

How to Live with the Bomb

(Second Version)

As I write these lines the pre-election political campaign is still on. The issue of what we stop or shall we not stop testing H-bombs is being hotly debated, and needless to say the arguments on both sides are based on a false premise. This false premise, which is sometimes tacitly accepted, sometimes loudly proclaimed, is as follows: The government of the United States would like to see atomic bombs eliminated from ^{our and} Russian armaments provided only we could obtain agreement on this, as well as a general reduction of armaments, and provided only we could obtain a foolproof inspection system so that we could be sure that we need not fear secret evasions of the agreement. Since the United States government is a complex organism and until it is actually faced with a decision to make a concrete proposal in this respect that has a reasonable chance of acceptance or to accept a concrete detailed proposal made by Russia, the question of what the United States government wants in this respect has no precise meaning. However, I am personally convinced that the United States government has not in recent years vigorously pursued any policy that has a reasonable chance

of leading to the elimination of the bomb. Moreover, I rather suspect that, if we are able to think through dispassionately the problems which are involved in living with the bomb and if we understand what needs to be done to eliminate the present grave risks which this involves, we might conclude that in the foreseeable future it should not be the aim of the United States government to eliminate the bomb from our national armaments, notwithstanding the impossibility of setting up a foolproof inspection system to which Russia might agree. Because of the importance of this issue, I wish to plead with the reader to try to forget his preconceived notions and to try to think through in a dispassionate manner the various aspects of this problem that I shall attempt to present here.

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I personally have no doubt that, if it was clearly in the interest of both Russia and the United States to eliminate atomic bombs from their armaments and if they enter into an agreement to this end which they both wanted to keep in force, it would be easy for each of them to devise ways and means to convince the other that the agreement

is not being secretly evaded, but it would be a serious mistake to take it for granted that it would, in effect, be in the interests of Russia and the United States or even in the interests of peace to do away with the bombs now when we are close to having reached a strategic stalemate.

Soon after the war ended many of us regarded the elimination of bombs from national armaments as the single most important issue.

As soon as
It has always been clear to us that, America and Russia have learned how to mass-produce atomic bombs, any world war in which they are lined up on opposite sides would be fought with atomic bombs, even if atomic bombs had been eliminated from national armament in time of peace. The reason why we, nevertheless, regarded the elimination of atomic bombs from national armament as the single most important issue was the fear that war might break out as the result of an atomic arms race. The outbreak of the first World War was largely due to the arms race between Germany and the Entente that intensified the power conflict. By 1912 war was regarded as likely by many governments in Europe, and in 1941 when it became clear that the harvest in Central Europe was good, the consideration that the

Central Powers might be in a weak position if war came in a year of poor harvest was an important consideration in bringing about the first World War. In a sense the first world war was a preventive war fought by Germany on the assumption that sooner or later war would come and that 1914 was a particularly good year to fight it. Germany took a calculated risk which turned out -- as calculated risks so often do -- to be a miscalculated risk. The atomic arms race which followed the last war approached a crisis when it became clear that Russia knows how to make atomic bombs and that sooner or later our superiority will turn into a strategic state-mate. Even though a few people only raised their voices in favor of a preventive war, many people believed that war would probably come, and they were, at least on the subconscious level, aware of the fact that if war comes at a time when America has no longer superiority, things will be much worse. This thought, even though it may have remained subconscious, made these people inclined to advocate that the United States take calculated risks. If we go to the brink of war, so the thought went, we might win a point and improve our strategic position; and if our calculated risk turns out to be a miscalculated risk, at least we have the war which they thought would come anyway at a time when we can win it

without exposing our country to virtually unlimited devastation. It would seem now that we approach the state of strategic stalemate where the danger that the war drags out as a result of the race in arms has receded. Our present greatest peril arises from the fact that no political settlement has been reached with Russia. At present there are several areas in the world where there might be a conflict between two neighboring nations and where there is danger that, if there is a resort to arms, the United States and Russia may intervene militarily on the opposite sides. The present danger arises thus not out of the race in arms but out of the state of arms, for undoubtedly such a war will be fought with atomic bombs, presumably, first used only in the tactical areas. But after the forward ~~war~~ air-fields have been knocked out with atomic bombs, both sides will begin to use air-fields farther beyond the lines which in turn will have to be destroyed, and it is difficult to see how the spread of such a war can be prevented and how it can be kept from degenerating into an all-out atomic catastrophe. This danger will remain with us as long as our strategy is based on the use of atomic bombs as a tactical weapon in military conflicts and, above

all, as long as in the absence of a political settlement with Russia it is impossible for us to cooperate with Russia in maintaining peace.

Clearly the political settlement that would be needed in order to avert the present danger would have to be far-reaching enough to accomplish two objectives. It would have to make sure that in all of the foreseeable conflicts in which neither the United States nor Russia is directly involved, Russia and the United States would cooperate in order to prevent a resort to arms. Secondly, it would have to make sure that, if for some unforeseeable reason there is nevertheless a resort to arms, Russia and the United States will not intervene militarily on opposite sides.

It is clear that in the years after the war Russia and the U.S. were deadlocked on all issues, and it would have been impossible for them to negotiate a political settlement of the kind that is needed. We must, therefore, now examine: Has this situation changed, and if it did, why did it change?

THE POST-WAR POWER CONFLICT

The situation that developed soon after the last war made it virtually impossible for Russia and the U.S. to make any progress toward settling any of the major controversial issues. Russia and America found themselves trapped in a power conflict which was tragically reminiscent of the conflict between Sparta and Athens that preceded the Peloponnesian war that devastated the whole of Greece. It is characteristic of such a power conflict that within it operates a vicious circle; war considered as possible and the importance of winning the war when it comes become more and more the overriding consideration as times goes on. Most of the controversial issues, if they are settled one way or the other, increase the chance of one party or the chance of the other party to win the war when it comes, and because the issue of who is going to win the war is clearly not one on which a compromise is possible, none of the the old controversial issues can be settled, whereas new controversial issues keep cropping up. Each group tries to draw more and more nations into its orbit in the belief that the more allies you have the better your chances are to win the war. And finally a war may

come which neither party really wants because you have to go to the rescue of one of your allies who got entangled in a war with one of their allies.

For many years after the war Russia and America seemed to trod the same path toward the final, inevitable clash which was trodden before by Sparta and Athens. Russia drew her satellites closer and closer to herself, and we tried to increase the number of our allies and lengthen our lines. Then gradually there was a change. Since several things happened at the same time, it is easy to misinterpret the real nature of this change, and it is easy to fail to see the real cause that brought about this change. The most conspicuous symptom of the change visible even to those who only scan their newspapers is the fact that Russia and America stopped the shouting war which they have relentlessly pursued for a number of years and which appeared to many as a prelude to a shouting war. First, there was the Geneva meeting in July of last year, and this was followed by an invasion of Russia by congressmen and senators. These visitors made the surprising discovery that the Russians walk on two legs like other ordinary human beings; that they

have a sense of humor like many other human beings, and they begin to think that the Russians are, maybe, not so bad after all. In matters of this sort, people usually believe what gives them pleasure to believe. It is pleasurable to believe that our own government is righteous and that the potential enemy is wicked; that our potential enemy plots our destruction day and night; that there is no act vile enough that he would not willingly commit if it were to his advantage ; but it is a pleasure to believe all this only as long as our potential enemy is weak. When your potential enemy gets so strong that he really becomes dangerous, provided he is as vile as you had thought he is, it ceases to be pleasurable to believe that he is so terribly wicked. You then begin to look for reasons to revise your opinion of his character. If you are lucky, you will find such reasons. In the case of Russia, it was easy to find reasons for changing our mind because it so happened that Stalin died and some conspicuous changes took place in Russia. For years our government spoke of the wicked men in the Kremlin. We could now say that unfortunately the Intelligence reports of our government were inaccurate, and that instead of the "men" in the Kremlin, we should have talked about the "man" in the Kremlin, and the man in the Kremlin is dead.

That Stalin's death may make a great difference to those living in Russia, I have no reason to doubt.

That the Russian political system represented a vulnerable machine which can run wild was amply demonstrated during the great purges around 1935, and it was widely suspected that the personality more or less responsible for throwing that machine out of gear more than anything else was Stalin's own personality. That this disfunctioning of the Russian political machine brought great suffering to the Russian people and, above all, to the intellectual class of Russia, we all knew but the leaders of the governments of the West ^{at} ~~had~~ no time during the war felt that these tragic occurrences in Russia disqualified Stalin from representing Russia's interests in negotiating with our allies. Human compassion should induce us to welcome Russia's new leadership and to give them the benefit of the doubt, if there is doubt. Nothing that has happened may induce us to believe that the intellectuals in Russia will not now enjoy political freedom, but it will be a great step forward if no one in Russia needs to fear unlawful imprisonment, and if at least those who are not actively engaged in politics will be able to feel per-

sonally secure. A bill of rights that is enforced is necessary for political freedom but such a bill of rights does not guarantee political freedom. In America there were many people who until recent years firmly believed that the parliamentary form of democracy guarantees not only a bill of rights but also political freedom, and they thought that the American political system was an automatic guarantee of freedom. This, as anyone can see now, is obviously an illusion. It is quite true that the right to vote protects different minorities, such as the Negroes and the Jews, from oppression, because these minorities can swing their vote, under the two-party system, from one party to the other, and by virtue of this can exercise a measure of control. But the American political system does not protect any minority who may be suspected or accused of being Communist sympathizers or of being sympathetic to Russia or China or any other country that might for the time being be regarded as a potential enemy. In the years during the rise of McCarthyism there was no appreciable infringement on the Bill of Rights. No one needed to fear being sent to jail without a fair trial. But political freedom was on the way out. And if this trend was halted by the grace of God, it was halted not because the American political system is invulnerable, not

because the political machinery in this country cannot run wild, but rather because there is a sufficient number of influential individuals whose emotional attachment to our traditional freedoms was great enough to stem the tide.

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When I saw a report by Dean Ackerman of the School of Journalism at Columbia University on the front page of the New York Times, in which he said that he can no longer get his students to discuss politically controversial issues in class, it became quite clear to me that political freedom in the United States was on the way out unless there will arise at the last minute new forces to stem the tide.

We may hope that a bill of rights will from here on remain in operation in Russia, and that the vulnerable political Russian system will gradually evolve to be less vulnerable. But on this point we can have, of course, no assurance, just as we cannot know for certain that political freedom in the United States will remain as strong as it seems to be at present. But if I say that something has changed in Russian-American relations and if I say further that this change is so fundamental that now for the first time in the post-war period the way is open to reach a political settlement that will serve its purpose, I am in no way basing my optimism on such a hope. The fundamental change that has come about has nothing to do with the death of Stalin or the decline of McCarthyism, even though it is likely that the shouting war would not have stopped in 1955 ~~xx~~ had Stalin not died and had the Republican party not assumed office and subsequently broken free from Senator McCarthy's influence. Even President Eisenhower's personality and prestige might have played an important role in bringing about the change. Nor do I wish to underestimate the importance of stopping the shouting war. A man who shouts cannot start thinking as long as he keeps on

shouting. Now that we have stopped shouting, we may be free to start thinking and goodness knows, it is high time. But the main reason why I believe that for the first time since the war a political settlement with Russia is possible has nothing to do with internal changes in Russia and the psychological change in America. It is entirely based on the bomb and the way the bomb has broken the vicious circle in which America and Russia were caught after the war.

As a result of the bomb, Russia and America are approaching a strategic stalemate. It is necessary to be a little bit more explicit than just to say this vague term. We are now on the way to mass-produce bombs and have means to deliver these bombs in such quantity that, in case of war, we could destroy Russia to any desired degree. Unless we are irresponsibly careless, we can arrange matters in such a manner that no sudden attack by Russia can destroy our power to retaliate to any desired degree. There is every reason to believe that Russia can, if she wants to, be in much the same position; that she will soon be able to destroy us to any desired degree, and that we would not be able to destroy her ability to retaliate by attacking her first. By safeguarding

the ability to retaliate in case of a sudden attack we avoid the introduction of a dangerous instability into this system of strategy but, as will be shown later, it is far from being sufficient to assure real stability. For once Russia and America reach a strategic stalemate between their air-forces, there arises an entirely new situation. The valid reasoning which guided the foreign policies of the great powers in the past is valid for them no longer since they have both become in a sense unconquerable. America has gone to war within this century twice in order to prevent a shift in the power balance which could have become dangerous to her. If Germany had won the first World War or if Germany had won the second World War -- or so American statesmen believe -- after a short while she would have been in a position to fight a war against America and to conquer America. But if America can destroy any nation to any desired degree, then clearly America cannot be conquered, and Russia is in much the same position. All of the controversial issues on which America and Russia were deadlocked, because settling them one way or another would have increased or decreased America's risk of losing the war, are becoming irrelevant issues now, at least irrelevant from

this point of view. From the point of view of America's safety, it is no longer important which way they are settled as long as they are settled one way or the other. But some of the issues are still unnegotiable because they affect the welfare of ~~their~~ third parties, and it is only right that both we and Russia should remain concerned about the welfare of third parties. The overall deadlock has ceased and all of these issues appear in a new light. The deadlock between the American and Russian strategic air-forces illustrates that, in the Age of the Bomb, it is in principle possible to find a solution to a mathematical absurdity.

The leading statesmen of the different nations used to regard it as their task to safeguard their nation against all probable contingencies that may arise but the military leaders have the same task of safeguarding the security of their nation in every conceivable contingency. These men have no right to be satisfied unless their guarantee is militarily as strong as all the other nations put together who may be regarded as conceivable potential enemies. Thus absolute security for each nation ~~xxxxx~~ means that each nation must be as strong militarily as all other nations put together -- an apparent mathematical absurdity.

The bomb has transformed this mathematical absurdity into a potential possibility. For potentially it is possible now for each nation to destroy all other nations to any desired degree and, in this sense, to be as strong as all other nations put together. With the permission of the reader, I wish however to express doubts that this is a practical road to security. Quite the contrary. Right now it ought to be one of our major concerns to see that there should not arise, one nation after another, that will engaged in the manufacture of bombs and acquire means for their delivery. For to halt the development in this direction with the kind of gadgets which we are attempting to build into our bilateral agreements, through which we render nations assistance in the field of atomic energy, seems to me a childish attempt to halt this development. The only hope in this direction, it seems to me, lies in first reaching a political settlement with Russia, and then in cooperation with Russia and the other great powers to freeze the status quo. Only when each nation knows that its territory cannot be violated shall we have removed the incentives for the smaller nations to engage in an arms race and to stockpile bombs. If we have the kind of political settlement with Russia

which permits us to prevent a resort to arms in case of conflict, can the smaller nations relax and use their resources for their economic development rather than for the purchase of arms? Once we have a political settlement with Russia, it might be possible to maintain professional, highly mobile, and heavily armed, regional police forces in different regions in the world which would squash any resort to arms and restrict it to its status quo if it had been violated. It is not my purpose, however, to discuss this issue here any further. While the method indicated represents my present preference, mainly from the point of view of the long-range potentialities of this method, it does not represent the only way in which this problem can be solved, and another way of approaching this problem will be touched upon further below. If we can arrive at a political settlement with Russia that will give us assurance that in none of the foreseeable conflicts, which may lead to a resort to arms, would Russia always intervene militarily on the opposite side, we would have eliminated the most likely cause of an all-out atomic catastrophe that might befall the world.

But we would still not have eliminated the danger which, even in the absence of a political conflict, must arise from the mere presence of large stockpiles of hydrogen bombs, maintaining a strategic air-force for their delivery, and supplementing or replacing the strategic ~~air~~ air-force by intercontinental ballistic missiles. How shall we meet this danger? If it is true that we owe our escape from the vicious circle of the post-war power conflict to a strategic stalemate, then it might be unwise to avert the danger inherent in the presence of the bomb by the trivial method of getting rid of the bombs and abolishing the systems that we have built up and are continuing to build up for their delivery. Therefore, we must ask, can we live with the bomb? And this is the question to which we shall turn our attention now.

Obviously we are not going to keep the bombs around forever if the only way to make sure that no bombs will explode is to have no bombs around. But I do not propose to discuss here what we should do with the bomb ultimately; I do propose to discuss here how to meet the peril of the bomb in the immediate future.

HOW TO LIVE WITH THE BOMB

Apart from the absence of a political settlement, the bomb is a menace because we did not develop the proper philosophy concerning its conceivable use. One might well ask how it can be that the human mind which created the bomb is so slow in understanding how the bomb which may be here to stay can be fitted into our world. The answer is that the kind of minds which created the bombs are very different from the kind of minds that contemplate its conceivable use. The mind of the creative scientist is an inquiring mind; nothing is taken for granted; nothing is ruled by precedent; nothing is held to be psychologically impossible. The scientist is driven by an urge to discover the truth, and if he discovers the truth, he will be respected by his fellow scientists. Politics is regarded as the art of the possible, and nothing seems possible that has not been done before. A statesman may not succeed in being respected but his first consideration must be to be respectable. It is not respectable to propose solutions which have never been thought of before, and anything that is unprecedented is regarded as psychologically unrespectable whereas, in truth, it only calls for unusual gifts

of statesmanship. Admittedly people will not accept anything new unless they are compelled to do so by the force of circumstances. I believe that as far as the bomb is concerned they will be compelled to do so by the force of circumstances.

When we free ourselves from the kind of primitive assumptions that are made in order to show that the ability to retaliate will make us safe, and when the strategy of the bomb and intercontinental ballistic missiles will be openly and publicly discussed, we will have gone a long way toward an intelligent philosophy of the bomb. There will be only one small, additional step needed to get to the point where we can formulate an intelligent program for the potential use of the bomb. And once such a program is formulated and generally understood, we will have a fair assurance that the bomb will never be used for killing people and presumably will never be used in any other way either.

The bomb has an unfortunate history. By the time we tested the bomb at Alamogordo, New Mexico on June 16, 1945, the war against Germany was won and the Japanese government knew very well that they could not possibly win the war. That does not mean that the Japanese

government would have or could have accepted the demand for unconditional surrender but it does mean that the responsibility of bringing the war to its end should have been shifted from the War Department to the State Department. Because of the demand for unconditional surrender, the responsibility remained with the War Department. Since it is the job of the military to prepare for all conceivable contingencies, the military had to be prepared to invade Japan in order to end the war in case negotiations should fail. I personally have no doubt whatsoever that peace would have been negotiated with Japan at that point, which would have accomplished our war aim; namely, to free from Japanese domination all non-Japanese territories in the East. I am not say that Japan would necessarily have agreed to give Formosa back to China, but she might well have agreed to the setting up of an independent Formosa which is what, in fairness to the Formosans, ought to have been done in any case. Formosa had been detached from China for over two generations and the native Chinese were regarded in Formosa as aliens. Needless to say, our statesmen would not have listened to the scientists who made the bomb on any such political matter, and it was with great difficulty that we got them to listen in the matter on which we felt we had some-

thing to say about the use of the bomb. Secretary Stimson, in an article which he wrote in Foreign Affairs defended the use of the bomb against Hiroshima on the grounds that the alternative to the use of the bomb would have been invasion and that invasion would have cost a million lives, both American and Japanese. The truth of the matter is that the alternative to the use of the bomb would have been the negotiation of peace and that the responsibility of the war should not have been the responsibility of the War Department at that point but the responsibility of the State Department. Negotiating peace with Japan would have required negotiating the peace with our allies, and this is presumably the reason our government followed the lines of least resistance, which was the occupation of Japan and the deferment of the conclusion of a peace treaty. Secretary Stimson must also defend, and he does defend, our reason for not demonstrating the bomb instead of using it on the grounds that at that time we had only two bombs, both of which might have proved to be duds, and that we were in no position to risk a demonstration. This is, of course, perfectly true but how many weeks would it have been necessary to wait until we had a sufficient number of bombs to stage a demonstration as so many of

us had urged? Why could we not have answered the Japanese quest for peace, which was transmitted by the Japanese Ambassador in Moscow, to the Russian government, by saying through the proper diplomatic channels to the Japanese government the following: "We are willing to negotiate an armistice, fixing the rough outlines of a peace treaty on the basis of a retreat of the Japanese from everywhere in the Far East to their homeland. Before we enter into negotiations, we wish to demonstrate a new bomb that we have developed. We propose that a medium sized city chosen by the Japanese government be evacuated. On condition that the Japanese government cooperates, we shall send a single bomber over that city and drop a single bomb in order to demonstrate this new device. The Japanese government is urged to observe in person the effects of this bomb. The observers shall be placed at ^a/safe distance from the center of the city of about ten miles."

If such a demonstration had been staged, as so many of us urged and if the Japanese government had turned out to be intractable, we could have proposed to Japan that we would give her ten days warning in each case before we destroyed a city as long as there is no Japanese interference with a single bomber which would be sent in each individual case.

Had we followed this procedure as so many of us had urged, we would have established the bomb as an instrument of demolition rather than as an instrument of murder.

Largely because we started out on the wrong foot with the bomb, we got ourselves into greater and greater difficulty in trying to discover how to live with the bomb. In none of the discussions right after the war did anyone ever suggest that atomic bombs should be used as a tactical weapon. Atomic bombs were regarded as too horrible to be used in warfare. They must be built and stockpiled for the sole purpose of deterring aggression, so we said. Thus, we built a large stockpile of these bombs, and eventually managed to have bomber planes fast enough and equipped with sufficient fire-power to deliver these bombs. Massive retaliation was threatened and our ability to make this threat was regarded by many, including Winston Churchill, as the only practical way for making sure that Russia will not invade Western Europe. Massive retaliation can be used as an effective threat against Russia -- assuming that such a threat is in fact needed -- as long as Russia cannot herself massively retaliate but when we reached the strategic stalemate, the threat of massive retaliation amounts to a threat of murder and suicide which is, rightly or wrongly, not going to be taken seriously,

and must, therefore, remain ineffective as a deterrent. In the meantime when we are talking about disarmament, we started a gigantic rearmament in nuclear weapons to be used in tactical warfare. Because of the stalemate between the strategic air-forces, which either has been reached or which we are approaching, the new theory is that in case of a war between us and Russia or some local war in which we and Russia intervene militarily on the opposite sides, our strategic air-forces will refrain from attacking Russian cities and Russian strategic air-forces will refrain from attacking our cities. The war will be fought on the territory which is the site of the conflict with atomic bombs used tactically, and if we are lucky we can, in this way, avert an all-out atomic catastrophe. In the meantime it is not clear what would happen if an American city is destroyed by atomic bombs. Clearly, if we are resolved that, if an American city is destroyed, we are going to hit Russia with all we have, and if Russia is similarly resolved, we have a highly unstable situation and, sooner or later, an all-out atomic catastrophe must overtake the world. Since some of the other nations will acquire bombs and means for their delivery -- as they must

unless we create conditions which make them feel so secure that they will have little incentive to incur the expense which atomic armaments must involve -- the logical extension of the principle of massive retaliation against Russia, if one of our cities is destroyed, would be to say that if one of our cities is destroyed by an atomic bomb, we shall massively retaliate against all countries that might have dropped a bomb. Without this extension, massive retaliation will not deter those countries that might like to see Russia and America destroy each other. That we are crossing the line between sanity and insanity by so doing is pretty obvious.

Even if we adopt the principle of destroying two Russian cities for each American city destroyed, and if the Russians were similarly minded, we would still have a high unstable situation, and an all-out atomic catastrophe would be merely somewhat deferred but not

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averted. /Before going any further along this line, let us now turn to the technical development which is now in progress. The time is not far off now when we shall have intercontinental ballistic missiles developed, and if these are mass-produced, they will be presumably

placed underground. Each ballistic missile might be assigned to one Russian city, and one such missile equipped with a hydrogen warhead might be sufficient to destroy one city. It is likely that we shall succeed in developing hydrogen bombs which do not spray a large quantity of radioactive dust on the countryside surrounding the ~~city~~ city over which they explode at a considerable height. These hydrogen bombs must, of course, differ in their construction from the megaton bombs that were tested by us in the initial stages of this development. It may, of course, be assumed that the Russians will, about the same time, have such ballistic ~~missiles~~ installed and that each missile may be assigned to the destruction, if necessary, of one American city designated in advance. What in this situation ought to be the philosophy of our "defense"? To say that neither of us will use the hydrogen bomb because both of us would be afraid of its effects and afraid of retaliation is taking a far too superficial view of the matter. The question is not whether there shall be an equilibrium -- the question is whether this equilibrium will be stable. If we keep on assuming that we must be able to meet every conceivable contingency and persist in disregarding ^{which} ~~these~~ contingencies ~~which~~ are likely to occur and which

are not, we are faced with a problem which is almost impossible to solve. But inasmuch as it is the responsibility of those entrusted with our defense to consider every conceivable contingency, it will be necessary to make an attempt to solve the almost impossible. This, I believe, can in fact be done but only at the cost of being logical in an excessive manner which almost borders on insanity. However, we embarked upon the road of insanity when we first conceived of massive retaliation, and since it is likely that we shall keep on trodding the path of insanity, our only salvation might lie in strenuously clinging to logic as best we can.

Let us then begin by contemplating all conceivable contingencies. Let us assume we have a large number of these intercontinental guided missiles in position to be launched at an instant's notice. Could the decision to launch them be safely delegated to the President or some other central authority, or must their launching be made automatic so that, if one of our cities is destroyed, the local commander in charge of the corresponding ballistic missile may press the button and destroy the corresponding Russian city. Clearly, if the Russians

have adopted the automatic system and we have reserved the decision to launch these rockets to a central authority, we might be put at a disadvantage. Suppose, for instance, we get into some local scrap in the Middle East and we intervene militarily on the opposite side. The war slowly increases in velocity and then, all of a sudden, one day a representative of the Russian government makes the following announcement: "Half of the cities of the United States will be destroyed within the next three minutes by guided missiles which are already on their way." The list of these cities is frankly disclosed. He now offers us two alternatives. We may call it quits at this point or else we may begin to hit back. But if we hit back, under the Russian automatic system of retaliation, for each city which we hit in Russia a city of equal size (not destroyed in the first attack) will now be destroyed. We may choose to destroy all of the Russian cities, in which case all of our remaining cities will be destroyed also. If we are confronted with such a situation, obviously the duty of the President of the United States would lie in calling it quits.

If we do not wish to take this risk, we almost have no choice but to reach an agreement with Russia along the following lines: We must prepare a list, in which we establish a one-to-one correspondence between Russian and American cities, trying to match cities of equal size. The destruction of one American city would then automatically evoke the destruction of one Russian city, and it would not be within the power of the President to prevent the destruction of a Russian city after the corresponding American city has been destroyed. This would hold visa versa. Assuming that no third power can throw a monkey wrench into this system, so that none of our cities can be destroyed by an unidentified attacker, we might achieve stability by recognizing that we must tolerate destruction of one of our cities if we destroy one of Russia's cities. Similarly, the Russians will recognize that they must tolerate the destruction of one of their cities if they have destroyed one of our cities. That no city shall be destroyed by accident or by the irresponsible action of a local commander will require the establishing of safeguards that will require a careful analysis of such a system. But once we reach this point, we might as well go one step further and recognize that we can now, if we wish, abolish war in the old-fashioned sense.

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^{When we}
Having created the bomb, we have created a new problem:
the problem of how to live with the bomb. This problem lies in the
area of political thought and ^{of} political action. Political action
we have to leave to the politicians, for politics is the art of
persuading people to do the things that need to be done, and by
and large scientists are not skillful in this art, at least not
unless they turn into politicians which -- to my mind -- ^{must be} is too
high a price to pay. But before politicians can begin to persuade
people to do what needs to be done, they have to discover what needs
to be done. The problem of what needs to be done falls in the area
of political thought. The progress of thinking can be accelerated
in this area just as in the area of pure science by discussion.
The discoveries in atomic energy which led to the bomb, were greatly
accelerated by discussions among the scientists who were interested
in this problem. And I believe that similarly progress in the
area of political thought aimed at discovering how to live with
the bomb, would be greatly accelerated if only we could have in
the area of political thought the same kind of discussion that went
on among scientists in the field of atomic energy. Unfortunately
it is very difficult for politicians to engage in this kind of dis-
cussion, for there is a fundamental difference between discussions
among scientists and discussions among politicians. In a discussion
among scientists undivided attention is ~~formed~~ focused on the
problem at hand, for if I am engaged in a discussion with other
scientists I have to ask myself when I listen to someone else, mere-
ly "IS IT TRUE WHAT HE SAYS". A discussion among politicians is
of a very different nature. In a discussion of politicians the first
question a politician will ask himself as he listens to another, is
"WHY DOES HE SAY IT?" rather than is it true. Because the chief

skill of the politician is to persuade others to do what needs to be done, the purpose of a discussion among politicians is persuasion and not the discovery of the truth. Therefore when the greatest need of the hour is to discover what needs to be done, a discussion among politicians is not very conducive to progress in the area of political thought.

March 18, 1957.

MEMORANDUM ON THE BOMB

Dear

It may be 25 years since I last saw you, and when we met it was only for a few days. Yet our meeting was long enough for me to be certain that you are a scientist in the sense what the word, *as it was used 25 years ago*, scientist meant 25 years ago. The concept has become a little blurred since that time, but I believe you will understand what I mean. *in the media because so many scientists have been called "scientists" and so many scientists have become politicians* From all I have heard you are still a scientist and have not become a scientist - politician, and this is alone what counts for the purpose that I have in mind at present.

To discover how to liberate atomic energy on a large scale and how to make bombs has been our doing. Here in the United States it took us about six years from the first hunch how this can be ~~done~~ accomplished to the experimental explosion of the first bomb at Alamo Gordo, New Mexico. It was neither particularly easy nor particularly difficult to accomplish this, and the amount of thinking that went into it was not large compared to the amount of thinking that has gone into the *most* fundamental discoveries in physics that were made during the first half of this century.

Insert I
Hitherto scientists have not regarded as their responsibility to discover how to live with the bomb. This is generally regarded the responsibility of the statesmen, and having placed this problem - after the war - in the hands of the statesmen

There was a short period when scientists devoted some attention to the problems that arose in the field of political thought as a result of the existence of the bomb, but soon thereafter almost without a single exception their attention returned to

scientific problems which are inherently deeper problems in many ways, more difficult and therefore offering a greater intellectual challenge.

Looking back at these last ten postwar years, it is unfortunately evident that no progress was made by our politicians towards discovering how to live with the bomb, and it is very doubtful that such progress will come soon enough if they are left to themselves. My thesis here is that with respect to this problem the politicians need our help, and that we are in a position to help them. In what manner we could help I shall explain shortly.

One often hears that the problem of how to live with the bomb is more difficult to solve than was the problem of how to make the bomb. This is a very confusing statement. Clearly in a sense the problem of how to live with the bomb is a political problem. If you think of politics as the art to persuade people to do what needs to be done, then indeed we are dealing here with a difficult problem which does not lie in the area of science, for persuading people to do what needs to be done is an art, and most scientists are not skillful in this art. However, my contention is that before the politician can begin to persuade people to do what needs to be done, he must first discover what needs to be done.

With respect to the bomb our politicians have not been able to make much progress in the past ten years, and this is precisely the area where they need our help and where we can help them.

Politics might be more difficult than science if you can compare two things as dissimilar as these two kinds of activities. But discovering what needs to be done in order to enable us to

live with the bomb without being overtaken by an all out atomic catastrophe is not any more difficult than to discover how to make the bomb. The fact that it took us only six years to make the bomb and that in the subsequent ten years our politicians were not able to discover how to live with it, is, I believe, due to two things:

Firstly, it took a lot of thought to find out how to make a bomb and the amount of thinking devoted to the problem how to live with it, has so far not amounted to a small fraction of the thinking that went into the making of the bomb.

But, secondly and more important, progress in the realm of thought is greatly accelerated by discussion. Discovering how to make the bomb was greatly accelerated by discussions among scientists. Discovering how to live with the bomb has been abundantly discussed by politicians without having much furthered the progress of our thoughts in this area.

The reason for this failure is, I believe, mainly due to the fundamental difference between the discussions among scientists and discussions between politicians. In discussions among scientists the only thing that each of us must ask when he listens to the other is "is it true what he says?" In contrast to this, in a discussion among politicians, each politician asks when he listens to the other, not 'is it true what he says' but rather "Why does he say it?" Because of this fundamental difference in the two kinds of discussions scientists may now render a great service to mankind by discussing among themselves in the manner in which they are accustomed to discuss scientific subjects, the question of how to live with the bomb. Admittedly the topic is not as interesting as many other topics in the area of science proper that we could discuss, but

this is an emergency. The bomb which we have created, has become a Frankenstein monster, and unless we help to discover how we can live with it, it might destroy us all.

2) it is by no means certain that Russia and America ought to pursue a policy aiming at the elimination of the bomb. *For a strong case can be made out in favour of the view*

That the very existence of the hydrogen bomb and its availability to both Russia and the U.S. in ^{practically} unlimited quantities creates for the first time in ~~world~~ history a situation where a real stable peace can be had if only - and admittedly this is a very big IF - the statesmen can be somehow brought to understand the new situation which has arisen and adopt the right philosophy on the issue of how to live with the bomb.

If this thesis is indeed correct then the real issue is not how to get rid of the bomb but rather
 How to live with the bomb *is a question which we must ask is the sole topic of this article.*

The present main danger

In the absence of an adequate philosophy on how to live with the bomb - and ^{despite} no such philosophy has been developed to date - we shall remain in constant danger that the bombs blow up in our face. ¶ Today there are a number of areas in the world where neither Russia nor the U.S. is in complete command and the most immediate danger lies in the fact that a local conflict between two nations in such an area may lead to armed action, that the U.S. and Russia may intervene militarily on opposite sides and ^{the nuclear bombs} will be used in ^{such a} these local conflicts as ^{farther} tactical weapons; that larger and larger bombs will be used ^{farther} and ^{farther} behind the battle lines and that in the end the war will lead to an all out atomic catastrophe. ¶ In order to avoid the ^{acute} danger that such will be the course of the events it will be necessary for Russia and America to reach a political settlement in the following sense of the term. What is needed is an understanding between

America and Russia which will make it reasonably certain that in none of the foreseeable local conflicts will they intervene militarily on opposite sides.

Can such an understanding be reached in any way?

It is a wellknown fact that after World War II all controversial issues between Russia and America were deadlocked. It is important to understand WHY they were deadlocked, and if anything has changed in this respect, what is it that has changed that should make it possible now to reach a settlement - admittedly a settlement only in a very limited sense of the term - when prior to this time there was no base for negotiations. What has in fact changed or is about to change is rather obvious. The new situation for which there is no precedent in history and towards which we are now rapidly moving, consists in the ability of Russia and the U.S. to destroy each other in any desired degree. *It is my conviction* If in addition it is true that Russia and the U.S. can adopt a philosophy concerning the use of the bomb which will make this situation stable, i.e. if they can make sure that *shall they* they shall in no contingency have to destroy each other to a degree which *is intrinsically* no sane statesman could regard as desirable, then the time has come when the national policies of Russia and America can be based on a new premise for which there is indeed no precedence in history.

One of the basic premises of national policies of the major powers in the past that, in time of crises came again and again to the fore, was the overriding importance of strategic considerations.

Twice in this century the U.S. had to fight a world war. In both cases one of the major considerations was the belief that if Germany were permitted to be victorious the UNITED States would find herself in a position where she could be vanquished in the war that might follow. For any major nation the main objective of the chess game of power politics - and hitherto no nation could choose to play any other kind of politics - was to avoid being maneuvered into a situation where it could be checkmated by the next move of the enemy. As far as Russia and America is concerned this consideration will no longer remain true once they are in a ^{desired} position to destroy each other and any other nation to any/degree.

If the situation can be made stable, and this of course depends on whether an adequate philosophy concerning the bomb can be developed, explained and understood by all, then one of the controversial issues that has been outstanding between Russia and America in the past ten years will retain their original meaning and importance.

By settling anyone of these issues one way or another one would have increased Russia's chance to win the war, or one would have increase America's chance to win the war. As long as America and Russia can conceivable be vanquished, and in the past this certainly was the case, issues of strategic importance cannot be settled because no compromise is possible on the issue of who is going to win the war.

This leads to the kind of deadlock in which a vicious circle operates that ultimately brings about war. We have this vicious circle in operation in the first ten years after World War I

just as we have seen it in operation perhaps even more clearly because we could view it more dispassionately - between Athens and Sparta prior to the outbreak of the Polyponnesian war. This vicious circle will cease to operate between Russia and America as soon as it becomes clear that either country can destroy the other to any desired degree and that no sudden attack of one country against another could appreciably cripple the power of the other to retaliate. Only when these conditions are fulfilled can we speak of a real stalemate and even when these conditions are fulfilled the mere fact of the existence of such a stalemate does not automatically guarantee stability unless only the great powers adopt an adequate philosophy concerning the use of the bomb. The stalemate will remain unstable and while no one can say with certainty that we cannot somehow muddle through and somehow avoid an all out atomic catastrophe - there is no reason to believe, except wishful thinking, that we shall.

Now that the noise of the elections is going to abate, there ~~may be a~~ *for the* ~~chance~~ *that* ~~voices will be raised urging a re-examination of~~ *the* ~~premises of our post-war policies. These premises are in part un-~~ *known and defense* ~~formulated assumptions which are taken for granted and~~ *might be heard* ~~which cannot profitably be challenged by either party during an elec-~~ ~~tion.~~ Bismarck said once that there are never as many lies told as *he* ~~during a war, after the hunt, and before the elections. He was of~~ ~~course not speaking of all elections.~~ *In elections* ~~outright lies are~~ *of elections.* ~~not the stock in trade, any more, at least not in America; the stock in~~ ~~trade now is the half-truth.~~ *And* ~~where the truth is concerned two halves~~ ~~do not make a whole; they merely make for confusion.~~ *But* ~~Once the elections~~ ~~are over, one may hope that the debris will be cleared away and the dust~~ ~~will settle.~~ ~~Unfortunately when it comes to the issue of peace there is~~ ~~little reason to hope that we shall be told the truth by the statesmen~~ ~~who are supposed to lead us for in order to do so our statesmen would~~ ~~have to overcome, in addition to all of the obvious obstacles, the addi-~~ ~~tional obstacle that they are not in possession of the truth.~~

Right now with the elections ^{campaign} still going on the confusion

is very great indeed. The issue of shall we or shall we not stop the

testing ["] of hydrogen bombs ^{a shining} is perhaps one of the most prominent symbols

of this confusion. ^{by both sides} It is somehow tacitly assumed ^{as well} that both America and

^{us} Russia would ^{the} want to do away with ~~both hydrogen bombs and atomic bombs~~

as part of ^{that} national armaments if only they could devise a politically

acceptable system of inspection ^{so that} by means of which they could ^{be} make sure

that secret violations of the agreement would be detected. ^{It might} ~~It might~~ ^{that}

~~still be that both America and Russia believe that the world would be~~ ^{well be that}

~~better off if there were no bombs around, but it is does by no means~~

~~follow that once we and Russia have learned how to make the bombs we~~

~~could make them disappear from the scene.~~ ^{It might well be} that both

the American and the Russian governments would be glad if somehow they

could wish the bombs out of existence. ~~It is also possible that had~~

~~we not used the bomb against Japan, and had not both America and Russia~~

learned how to mass-produce ~~atomic bombs and hydrogen bombs~~ they could

~~enter into an agreement to destroy all such bombs, to refrain from manu-~~

~~facturing them, and above all to set up a mutual inspection system con-~~

~~trolling not only the bombs~~

~~systems that means which can be effecting~~ ^{dominate all of us}
~~with means of delivery.~~

But America and Russia have learned how to mass-produce

bombs, and they have also learned how to deliver them to each other's

territory. ~~it does not follow that~~ Maybe war has become impossible but it has not become im-

probable. ~~Since~~ No substitute for war has been found or even diligently looked

for. ~~There may be a war and~~ If there is war, even though America and Russia may not at first

be directly involved in the end they might intervene on opposite sides,

and if bombs do not form part of their national armaments at the out-

break of the war, it will not take long before they are mass-produced

again. ~~Thus:~~

There might, nevertheless, remain an overwhelmingly strong

argument for stopping the arms race in bombs if it could be shown that

war might come as the result of this arms race ~~rather than as the result~~ ~~itself would~~

~~lead to war~~ of a political conflict. There was a short period in the post-war period

when war could very well have resulted from the arms race at the time

when Russia was about to close the gap and there were ~~powerful~~ voices

in America urging a preventive war. But with this phase of history be-

hind us, it is not so clear that the arms race itself ~~must~~ ~~may~~ lead to war

at least not if we understand the meaning of the bomb and learn to

live with it. ~~Since it is difficult to say with any assurance that we~~

~~And~~ Eliminating the bomb from the national armaments of Russia

and America will not prevent their use in case of war, if war comes.

Why then not follow the line of least resistance

~~We shall retain the bombs if we follow the line of least resistance~~

~~and, in the absence of a strong argument against retaining the bombs,~~

~~we are going to follow the line of least resistance.~~ It may be argued

that we ~~should~~ ^{must} stop the arms race in bombs in order to avoid the danger

Is this correct? that war might break out as the result of the arms race. That ~~the~~ ^{any} arms

race itself can be the cause of war is certainly true. The first World

War broke out as the result of an arms race that arose out of a power

conflict in Europe. *By 1913* That power conflict reached a stage where war was

regarded as probable. In 1914 Germany had a large crop and, since she

was convinced that war would come sooner or later, she wanted to be

sure that the war would not be fought at a time when, because of a crop

failure, she could be starved out before the war could be won. Thus

decided to forgo the calculated risk Germany ~~found~~ ^{decided} a preventive war in 1914, ~~taking a calculated risk~~ that

proved to be a miscalculated risk.

The arms race after the last war might have resulted in a war

at the time when Russia was about to close the gap, and there were voices

in America urging a preventive war. With this phase of history behind

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~~what must we do to make~~
~~sure that~~
~~with the present arms race~~
us, we may well ask what we must do to keep the continued arms race

~~also~~
from leading to war.² Eliminating the bombs from ~~our~~ national armaments

~~it is~~
might be one possible answer but ~~this may~~ not be the only answer, and

it may well be that it is not the best answer.

is there a danger that the
present arms race ~~will~~ may
still lead to war and if so
how can we avert that
danger?

Since it is difficult to say with any assurance that we can learn how to live with the bomb, I would not want to say that it is impossible to get rid of it. But inasmuch as more than likely than not, we are not going to get rid of it, we must now examine the unprecedented, and quite possibly permanent, change that the bomb has brought to the world, and try to formulate the rules of conduct that we must adopt in order to survive in a world in which such bombs are mass-produced and stockpiled.

straight
down the/path toward disarmament. Perhaps they have a case and perhaps they can sell their case both to the American and Russian governments. There are no signs so far that either of these two governments would want to do away with the bomb, and perhaps there is a good reason why they should not want to do away with the bomb. If this is so, we had better try to understand the unique change that the bomb has brought to the world and try to figure out what we must do to be able to live with the bomb and still have a stable peace.