Act, and they were in fact so sentenced.

A nation which indulges in this kind of inconsistency, indicates thereby that it has no intention of observing the agreement, providing for arms limitations. Should either Russia or America, having concluded an agreement, indulge in this type of inconsistency this would undoubtedly ~~xx~~ lead to a prompt abrogation of the agreement.

But barring such a possibility, can anyone seriously believe that American scientists would keep violations of the agreement, of which they learn, a secret? Once the world moves into the second stage of the stalemate, and it becomes clear what benefit the world might derive from a Pax Russo-Americana, American scientists, engineers, as well as the American public in general, would realize that maintaining the stalemate stable is just as imperative for America as it is for Russia. Who could seriously believe that in

these circumstances American scientists would break faith with their Russian colleagues, would fail to do what the President has asked them to do, and endanger the safety of the world by remaining silent when they ought to speak up?

Naturally, I can speak with much less assurance about the ~~existing~~ attitudes of Russian scientists and engineers. I am convinced, though, that the great success which Russia had in developing atomic bombs, hydrogen bombs, and inter-continental ballistic missiles was due to the enthusiastic work of Russian engineers and scientists, who were convinced of the righteousness of Russia's cause. And I can't quite see any high official of the Russian Government appealing, in secret, to Russian scientists and engineers and asking them to do something, that the Russian Government had openly declared she would not do-particularly if the Russian Government has the right openly to abrogate the agreement.

However, there is no reason why I should speak here of what Russian scientists and engineers may or may not do. They can very well speak for themselves, and I believe they ~~may~~^{will} speak for themselves, if the time should come for them to do so.

*** THE END ***

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 soliders 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.

APRIL 24, 1958

ON THE POSSIBILITY OF A PAX RUSSO-AMERICANA

IN A STABLE ATOMIC STALEMATE

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The Strategic Stalemate -- Where It Stands at Present,
and What Form It May Take in the Foreseeable Future

At present a kind of stalemate exists between Russia and America, based on ability of both nations to destroy each other to any desired degree. Both have learned how to make powerful, "dirty" hydrogen bombs of the fission-fusion-fission type, light and compact enough to be transported by jet bombers to almost any point on earth.

Such a stalemate would not be stable if it were possible for either of the two nations to cripple, by a sudden attack, the ability of the other to strike back. This is not the case now; but potentially this kind of instability is inherent in the present form of the stalemate.

The American Strategic Air Force operates from bases inside America and on foreign soil, which could be knocked out by a sudden attack. To preserve its capacity for retaliation, America has been forced to adopt the principle of "instant counterblow". If warning is received that foreign planes have crossed what America regards as her "air defense perimeter", bombers carrying hydrogen bombs take off. They are not supposed to continue their flight toward Russia unless subsequent information confirms the attack against American bases or cities.

Maintaining the present stalemate is exceedingly costly for both sides. Soon we may enter a transition period in which America will find it necessary always to keep perhaps one-third of its bombers, loaded with bombs, in the air, and this will further increase the cost. There may be a further transition period, in which America will rely partially on submarines, capable of firing intermediate range rockets with hydrogen warheads; and on low-flying, pilotless bombers launched from dispersed bases. These weapons will be effective until Russia develops appropriate counter measures.

Because I propose to discuss long-term policies, I shall disregard these transitional phases and focus attention on what might be called the "second stage" of the stalemate, towards which we are now moving.

In this stage, solid-fuel, long-range rockets will be available in large numbers to both sides. Both will possess adequate quantities of "clean" high-power hydrogen bombs compact and light enough to be carried by long-range rockets.

At this stage there will be no more need for bases on foreign soil since long-range rockets could be launched from home bases. Furthermore, launching bases for solid-fuel rockets can be made invulnerable to aerial attack. In this stage, neither side will need to fear that a sudden attack on her bases might appreciably diminish her ability to strike a counter-blow. Consequently, the stalemate will cease to be inherently unstable. If an accident or a mistake in judgment should cause an unfortunate incident, there would be no need for an "instant" counter-blow.

When this second stage approaches, America and Russia should be able to agree to limit the number of powerful hydrogen bombs in their stockpiles and eliminate altogether the "dirty" bombs.

Is the Basic Premise of the Present American Military Policy Valid?

Will the premises upon which the present American military policy is based remain valid in the above-described second stage of the stalemate? I shall try to show that, whether or not these premises are valid today, they will not be valid then.

The architects of this military policy were not primarily concerned with the danger that America may be invaded by a Russian army; but with America's ability to live up to her commitments to protect certain areas of the world against invasion. This she is supposed to do by using small atomic weapons. Given enough time, peoples of the world may begin to understand what destruction would be in store for them if they were "protected" by American intervention with atomic weapons; but still America may come to their defense in case of invasion, whether this intervention is welcome to the people who live there or not. Let us then envisage what can happen if such a situation should arise in the second stage of the stalemate.

According to the present American military doctrine, America will intend, in this case, to fight a local war with small atomic weapons, in the assumption that the threats of large "strategic" bombs, available to both side, would cancel each other out because their use will mean an all-out nuclear war, which neither side wants. I believe Russia may refuse to conduct the war on these terms and resort to limited use of its strategic nuclear weapons without provoking an all-out nuclear war.

Let us assume -- to take a concrete example -- that Turkey feels menaced by the growing power of the Arab Republic and that Turkish troops invade Syria. Under Paragraph 51 of the United Nations Charter, which allows for collective defense in case of an armed attack against a member of the UN, Russia would be within her rights to take armed action against Turkey, perhaps by dispatching an army of "volunteers" to assist the Arabs. If the Turkish armies are in danger of being defeated, America

in turn may intervene to save her ally from defeat. America's hope will be to win this localized war through superiority in nuclear weapons. However, putting ourselves in the position of Russian leadership, can we not imagine that, instead of accepting the fight in Turkey against odds, they may declare that if America insists on protecting Turkey in its attempt to change by force the status quo in the Near East and intends to use for this purpose atomic weapons, or to supply such weapons to Turkey, Russia would use H-bomb carrying missiles to demolish one large American city, say between one-half million and one million inhabitants. Russia may promise to give the selected city four weeks' warning in order to permit orderly evacuation and enable the American Government to provide for housing and feeding of the refugees. For reasons to be made clear further below, Russia may further declare that she would be willing to tolerate America's demolishing in retaliation one of her own cities of equal size, but would also expect four weeks' warning. In other words, Russia will "set a price" in terms of mutual destruction of cities without loss of life, which America will have to pay if it wants the status quo in the Near East changed in her favor with the help of Turkey.

To this the American Government may of course reply with the threat that America would demolish two (or more) cities in Russia for each city demolished in America. To this Russia may answer as follows: "The Russian Government has adopted the principle of tolerating the destruction of one of her cities for one American city. She is determined to adhere to this rule of "one for one". Therefore, if America should demolish two Russian cities in exchange for the first destroyed American city, Russia will demolish one additional American city. If America

should retaliate -- as she threatens to do -- by demolishing more cities in Russia, Russia would demolish one American city for each one destroyed in Russia, etc., etc."

If America adheres to the rule of two (or more) for one, while Russia sticks to the "one for one" rule, ultimately all cities in both countries would be demolished. Because the Russian government has no reason to assume that the American government has gone insane, she could safely disregard the threat of two for one and could go through with her threat to demolish one American city.

The same principle can be extended, from an ad hoc application in a local conflict, to a general system of world security, in the second stage of the nuclear stalemate.

I believe that this example proves that in the second stage of the stalemate, one side could invoke the threat of the use of clean hydrogen bombs of high power in order to enforce the maintenance of the status quo -- and conceivably even actually use them -- without unleashing an all-out atomic war. Therefore, it would not lie within the power of America to decide that a local conflict will be settled by local fighting with small atomic bombs. Thus, the present American military doctrine will prove invalid.

HOW EITHER AMERICA OR RUSSIA COULD, BY UNILATERAL DECLARATION,
ENSURE THE STABILITY OF THE SECOND STAGE OF THE STALEMATE

Let us assume that, once this stage is reached, Russia issues the following proclamation:

"There are certain areas in the world which Russia is committed to protect from invasion. We know that Russia and America are in a position to destroy each other to any desired degree and Russia cannot be expected to accept ~~x~~ commitments that could involve total destruction. However, we can extend effective protection with only limited commitments if we are willing to pay a reasonable price in economic sacrifice, and are able to exact a similar price from America. Russia therefore renounces the use of atomic or hydrogen bombs, either against soldiers in combat, or against the civilian population in non-evacuated cities. But Russia reserves the right to use "clean" hydrogen bombs for demolishing American cities after having given four weeks' warning to permit orderly evacuation and adequate housing and feeding^d of the refugees.

"Accordingly, we are issuing a 'price list', listing all areas under Russian protection and specifying a price for each of them in terms of number and size of American cities to be demolished if an attempt will be made to change the status of this area of force. Attached is a list of American cities divided into categories according to the number of inhabitants.

"Russia will in no circumstances exact a price in excess of the maximum price specified. We have appraised how much America may be willing to pay, and believe that the prices are high enough for safe protections of all the areas listed. Should subsequent events, however,

prove that we have underestimated America's willingness to pay, we may revise all our prices upward.

"Russia realizes that it is necessary to render the stalemate stable, and she knows that this requires her to impose certain restraints on herself. Therefore, Russia adopts the principle of "one for one". Accordingly, if she demolishes a number of American cities of certain size, she will tolerate America's demolishing an equal number of Russian cities of the same categories. For any additional city which America might demolish in Russia, Russia would demolish -- according to the principle of "one for one" -- one American city of the same category.

"Russia has no intention to take armed action, or support anyone else's armed action directed against a territory which America is committed to protect; but there might be unforeseeable contingencies where Russia might want to take such action. For this reason, Russia would welcome, if America were to issue a price list similar to one issued by herself, covering areas which America is committed to protect, and specifying the price for each area in terms of the minimum and maximum number and size categories of Russian cities that America would want to demolish.

"Russia would expect America to give four weeks' notice to the Russian cities which she may single out for destruction and, naturally, Russia would demolish -- according to the principle of "one for one" -- one American city of the same size category for each Russian city destroyed by America, after having given four weeks' notice. This matter may be handled by means of unilateral declarations, and there is no reason for America and Russia to enter into an agreement in regard to it.

"Russia does not want to divert an appreciable fraction of her national income into arms expenditure, and is greatly reducing her army, navy, and air force. Russia may, therefore, not be in a position to defend an area she is committed to protect, by fighting a war in the ordinary sense of the term. Accordingly, all that Russia can commit herself to do is to exact from America a reasonable price -- for which Russia, in turn, is willing to pay an equal price.

"In these circumstances, America could -- if she were willing to pay the price -- conquer (or have an ally of hers conquer) some specific area under Russian protection. America and Russia would then both lose an equal number of cities. Since America will derive no benefit from having demolished cities in Russia, she would have to pay for her gain from the conquest of a given area by the loss of a certain number of cities. Russia does not believe that America has sufficiently great interest in any of the areas listed by Russia to justify the loss of even one city of say half a million inhabitants. For this reason, Russia believes that the price list proclaimed by her affords adequate protection to all the areas listed."

If Russia were to issue a proclamation of this sort, it would be greatly to America's interest to adopt the same strategy. If both America and Russia adopt such a philosophy, the stalemate will be stable -- at least in the sense that no initial disturbance would lead to a chain of ever-increasing destruction. Moreover, it would be very unlikely that any city would ever be actually demolished.

Quite similarly, if America were to issue a proclamation of this sort, it would be to the interest of Russia to embrace the same philosophy.

The "rule of conduct" here presented would render the stalemate stable, and at the same time, eliminate "local" atomic war, as a means of resolving local conflicts. It suffers from a serious defect -- that of being unprecedented; but so is the atomic stalemate. If I were asked to propose a rule of conduct which would not suffer from this defect and yet solve the problem that the bomb poses to the world, I should have to reply: "I cannot".

An unprecedented proposal is not easy to accept, and to be adopted by a government a rule of conduct must be politically acceptable. But measures not acceptable to the people today may become acceptable tomorrow, when people have had enough time to see their necessity.

The thought that cities might be demolished is, of course, hard to take. And it will not be easy to make the public see, and possibly even harder to explain it to the statesmen, that actually no cities need to be demolished, if the proposed rule of conduct were adopted. The stability of a mechanical system which is subjected to certain constraints, is determined by the conceivable motions permitted by these constraints. But if the system is fairly stable, it remains at rest and the conceivable motions do not actually take place. Physicists learn this in the freshman course; but will they be able to explain to statesmen that in a stable stalemate cities might be conceivably demolished, but no city need be actually demolished?

Let me now, for the sake of argument, assume that the atomic stalemate has been rendered stable by the adoption of an appropriate rule of conduct, and try to visualize the kind of a world which will then result.

Clearly, it shouldn't take long until Russia and America would discover that their air force, army, and navy, do not add appreciably to their security. They could then be expected to reduce these forces, and the arms expenditures may fall to a small fraction of their present level.

Let us now compare such a stable atomic stalemate with the situation that would prevail in the world if America and Russia had agreed to rid the world of the bomb at an early date.

Getting rid of the bomb will not prevent nations from attempting to settle conflicts by resort to arms. Would the memory of the bomb be strong enough to prevent this -- and how long could it be kept alive? Is it not likely that if the bomb is abolished, armed conflicts will continue to occur between nations; and that America and Russia might be drawn into one of them? If this should happen, before long atomic bombs would reappear on the scene and all hell break loose.

In this century, the United States entered the war twice, not to make the world safe for democracy, or establish the Four Freedoms in the world, as some might choose to believe, but mainly to prevent a German victory, since this victory would have produced a major shift in the power balance and threatened America's security. Indeed, had Germany won the First or the Second World War, she might have become so strong as to be able to vanquish the United States -- if no atomic bombs existed! -- in another World War.

Similarly, Russia felt impelled to go to war with Finland just prior to the onset of the Second World War in order to improve her strategic position in the impending war with Germany.

If Russia and America will be able to maintain the atomic stalemate in a stable form, neither of them will need to be concerned about their security, or fight a preventive war for the sake of their security. China might become a great industrial power; Germany might become economically far stronger than England, or any other nation in Europe; Japan might become a great industrial nation, with an orientation of her trade towards China -- none of this need to concern either Russia or America from the point of view of their security. In a stable atomic stalemate, an increase in the so-called "war potential" of any nation, or combination of nations, resulting from their industrialization, and accompanied perhaps by a conspicuous rise of their production of steel, coal, or oil, will become irrelevant from the point of view of the security of Russia, America, (and other nations which in time might acquire a position similar to that of Russia and America in the setting of the stalemate).

If the arms race continues unchecked, an elaborate defense system based on rockets carrying atomic or hydrogen warheads, may be developed permitting destruction of long-range rockets in flight. Once America and Russia will have entered this third phase of the arms race, neither of them will be able to limit the bombs in its stockpile to a number which could still be regarded as safe from the point of view of the world as a whole. Moreover, the side which would first develop an effective defense against long-range rockets would be in a position to demolish as many cities as it wishes on the other side without having to pay a similar price herself. Clearly, if this happens, the atomic stalemate will become unstable.

It would be imperative, therefore, to halt the arms race before any nation gets too deep into this phase of arms development. If America and Russia were to conclude an agreement to this end, what kind of inspection would give them adequate assurance against major violations of the agreement?

I believe that the right approach to this problem is to realize that such an agreement is not enforceable and will stand only as long as America and Russia wish to keep it in force. It might, therefore, be best to provide that each side has the right to abrogate the agreement whenever it suspects, rightly or wrongly, that major secret violations have occurred. Then the pertinent question will be not: "What inspection system should the agreement specify?" but rather: "by what means could America and Russia convince each other that there are no major secret violations of the agreement?" (For clearly, unless they can do so, one or the other will be forced to abrogate the agreement -- something neither of them would want.)

To this question one might perhaps find an answer along the following lines:

Major research and development work needed to develop effective defense against long-range rockets, could not be successfully carried out without the enthusiastic cooperation of thousands of scientists and engineers. Should any agency, of either the Russian or the American Government, keep on with such work, these engineers and scientists would know about it.

Both Governments might obtain reasonable assurance that violations would be detected, if it were possible to develop between individual Russian and American scientists, a relationship of mutual

trust. This would have to come about by a deliberate effort on the part of their Governments, and might call for the creation of inter-governmental research institutions on a rather large scale.

The world "trust" denotes relationship between human beings. Governments cannot be expected to trust each other, and they rarely do. But scientists are human beings, and, moreover, they are drawn to each other by passionate interest in their work. As long as America's and Russia's interests were in conflict, Russian and American scientists found themselves in a conflict of loyalties. But as we move into the second stage of the atomic stalemate, America's and Russia's interests begin more and more to coincide, and scientists, Russians as well as Americans, will be quick to perceive that in this stalemate, the common, over-riding interest of America and Russia is to make the stalemate stable.

Imagine the President of the United States addressing the American people as follows: "America and Russia have just concluded an agreement for the purpose of stabilizing the atomic stalemate. To this end, it is necessary for both sides to refrain from developing an effective defense against long-range rockets.

We hope that Russia will be able to convince us that no such work is being carried out there. If not, we have reserved the right to abrogate the agreement. Until we have abrogated it, we are pledged to tolerate no similar work here.

It is my duty to see to it that America honors this pledge. I, therefore, appeal to all American scientists and engineers, if they should discover that some ill-advised official is bent on evading the agreement, to report this violation to an inter-governmental control commission, or to the Russian Government, which, in turn may inform the inter-governmental commission. America and Russia have jointly set up a fund out of which

high rewards may be paid for information leading to the discovery of a violation."

I have added the last lines for the benefit of those, who believe in the irresistible power of monetary inducements. I, myself, believe that in this case monetary inducements would not be necessary.

The American Government have trouble enough as it is to recruit able scientists and engineers. What success would any of its agencies have in recruiting engineers and scientists for a purpose expressly disavowed by the President? And how would such an agency keep its illicit activities secret?

After the First World War, the Treaty of Versailles provided for the disarmament of Germany. However, Germany did not revoke the Espionage Law so that German citizens who informed the inter-allied control commission of violations of the disarmament clauses could be -- and actually were -- sentenced to prison terms.

Should either Russia or America, having concluded an agreement, indulge in similar inconsistency, this would undoubtedly lead to prompt abrogation of the agreement by the other side. Barring such a possibility, can anyone seriously believe that American scientists would keep violations of the agreement secret? In the second stage of the stalemate, when it will have become clear what benefit the world might derive from a Pax Russo-Americana, American scientists and engineers, as well as the American public in general, would realize that maintaining the stability of the stalemate is as imperative for America as it is for Russia. Who would seriously believe that in these circumstances, American scientists

would break faith with their Russian colleagues, fail to do what the President asked them to do, and so endanger the safety of the world?

I can speak with less assurance about the Russian scientists and engineers. I am convinced, though, that the great success which Russia has had in developing atomic bombs, hydrogen bombs, and inter-continental ballistic missiles, was due to the enthusiastic work of Russian engineers and scientists. And I can't quite see any high official of the Russian Government appealing, in secret, to Russian scientists and engineers, to do something that the Russian Government had openly declared should not be done — particularly if Russia has reserved the right to abrogate the agreement.

However, there is no reason why I should speak here of what Russian scientists and engineers may or may not do. They can very well speak for themselves, and I believe they will speak for themselves, when the time should come to do so.

**** THE END ****

Leo Szilard

Rough Draft

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Outline of Paper Entitled:

"On the Possibility of a Pax Russo-Americana
in a Stable Atomic Stalemate"

Introduction.

The bomb poses a problem to the world for which history provides no precedent. In looking towards a solution of this problem, one may adopt either of two approaches to it. Of these I shall mention only in passing the approach on which public attention has been mostly focused in the past twelve years. This approach is based on the thesis that the solution of the problem that the bomb poses to the world lies in ridding the world of the bomb at an early date.

Those who adopt this approach to the problem may be expected to urge the stopping of bomb tests as an important first step toward this goal. One may willingly concede that Russia and America might be able to agree at an early date to stop further bomb tests and, perhaps, they might even take, in the near future, the next step and agree to stop the manufacture of further bombs. But what about the stockpiles of bombs that Russia and America will have built up in the meantime?

Clearly, if one thinks of the solution of the problem of peace in terms of ridding the world of the bomb, then no arrangement which stops short of the step of eliminating the

bomb stockpiles can be regarded as adequate. Would America and Russia want to take this crucial step in the foreseeable future? And assuming that they both did want to take this step, would they be able to take it?

I do not propose to discuss here the difficulties which may stand in the way of solving the problem posed by bomb by getting rid of the bomb in the foreseeable future. Nor do I propose to discuss here the advantages and disadvantages that this approach may have from the point of view of the overriding problem of maintaining peace. Rather, in the present paper, I am discussing chiefly another approach to the problem posed by the bomb. One is quite naturally led to this second approach, if one starts out with the assumption that both Russia and America are going to retain large stockpiles of hydrogen bombs of high power (either of the "dirty" or of the "clean" variety) for the next ten years, and perhaps throughout the entire foreseeable future.

If this is what is going to happen, then, right now, the most urgent problem to which we must devote our attention is how to live with the bomb, rather than how to get rid of it.

Is it possible to try to live with the bomb, say for another generation, and yet to survive? And, furthermore, is it possible to live with the bomb and to live well?

We are not far today from a "stalemate" in which the atomic striking forces of Russia would be capable of destroying

America to any desired degree, and the atomic striking forces of America would be capable of destroying Russia to any desired degree. Accordingly, in a certain sense, both Russia and America are about to become invincible. Today, they might still be drawn into a war and fight on opposite sides, but even today no rational military policy that America or Russia may adopt could be aimed at an all-out victory. In this sense we may speak of a "stalemate" between the strategic striking forces of Russia and America, and I shall speak here of a "stalemate" in this narrow sense of the term only.

At present we are going through a transitional period in which the character of the "stalemate" is still rapidly changing. I am mainly concerned here with exploring the general principles upon which long-term policies might be based in that stage of the stalemate that may be expected to prevail in, say, about five years' time. For the sake of brevity, I shall refer to this stage of the stalemate as the "solid-fuel stage."

Five, or at most ten, years from now there should be a stalemate between the strategic atomic striking forces of Russia and America, based on solid-fueled-long-range rockets carrying "clean" hydrogen bombs of high power. Moreover, these long-range rockets would be launched from bases dispersed inside the territories of America and Russia proper. These bases could, and presumably would, be made invulnerable

to attack by bombs. In this stage of the stalemate, Russia and America would be capable of destroying each other to any desired degree, but neither of these two countries would need to fear that a sudden atomic attack, by the other, might appreciably diminish its own power to strike a counterblow. This fear is one of the elements responsible for the inherent instability which characterizes the present, transitional phase of the "stalemate." With this fear eliminated, the current American emphasis on the need to be prepared for an instant counterblow would disappear also.

"What kind of an understanding between Russia and America would it take to make it possible for them to refrain from embracing such 'undesirable' policies?"

Whether an all-out atomic war, that neither America nor Russia wants, would erupt in the "solid-fuel stage" of the stalemate would depend essentially on the answer to two questions:

A. What kind of political and military disturbances may be expected to occur?

Clearly, political and military disturbances that may be expected to occur would depend on whether or not there is a political settlement between America and Russia and on the nature of the settlement.

B. What policies would America and Russia adopt concerning the possible use of the bomb in any of the hypothetical contingencies that might conceivably arise?

In the "solid-fuel stage" of the atomic stalemate, the main danger would not lie in the possibility of a wanton attack of the atomic striking forces of America against the cities of Russia or vice versa. An all-out atomic war which neither Russia nor America wants, might come however either as the result of an accident, arising perhaps from a mistake in judgment, or--more likely--come as the result of a conflict between two other nations which may lead them to go to war with each other. In such a case, America and Russia may then militarily intervene on opposite sides. If that happens, the war might then be fought with atomic weapons, used within the area of conflict, against supply and air bases, as well as against troops in combat. Such a war might not remain limited to the initial area of conflict and it might end in an all-out atomic catastrophe, unless Russia and America impose upon themselves certain far-reaching restraints and unless these restraints are proclaimed in advance and fully understood by both nations.

The need for a political settlement.

The danger of this kind of disturbance could be greatly diminished through a political settlement between America and Russia, particularly if the settlement had the concurrence of the other great powers affected.

I am using the words "political settlement" here in a narrow sense of the term only, having primarily in mind an understanding that would enable Russia and America to act in concert with each other and thereby to prevent other nations from resorting to war. A political settlement in order to be adequate would have to insure also that, if Russia and America were not able to prevent a war between two other nations, at least they would not intervene militarily on opposite sides. An adequate political settlement could eliminate the kind of disturbances which could be most dangerous, from the point of view of the stability of the stalemate.

What are the chances that Russia and America may be able to arrive at a political settlement of this nature?

The possibility of a political settlement.

It is my contention that an adequate political settlement may become possible in the setting of the stalemate which is based on the possession of long-range, solid-fuel rockets by America as well as Russia because in such a setting the political forces which had led to the cold war in the post-war years would cease to operate. In the post-war years, preceding the advent of the atomic stalemate, each additional ally represented a potential asset to America; in the setting of such a stalemate, however, each additional ally would represent a potential liability to her. The same

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considerations hold, of course, for Russia also. The controversial issues that have arisen in the post-war years between Russia and America should become negotiable in the setting of the stalemate. And when Russia, America and the other great powers may act in concert for the purpose of stabilizing the stalemate, then it should become possible to set up machinery under the United Nations organization that may effectively prevent other nations from going to war with each other.

In the setting of the "solid-fuel stage" of the stalemate, America's and Russia's overriding national interests will substantially coincide. Also, America and Russia are not rivals in trade, nor do they compete for essential raw materials. Therefore, in that setting, it should become possible for America and Russia to reach a political settlement with the concurrence of the other great powers involved. Rendering the stalemate metastable--The general principle of limited commitments.

It is hardly possible to say at this time that the political settlement,^{which} would be obtainable in the foreseeable future, would be reasonably satisfactory to all the major aspirations of all the major powers. If no such settlement is, in fact, obtained, then the status of the world could not be regarded as truly stable, i.e., changes might still

be brought about by force or by the threat of force against the wishes of either America or Russia.

It is, however, within the power of Russia or America to render the atomic stalemate at least "metastable" in the sense that the political and military disturbances that could occur would not trigger a chain of events involving progressively increasing destruction that could end up in an all-out atomic catastrophe. To this end it is not even necessary for America and Russia to conclude an agreement with each other. In case of a conflict between America and Russia, either Russia or America could render the stalemate metastable by unilaterally adopting and proclaiming an adequate policy with respect to the bomb.

If, say, America were to adopt a policy deliberately aimed at rendering the stalemate metastable, then she would have to impose certain far-reaching restrictions on her own actions with respect to the use of the bomb. These restrictions would limit not only what America may do, but also what she may threaten to do in any of the hypothetical eventualities that might conceivably arise.

In the post-war years, America did not hesitate to make unlimited commitments for the protection of certain areas of the world. As long as she was in sole possession of the bomb, she was in a position to make such unlimited commitments because she was able to threaten massive

retaliation against Russia, and thus to protect these areas against any real (or imaginary) threat, attributed to Russia. But clearly, in the "stalemate," when America and Russia could destroy each other to any desired degree, the threat of massive retaliation against Russia would be tantamount to a threat of "murder and suicide." A threat of this sort, if it were made by a nation like America, would not be sufficiently believable to be effective. If there is strong provocation for Russia to take armed action against a nation, which America is committed to protect, Russia may choose to disregard such a threat and America would then either have to admit to bluffing, or to proceed to destroy Russia and be herself destroyed in the process.

If America wants to render the stalemate metastable, as she must, then any commitment which she may make for the protection of other nations must remain a strictly limited commitment on her part. Such a limited commitment, if it is believable, may then afford a measure of protection to third nations, because America could make it reasonably costly for Russia to engage in armed action against an ally of America which is under America's protection. But America may not aim, in any contingency in which she might be called upon to fulfill such a limited commitment, at exacting a greater sacrifice from Russia than she herself is willing to make, or else she may provoke an all-out atomic war.

All this holds, of course, in the reverse for Russia also.

While the stalemate could be made metastable by either Russia or America through the unilateral adoption and proclamation of an adequate policy with respect to the bomb, the stalemate would not--in this manner--be necessarily rendered truly stable.

If America wanted to bring about a change--against the wishes of Russia--by using force or by threatening the use of force, and if she were willing to pay a higher price for the sake of obtaining this change, than Russia were willing to pay for the sake of preventing it, then--in principle at least--America would be in a position to have her way.

The same holds true, of course, in the reverse for Russia also.

At this point it becomes necessary to examine, in a more concrete fashion, just what kind of a threat the bomb may represent in a stalemate, what kind of sacrifice may America threaten to extract, and what kind of prices may she be called upon to pay if the stalemate is to be kept metastable.

Rendering the stalemate metastable--What use of the bomb may be threatened and what use may not.

We have been very slow in comprehending to what kinds of "use" the bomb might conceivably be put. Thus, in the first few years immediately following Hiroshima, the extensive private (as well as the public) discussions of the issue of the

bomb wholly failed to take into account the possibility that atomic bombs might be used in war against troops in combat by America or that America might at least threaten to use them in such a manner. It was therefore generally believed, in those early post-war years, that as soon as Russia as well as America will be in possession of the bomb, then these two nations would be willing to give up the bomb, since neither could then use the bomb against the other and survive.

It took years before people in America began to see that atomic bombs could be used against troops in combat also. Today there is a strong and increasing emphasis on the need for America to be militarily prepared to fight local wars with small atomic weapons. Today, many people believe that America ought to state clearly that she intends to confine herself, in case of war, to the use of small atomic bombs and would drop these only within the area of conflict. They assert that if America's intentions in this respect were clearly understood, America's possession of the bomb would represent a "deterrent" that would be effective because the threat implied would be believable.

These people argue that hydrogen bombs of great power may be retained in the stockpiles by America and Russia, for a long time to come, but that the possession of these bombs would not affect the course of any war in which America and Russia may fight on opposite sides. For neither side could

use such bombs for the destruction of any of the cities of the other without precipitating an all-out war, which neither Russia nor America wants.

This, I believe, is a wholly fallacious argument. It is my contention that only if Russia and America both chose to resolve a contest by fighting an atomic war with small bombs, locally, in and around the contested area, would the conflict, in fact, be resolved by such means. Either America or Russia might, unilaterally decide to threaten to demolish a limited number of cities within the territory of the other, after giving those cities adequate warning to permit their orderly evacuation. But, if/Russia made such a threat,^{for instance} then she could not aim at causing greater property damage to America than she would be willing to suffer herself, for if she were to pursue such a goal, she would bring about a chain of events leading step-by-step to ever-increasing destruction. If Russia were to impose upon herself, however, such far-reaching restrictions as she must--in order to preserve the stability of the stalemate--and if she were to proclaim these restrictions in advance, then her threat to demolish a limited number of evacuated cities would not be a threat of "murder and suicide;" it would be a believable threat that might well be effective.

Faced with such a threat, America would have no choice but to threaten a limited counterblow of the same kind. If America were not willing to pay the price set by Russia in such terms, then America would not be in a position to "fight" even though she might have military superiority in the contested area were she to use small atomic bombs against troops in combat.

But, even if America and Russia both wished to lean primarily on their capabilities of fighting limited atomic wars against each other, they could extend real protection to other nations by these means only as long as the threat to fight a local atomic war would prevent the outbreak of the war. If it failed to do this, then invoking the protection offered would presumably mean the almost total destruction of the protected nation. Thus, the protection afforded by such a "security system" might perhaps be invoked once, in the course of future events but, thereafter, nations would probably be reluctant to accept such "protection."

At a certain point on the road along which we are now moving, either Russia or America might decide to base their security on their capability of demolishing a limited number of evacuated cities by clean hydrogen bombs of high power, and to renounce atomic war as an instrument of her national policy. Thus, she could retain the bomb as an instrument of policy that would permit her to threaten the use of force

(or, if necessary, actually to use force) without threatening any longer the killing, by means of atomic bombs, of soldiers or civilians. If either Russia or America were to adopt such a policy, in the "solid-fuel stage" of the stalemate, she would then be able to reduce her arms expenditure to a small fraction of her current arms expenditure.

It is likely that the stockpiling of "clean" hydrogen bombs of high power would more or less automatically lead the Russian and American Governments to base their defense policy on the threat to demolish, if need be, a limited number of cities which have been given adequate warning to enable the orderly evacuation of the population.

In contrast to this, the stockpiling of "dirty" hydrogen bombs of high power is likely to lead governments to think in terms of threatening "murder and suicide," and no attempt to stabilize the stalemate on this basis could have an appreciable chance of succeeding.

It is my contention that in the "solid-fuel" stage of the stalemate, Russia and America would be in the position to maintain a stalemate based on long-range-solid-fuel rockets, capable of carrying clean hydrogen bombs of high power that may be launched from invulnerable bases inside American and Russian territory. The atomic stalemate could, under such conditions, be metastable even in the absence of an adequate political settlement. The stability of this system need not necessarily be destroyed by a third, fourth or fifth power stockpiling clean hydrogen bombs of high power.

of the killing of civilians, as well as soldiers, emotions be aroused which would make it difficult for these two governments to follow a rational course of action?

And, one may also ask: Would the situation in this respect be worse, or better, if Russia or America renounced atomic war and threatened, instead, to demolish evacuated cities that have been given warning adequate to permit their orderly evacuation?

One might, perhaps, argue that the loss of property would arouse emotions just as strong ^{would be} as loss of human life, and this argument must be met.

Certain nations, if they acquire substantial atomic capabilities, might make the threat of "murder and suicide" an integral part of their national policy, either for the purpose of protecting what they possess or for the purpose of acquiring what they covet. It might appear to be a perfectly rational course of action to threaten "murder and suicide," but to carry out the threat, if the bluff were called, would not be a rational course of action. It is my contention that, because it is always doubtful whether a threat of "murder and suicide" would be carried out, such threats would introduce a dangerous element of instability in the stalemate.

Breakdown of the stability--for other reasons.

The stalemate would be rendered instable also if several nations were in a position to launch from submarines intermediate or long-range rockets carrying hydrogen bombs. The reason for this is as follows: Solid-fuel long-range rockets which are launched from bases located on solid ground can be picked up in flight by radar and traced back to the launching site. Thus, it is possible to identify the nation that is responsible for the launching of a given rocket. Any nation launching a rocket under these circumstances, for the purpose of inflicting damage on another nation would have to be willing to suffer damage commensurate to that which it inflicts on another nation that is capable of striking a counterblow. But if Russia, America, and several other nations are in a position to launch rockets from submarines, then if a city in Russia or America or elsewhere were destroyed by a hydrogen bomb, it would not be possible to know what nation is responsible for the destruction wrought.

The stability of the stalemate might be endangered also if a technological break-through occurs either in Russia or in America that would enable one of these two countries to destroy incoming long-range rockets in flight.

Such a defense system is not in sight at present. What is likely to happen in this regard is, rather, the

following: Both America and Russia might develop a defense system which would enable them to destroy a small--but perhaps gradually increasing⁻⁻ fraction of incoming long-range rockets in flight. As progress is made in this direction, say in America, Russia would respond by building more long-range rockets and more hydrogen bombs to be carried by such rockets in order to compensate for the rockets which might be destroyed in flight. Such a process could lead to a perfectly senseless and very expensive arms race.

It would take an agreement between Russia and America to stop this kind of a senseless arms race. In the absence of such an agreement, the American and Russian stockpiles might increase beyond bounds and it would probably not be possible to keep them within such limits, as could still be regarded as safe from the point of view of the world as a whole.

Undesirable short-term policies which might lead to instability of the stalemate.

There is a considerable danger that, during the present transitional stage of the stalemate, either Russia or America may yield to the temptation of adopting short-term policies which will make it impossible for them, later on, to render the "solid-fuel" stage of the stalemate metastable.

In the present transitional stage of the stalemate, America is dependent for her defense on bases outside of her own territory because she does not as yet possess solid-fuel-long-range rockets that could be launched from invulnerable bases within her own territory. Thus, America has, for the time being, an incentive to maintain the system of alliances that she had built up after the second world war.

A number of her allies are, however, not satisfied with the limited commitment that America is able to make for their protection. The possession by Russia of long-range rockets carrying hydrogen bombs of great power carries with it the implied threat that, in case of a conflict, Russia might demolish a number of their cities. Were Russia in case of a concrete conflict explicitly to threaten to do this, then America might well counter with a threat of demolishing Russian cities. This counter threat could ^{be} effective

only, if Russia were to believe that America would be willing to lose cities of her own, for the sake of protecting cities of her allies.

Whether Russia would or would not believe such an American counter-threat is, at the moment, beside the point. What matters is that, clearly, today the governments of America's allies, themselves, do not believe that America would be willing to sacrifice cities of her own--if the

chips were down--for the sake of protecting theirs. Nothing that the American Government might say could possibly convince her allies in this regard.

In these circumstances, one after the other of America's major allies is going to demand to have atomic striking forces of its own. They will argue that, if they had such forces, they would then be able to respond to the possible Russian threat with a believable counter-threat of their own.

Clearly, before long, America will, ^{thus} be faced with the choice of either relinquishing an ally or putting that ally in the position of striking an atomic blow against Russia, or anyone else, independently of any decision that the American Government might take, in any given contingency.

If more and more nations acquire bombs, as well as an adequate delivery system, and if one of these nations adopts the threat of "murder and suicide" as an integral part of its national policy, then the stalemate may become instable and there might occur an all-out atomic catastrophe.

During the present transitional phase of the stalemate, there may come a period of time when--ahead of America--
a substantial number of
Russia may be in the possession of solid-fuel long-range rockets capable of carrying hydrogen bombs of high power and capable of being launched from invulnerable bases inside of Russian territory. America, lagging behind in development,

would then have to safeguard herself against a surprise attack that could destroy her ability to strike a counterblow, by keeping a considerable fraction of her jet bombers in the air. This is a costly operation and, in order to avoid it, America might build submarines equipped to launch intermediate-range rockets carrying hydrogen bombs of high power. Submarines, because they can shift their position, may be regarded as invulnerable bases.

The same consideration may lead other nations, such as England, France and Germany and, in the not too distant future still others, to base their defense on the submarine, the intermediate-range rocket and the hydrogen bomb. Rockets launched from submarines and picked up by radar in flight can be traced back to the point where the submarine was, when it launched its rocket, but this does not permit identifying the nation responsible for the attack. Thus, atomic striking forces based on submarines will render the system inherently instable and may lead to an all-out atomic catastrophe which neither Russia nor America wants.

Conclusions.

The atomic stalemate in the solid-fuel stage could be rendered metastable if the great powers adopted an adequate long-term policy with respect to the bomb. But in addition they would have to act in concert with each other in order to

prevent nations, that might make the threat of "murder and suicide" an integral part of their national policy, from acquiring a substantial atomic capability. The great powers would have to act in concert also to eliminate the danger of instability inherent in a defense system based on the launching of rockets from naval vessels.

Clearly, the interdependence of the world is such that the Great Powers, if they act in concert, are in a position to prevent all other nations from upsetting the stability of the stalemate by stockpiling bombs or by maintaining a system suitable for the delivery of such bombs. But, would the Great Powers assume this responsibility and, having assumed it, persevere in such an endeavor?

The chances that this would happen would be obviously enhanced if they were in a position to act in this matter in conformity with international legality and morality. It is conceivable, but by no means sure, that the machinery set up in the United Nations might enable the Great Powers to do so.

At the end of the last war, it was generally believed that--as long as the great powers act in concert with each--the United Nations organization may be able to guarantee the security of all other nations and may make it unnecessary, as well as impossible, for these other nations to go to war with each other or otherwise endanger world peace. Attempts made in the past ten years to use the United Nations for purposes other than those for which it was designed, have

greatly
/weakened this organization. But

if it were possible to restore the United Nations to its original function and base its actions on decisions of the Security Council, arrived at with the concurring vote of the five permanent members, ^{then} the Great Powers acting in concert with each other, would be legally as well as morally justified in imposing ^{on all other nations such} arms limitation and such other measures as the stability of the atomic stalemate may require.

of course,
Such measures could, /include the maintenance of armed forces operating under the United Nations' auspices in a few selected regions of the world.

Before the United Nations could effectively fulfill the functions that it was meant originally to fulfill, it might be necessary, however, to recognize China as one of the five permanent members of the Security Council. The original choice of the five permanent members might not have been a judicious choice, but one the choice has been made, and until such time as the Charter might be modified, it will not be possible for the Security Council to supply the moral and legal justification for the steps that might be taken in order to keep the atomic stalemate from becoming instable.

What is urgently needed at this time is not so much an agreement between America and Russia aimed at stopping bomb tests, but rather a meeting of the minds between America and Russia on the long-range policies that Russia and America will have to pursue in order to render an atomic stalemate stable.

Russia and America need to reach a meeting of the minds on the means that need to be employed in order to render the stalemate stable and on the kind of political settlement that they must reach in order that they shall be able to employ these means.

Appendix.

And, now, what about bomb tests?

The American Government has stated that America now knows how to make hydrogen bombs of high power which are 96% "clean." If a bomb is 96% "clean," it is clean enough and one might think that there should be no real need to develop such bombs further, in order to make them still cleaner.

But are these hydrogen bombs of great power which are 96% "clean," as light and as compact as the "dirty" hydrogen bombs of equal power which America now knows how to make? Would these "clean" hydrogen bombs be light enough and compact enough to be carried by the kind of rockets which America now knows how to make?

If the answer to these questions is in the negative, as it well might be, and further, if the rockets which America now knows how to make are capable of carrying hydrogen bombs of the "dirty" variety (but not of the "clean" variety), then America will be tempted to continue to stockpile "dirty" hydrogen bombs instead of going over to the stockpiling "clean" hydrogen bombs.

The same might be true for Russia, though to a lesser degree. For Russia may be at present further advanced along the road of developing solid-fuel-long-range rockets that are

capable of carrying heavy "payloads." Thus, if Russia also knows how to make the kind of "clean" hydrogen bombs of great power which America has learned how to make, she could more easily afford to stockpile them in place of the "dirty" hydrogen bombs than could America.

In these circumstances, I am led to conclude that America and Russia may well need to reach an agreement on bomb tests, but what they need to agree upon might not be a cessation of all bomb tests. Perhaps they ought to agree to continue such tests as they need to perform in order to learn--either through their own separate efforts or through a joint effort--how to make bombs of great power which are compact and light enough. Such test would then permit them to dispense with the "dirty" hydrogen bombs.

Unless this is done the cessation of bomb tests might turn out, in retrospect, to have been a step not in the direction of disarmament but rather in the direction of misarmament.