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THE UNIVERSITY OF CHICAGO ROUND TABLE

THE FACTS ABOUT THE HYDROGEN BOMB

- HANS BETHE
- HARRISON BROWN
- FREDERICK SEITZ
- LEO SZILARD

Second in a special series

“How Can We Make Peace?”

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The Facts about the Hydrogen Bomb

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MR. BROWN: Recently President Truman ordered that work proceed at full speed on the development of the hydrogen bomb. Since the President's announcement, there have been many statements in the press concerning this possible new instrument of destruction. How much of that discussion has been correct and how much of it has been incorrect? What does the hydrogen bomb mean? Does it increase the danger of war, or will the hydrogen bomb force both sides to come to an agreement?¹

Clearly to answer these questions one must first understand what the hydrogen bomb really is. We are fortunate in having with us today three men who played prominent roles in the development of ordinary atomic bombs: Hans Bethe, professor of physics at Cornell University. During the war Professor Bethe was director of theoretical physics at the Los Alamos Laboratories. He is noted for having discovered the mechanism of energy liberation in the sun. Frederick Seitz, research professor of physics at the University of Illinois. During the war Professor Seitz was head of the physics department at the Carnegie Institute of Technology, and he contributed to the success of the plutonium project both at the University of Chicago and at Oak Ridge, Tennessee. During 1946 and

¹ Professor Albert Einstein, in a statement made on February 12, 1950, said, in part: "The armament race between the U.S.A. and the U.S.S.R., originally supposed to be a preventive measure, assumes hysterical character. On both sides, the means to mass destruction are perfected with feverish haste—behind the respective walls of secrecy. The H-bomb appears on the public horizon as a probably attainable goal. Its accelerated development has been solemnly proclaimed by the President.

"If successful, radioactive poisoning of the atmosphere, and hence annihilation of any life on earth, has been brought within the range of technical possibilities. The ghostlike character of this development lies in its apparently compulsory trend. Every step appears as the unavoidable consequence of the preceding one. In the end there beckons more and more clearly general annihilation" (*New York Times*, February 13, 1950).

1947 he was director of the Oak Ridge Atomic Energy Training Program. Leo Szilard, professor of biophysics at the University of Chicago. Professor Szilard was a pioneer in nuclear physics. He was one of the first discoverers of the neutron emission of uranium which makes the chain reaction possible. In 1939 he was instrumental in getting the American government to take on the responsibility for the wartime atomic-energy development.

Szilard, you were interested and thought it would be a good idea to have a ROUND TABLE discussion on this particular issue. Why?

MR. SZILARD: The President stated that we are going to make hydrogen bombs, but he did not explain what hydrogen bombs mean. There were many statements in newspapers before the announcement of the President and after his announcement. Many of the statements were correct, and many of them were false. I believe that it is important for the American people to know what a hydrogen bomb means and to have the correct information about these bombs.

MR. BROWN: Seitz, how do you feel about this?

MR. SEITZ: We ought to take this matter very seriously—as seriously as we took any factor into account in 1939 and 1940. It will have a great effect upon our military position in the coming years.

MR. BROWN: What would be the effect of not talking about the H-bomb now, Bethe?

MR. BETHE: I was against talking about the H-bomb before the decision to make it was made, because, in this way, I think that we unnecessarily gave the Russians some information—the information that we consider it feasible and the information that we are making it. This, more or less, forces them to do the same.

MR. BROWN: You were against the discussion then. Why are you in favor of it now?

MR. BETHE: Now that this has already been announced, I think that the main thing is to bring before the public all the relevant factors which are necessary to form an enlightened policy on this matter.

MR. BROWN: On the other hand, you hear people saying, “Why should we worry about something which does not exist?”

MR. BETHE: I believe that the time to discuss this bomb is now. If we do not discuss it now, then thoughts about it will become frozen in our government and especially in our military department. This has been the case with the A-bomb. The A-bomb could now hardly be eliminated from our armaments, because most of our strategic plans are based upon it. I would not like to see the same happen to the H-bomb.

MR. BROWN: The general discussion of the H-bomb centers around its being a weapon—a weapon which possesses a great deal of potential destruction. Could we start off this discussion by asking of what the hydrogen bomb is made anyway?

MR. SEITZ: I suppose that everyone knows by this time that it is made of heavy hydrogen, which is used in cooperation with an ordinary A-bomb.

MR. BETHE: I want to say a few words on how long it perhaps will take to make this weapon. It has not been made. It has not even been conceived definitely how it will be made. And, connected with this, are all the uncertainties which you always have in a research development. You never know what will come out of it; and, in this particular case, we cannot predict whether the bomb can be made or not.

On the other hand, on the basis of the decision which has been made, we must conclude that our experts believe that it is probable that we can make this bomb. Even so, I think that we must be prepared to expect that it will take several years before the bomb has been completed.

MR. BROWN: What about the size of the H-bomb? One sees figures, varying all the way from two to a thousand times the explosive violence of ordinary atomic bombs. Is there really any limit to the explosive violence which could be obtained, assuming, of course, that it works in the first place?

MR. SEITZ: In the testing stages it is very likely that, while we are trying to find out whether or not it will work, the bomb will not differ a great deal from the ordinary A-bomb. But since the intention is to build something a lot bigger, I think that it is clear that this will be true only in the early stages.

MR. BETHE: That is certainly right. If we use the bomb in war—if anyone uses the bomb in war—then the bomb will certainly be very

large. If you can initiate an H-bomb at all, then you probably can initiate just as easily a big one as a small one. How big it is will depend only upon the amount of heavy hydrogen which you can carry in a plane or in any other device which you may use to deliver the bomb. We can assume, I think, that it is certain that a bomb used in war will be at least a hundred times as big as the present atomic bomb. The figure of a thousand had been used, and I use it for the sake of argument.

What would it mean if you had a bomb which is a thousand times more powerful than the present atomic bomb? This would mean that the range of blast destruction would increase tenfold—that a hundred times the area would be destroyed as by an atomic bomb. If a bomb were exploded at some place, then ten miles away from it there would be almost complete destruction. That would mean that a city as big as New York, the biggest cities on earth, could be destroyed by one single bomb.

MR. BROWN: When you say New York, of course, you mean the greater New York area.

MR. BETHE: I certainly mean that.

MR. BROWN: Something in the neighborhood of three hundred square miles or so probably?

MR. BETHE: Yes. And this, I think, is not all.

MR. SEITZ: There is one factor which I would like to add which concerns itself with flash burn. It is generally known that about 30 per cent of the casualties at Hiroshima resulted from flash. The flash extended out to about two-thirds of a mile. Now, the indications are that the flash effect would be at least thirty times larger in the H-bomb. That means that the flash effect would extend out to twenty miles, so that people would suffer severe flash burn at that distance.

MR. BROWN: We have the possibility of constructing a weapon which is, let us say, of the order of a thousand times the destructiveness of the Hiroshima bomb, or thereabouts. What about the cost of this weapon? Will it be fantastically expensive, or will it be relatively inexpensive?

MR. SZILARD: It is a mistake, I believe, to talk about the cost of the weapon. If we are building H-bombs and if the arms race is on, what will cost us most is not making H-bombs but rather the defense measures which we will be forced to take. Our coastal cities are highly

vulnerable against bombs. We cannot have advance fighter bases to defend New York or Baltimore or Washington. If we go into this arms race at all, it will be lunacy not to take defense measures. In the case of these coastal cities, it means dispersal of the population.

MR. BROWN: To what extent do you feel that dispersal will have to take place? What scale of dispersal are you thinking about?

MR. SZILARD: If I try to figure out in terms of dollars what the President's decision means, I would say that within a few years we will be up to twenty-five billion dollars as a general defense expenditure—including fighter planes, fighter bases, radar screen. And for dispersal purposes I think that we will spend at least fifteen billion dollars a year. This makes a total of forty billion dollars. But when I talk of forty billion dollars per year for defense, I assume that we are balancing the budget, because, if we do not balance the budget, we will have inflation, and the figures in dollars will be very much higher.

MR. BETHE: I am surprised that you are using such a small figure as fifteen billion for dispersal. Do you not want to disperse the inland cities, too? Is it not likely that they also will be attacked by planes or, maybe, by guided missiles?

MR. BROWN: It seems reasonable that the inland cities are less vulnerable due to the possibility of setting up rather elaborate ground-base radar screens and so forth. I certainly agree with Szilard that our coastal cities are far more vulnerable. However, if we do think in terms of dispersing our inland cities, such as Detroit and Chicago, that will add enormously to the estimate of the expense which you have already made, Szilard.

MR. SZILARD: I was thinking in terms of dispersing within ten years, and I did not go beyond fifteen billion dollars, because I think that we cannot afford to pay more. If we want to disperse all our cities, we would probably have to spend something like twenty-five billion dollars a year; and in ten years we could have very good dispersal.

MR. BETHE: How much dispersal would you envisage? Would you disperse cities of a hundred thousand or not?

MR. BROWN: Does that not depend mainly upon the types of industries about which we are talking? For example, there are many cities

which are relatively small but where one particular industry is enormously concentrated. In spite of the relatively low population, you would probably want to disperse that particular city.

MR. SZILARD: I would say that about thirty to sixty million people would have to move in a general dispersal; and I would think that, before we would do that, we would take care of our coastal cities. This other would be a later stage.

MR. BETHE: It certainly seems hardly to make sense to go into offensive H-bomb development without the defensive development to accompany it.

MR. BROWN: I wonder whether such a development could actually be accomplished. I have the feeling that there would be tremendous resistance upon the part of our larger industrial manufacturers. Certainly they could not be expected to carry on the operations themselves. It would have to be done entirely at government expense essentially. Then one gets into other factors. Let us suppose that a manufacturer in Pittsburgh is moved out to Kansas some place. Will he be able to compete? It seems to me that any marked dispersal movement would really cause an enormous economic upheaval in this country.

MR. SZILARD: It certainly would mean planned movement. It would mean controls much stricter than we ever had during wartime. It would be not a New Deal, but a Super, Super New Deal.

MR. BROWN: We have been discussing thus far the hydrogen bomb in terms of destruction by blast and in terms of delivering it over a target. One sees in the press, from time to time, statements concerning destruction by another source—namely, radioactivity. How would you look upon that particular danger? Will dispersal actually help if H-bombs are used not for blast but for radioactivity?

MR. SZILARD: In this case, it will not help at all.

MR. BETHE: You are certainly right when you emphasize the radioactivity. In the H-bomb, neutrons are produced in large numbers. These neutrons will go into the air; and in the air they will make radioactive carbon 14, which is well known to science. This isotope of carbon has a life of five thousand years. So if H-bombs are exploded in some number, then the air will be poisoned by this carbon 14 for five thousand years.

It may well be that the number of H-bombs will be so large that this will make life impossible.

MR. SZILARD: Yes, that is true, Bethe. But that is not what I had in mind, because it would take a very large number of bombs before life would be in danger from ordinary H-bombs.

What I had in mind is this: The H-bomb, as it would be made, would not cause greater radioactivity than that which is due to the carbon; but it is very easy to arrange an H-bomb, on purpose, so that it should produce very dangerous radioactivity. Most of the naturally occurring elements become radioactive when they absorb neutrons. All that you have to do is pick a suitable element and arrange it so the element captures other neutrons. Then you have a very dangerous situation. I have made a calculation in this connection. Let us assume that we make a radioactive element which will live for five years and that we just let it go into the air. During the following years it will gradually settle out and cover the whole earth with dust. I have asked myself: How many neutrons or how much heavy hydrogen do we have to detonate to kill everybody on earth by this particular method? I come up with about fifty tons of neutrons as being plenty to kill everybody, which means about five hundred tons of heavy hydrogen.²

MR. BROWN: You mean, Szilard, that if you exploded five hundred tons of heavy hydrogen and then permitted those neutrons to be absorbed by another element to produce a radioactive substance, all people on earth could be killed under the circumstances?

MR. SZILARD: If this is a long-lived element which gradually settles out, as it will in a few years, forming a dust layer on the surface of the earth, everyone would be killed.

MR. BROWN: You would visualize this, then, something like the Krakatao explosion, where you would carry out, let us say, one large explosion or a series of smaller ones. The dust goes up into the air and, as was the case in that particular explosion, it circled the earth for many, many months, and even years, and gradually settled down upon the surface of the earth itself?

MR. SZILARD: I agree with you, and you may ask: What is the practical

² This is an elementary calculation requiring only information generally available to the public (H. B.).

importance of this? Who would want to kill everybody on earth? But I think that it has some practical importance, because if either Russia or America prepare H-bombs—and it does not take a very large number to do this and rig it in this manner—you could say that both Russia and America can be invincible. Let us suppose that we have a war and let us suppose that we are on the point of winning the war against Russia, after a struggle which perhaps lasts ten years. The Russians and others can say: "You come no farther. You do not invade Europe, and you do not drop ordinary atom bombs on us, or else we will detonate our H-bombs and kill everybody."

Faced with such a threat, I do not think that we could go forward. I think that Russia would be invincible. So, some practical importance is attached to this fantastic possibility.

MR. BROWN: Do you think that any nation would really be willing to kill all people on earth rather than suffer defeat themselves? Would we be willing to do it, for example, do you believe?

MR. SZILARD: I do not know whether we would be willing to do it, and I do not know whether the Russians would be willing to do it. But I think that we may threaten to do it, and I think that the Russians might threaten to do it. And who will take the risk then not to take that threat seriously?

MR. BROWN: In connection with the production of radioactivity, we have discussed it thus far in terms of killing all people on earth. Can one visualize a mechanism by which one produces a radioactivity of, let us say, a short lifetime which can then be carried over an area in a more or less controlled manner, so that, for example, it would be possible for a nation to kill all people in the United States without killing themselves, or vice versa?

MR. SZILARD: This is a funny question, because this is what the situation is. Of course, it takes very many less H-bombs to kill all Russians by radioactivity or to kill all Americans by radioactivity than all people. But you have to get this radioactivity material to Russia or to America. Let us assume that we cannot deliver our H-bombs, because they are too heavy (this is something which can easily happen). Then the temptation will be great to rely upon the westerly winds to disperse the radioactivity over Russia or over America. But whether this is possible or not depends

upon the answer to a number of meteorological questions, and that answer is not known to anybody. On this question, I would say that we leaped before we thought when we decided to make H-bombs.

MR. BROWN: In that particular connection, would you like to express any opinion concerning the relative vulnerability of Russia and the United States? It would seem to me, offhand, that with our whole West Coast exposed to the westerly winds and having the whole Pacific Ocean to operate in, if that kind of thing can be done, we are placed at a considerable disadvantage, relative to Russia, in that respect because we have Western Europe to consider.

MR. SZILARD: This one factor is in favor of the Russians; but there are other factors involved. The whole question of getting radioactive elements settled over a given territory is difficult. To know whether it is possible to rely upon the westerly winds in any given situation is difficult. The weather conditions change and have to be taken into account. It is uncertain, I think, whether this can be done; we will not know for a number of years.

MR. BROWN: But we are agreed that that is certainly a possible use of the H-bomb which cannot be ignored.

MR. SZILARD: It is not only a possibility but a very serious possibility.

MR. BROWN: Then we are faced with the ironical conclusion in this respect that it becomes easier to kill all people in the world than just a part of them.

MR. SZILARD: This is definitely so.

MR. BROWN: How did this question of the discussion of H-bombs start in the first place? It seems to me that I remember down in Oak Ridge and at the University of Chicago during the war we discussed the possibilities of thermal-nuclear reactions to a considerable extent. That was eight years ago. Scientists have recognized for eight years now that, essentially, a hydrogen bomb might be possible. Why has the discussion not come up until now?

MR. SEITZ: The most important factor in causing all the excitement at present is the fact that the Russians attained the atomic bomb in September, 1949. This fact indicated that we no longer had a monopoly and, as a result, that we have some reason to be concerned.

MR. BROWN: That is connected then with the fact that it requires an ordinary atomic bomb to set off an H-bomb?

MR. SEITZ: That is right.

Some of the scientists who worked on the project during the war were pretty sure that the Russians would have the bomb about this time; but this feeling was not very widespread, and naturally even those scientists could not be sure.

MR. BROWN: Do you not suppose that there was another factor involved in that—that some scientists themselves sort of had their stomachs full of bomb development during the war and just got away from it?

MR. SEITZ: That was a big factor. There is an interesting situation which is occurring at the present time. Scientists have a great many viewpoints, rather different, I think, from the situation that we had in 1939 and 1940 when there was a rather high degree of unanimity of viewpoint about working on the atomic bomb. There is one large group of scientists who feel that the most significant fact about the existing situation is that in 1945 the United States and England reduced their arms budgets by a factor of about ten. Essentially we became disarmed. Russia, in contrast, has continued her armament at the wartime level and seems to be devoting major effort to it—I would guess with tremendous effect judging from the speed with which they developed the A-bomb. Probably they are working three times faster than we are. There is a great danger, if this continues, that we shall fall into an inferior military position and lose our bargaining power. In order to circumvent this, this group of scientists of which I speak feels that we are going to have to speed up our military development. The H-bomb is one aspect of this. This group in the main feels that the H-bomb is not the entire situation. There are other things which have to be kept in mind which are every bit as important. For example, there is the problem to which Szilard referred of delivering the bomb. We have to know whether we can deliver the things which we make. I would say that the whole program of military development should be considered as one coordinated unit. Then there is another important point. I would say that all scientists feel that our primary goal should be peace and that any reactivation of military affairs which occurs now should be carried out as a tool to achieve peace through negotiation.

MR. SZILARD: It would be easy for scientists to agree that it is important to improve our bargaining power; but what disturbs many scientists I know is that we do not see what we are bargaining for.

MR. BROWN: A few days ago, Bethe, I noticed in the paper a statement signed by you and eleven other scientists to the effect that the United States government should make a statement pledging us not to use the H-bomb first. Could you tell us a little bit about your considerations which went into that statement?

MR. BETHE: I certainly would like to. It was our belief that the main reason for us—perhaps the only reason for us—upon which it is valid to make the H-bomb is to keep our bargaining position and not to be confronted, one day, with an ultimatum from Russia that they have the H-bomb and can destroy us. If this is our only reason, then we thought that we would never use this bomb in an offensive war. Then we could contribute a great deal by stating this reason openly—by stating openly that we would not be the first to use the bomb in war.³

³ At a recent meeting of the Physical Society in New York, twelve of the country's leading physicists issued a statement calling for a pledge by this nation that it would not use the hydrogen bomb first. This statement said, in part:

"A few days ago, President Truman decided that this country should go ahead with the construction of a hydrogen bomb.

"This decision was one of the utmost gravity. Few of the men who publicly urged the President to make this decision can have realized its full import. Among the reports in the press was a great deal of misinformation. However, it was stated correctly that a hydrogen bomb, if it can be made, would be capable of developing a power 1,000 times greater than the present atomic bomb. New York, or any other of the greatest cities of the world, could be destroyed by a single hydrogen bomb.

"We believe that no nation has the right to use such a bomb, no matter how righteous its cause. This bomb is no longer a weapon of war but a means of extermination of whole populations. Its use would be a betrayal of all standards of morality and of Christian civilization itself. . . .

"Statements in the press have given the power of the H-bomb as between 2 and 1,000 times that of the present fission bomb. Actually the thermonuclear reaction, on which the H-bomb is based, is limited in its power only by the amount of hydrogen which can be carried in the bomb. Even if the power were limited to 1,000 times that of a present atomic bomb, the step from an A-bomb to an H-bomb would be as great as that from an ordinary TNT bomb to the atom bomb. . . . We urge that the United States, through its elected government, make a solemn declaration that we shall never use this bomb first. The circumstance which might force us to use it

MR. SZILARD: I read the statement, and I was really more impressed by the sentiment in it than by its logic. I think that what was behind the statement is a general uneasiness which I notice in many scientists. In 1939 when we tried to persuade the government to take up the development of atomic energy, American public opinion was undivided on the issue that it is morally wrong and reprehensible to bomb cities and to kill women and children. During the war, almost imperceptibly, we started to use giant gasoline bombs against Japan, killing millions of women and children; finally we used the A-bomb. I believe that there is a general uneasiness among the scientists. It is easy for them to agree that we cannot trust Russia, but they also ask themselves: To what extent can we trust ourselves?

MR. BETHE: This is quite right, and one of the reasons which we had for our statement was to prevent the military of either country, either Russia or the United States, to start a war with the hydrogen bomb, just in order to be the first.

MR. BROWN: We are in agreement that if the hydrogen bomb works, world-wide destruction on an unprecedented scale will be possible. First, entire cities of the size of New York, Chicago, and London could be destroyed by the blast effect. But, far more important, radioactivity could be produced and could be scattered over the countryside in such a way that all life on earth, or at least most life on earth, could be destroyed.

The second point of importance is that the cost of such a hydrogen bomb will not be only the cost of the bomb itself but the fantastic cost involved in carrying out a proper dispersal program which will permit us at least to have more security than we would have without dispersal.

would be if we or our allies were attacked by *this* bomb. There can be only one justification for our development of the hydrogen bomb, and that is to prevent its use.

"[Signed:] S. K. ALLISON, Director of Institute for Nuclear Studies, University of Chicago; K. T. BAINBRIDGE, Harvard University; H. S. BETHE, Cornell University; R. B. BRODE, University of California; C. C. LAURITSEN, Director of Kellogg Radiation Laboratory, California Institute of Technology; F. W. LOOMIS, Chairman of Physics Department, University of Illinois; G. B. PEGRAM, Dean of Graduate Faculties, Columbia University; B. ROSSI, Massachusetts Institute of Technology; F. SEITZ, University of Illinois; M. A. TUVE, Director, Department of Terrestrial Magnetism, Carnegie Institution, Washington, D.C.; V. F. WEISSKOPF, Massachusetts Institute of Technology; M. G. WHITE, Princeton University."

THE SUPER BOMB

By HANS THIRRING

*[The following description of a thermonuclear bomb was written by a distinguished Austrian physicist and was published in Vienna, Austria, in 1946, during military occupation by the United States. This article is one chapter of his book on the atomic bomb.]**

IT IS natural to think of the possibility of using fissionable materials, such as U-235 or plutonium, which are difficult to prepare and will never be available in large quantities, as detonators to start other nuclear processes in more abundant materials.

Ever since Cockcroft and Walton succeeded in producing nuclear transformations by fast ions, scientists have been measuring minimum energies required to initiate various nuclear processes. In the earliest experiments on the disintegration of nuclei, the ammunition used were alpha particles with an energy of several million electron volts. Experiments with electrical atom-smashing machines, first employed by Cockcroft and Walton, have revealed that protons with an energy of only a few hundred thousand electron volts were sufficient to initiate certain nuclear processes. Furthermore, it is clear that the initiation of nuclear processes by collisions depends only on the mass and energy of the colliding particles, and not on the way in which the energy was communicated to them. If, therefore, it should be possible to create somewhere in a mass of matter, a temperature high enough for the thermal energy of the atoms to become equal to, or greater than, the energy required for the initiation of a certain nuclear process, it must be possible, at least in principle, to initiate this process in a purely thermal manner, by a kind of "ignition" mechanism.

If, furthermore, the process, started in this way, should proceed so fast and develop so much energy that the temperature should continue to rise, a thermal "chain reaction" would become possible, with the nuclear transformation spreading like an explosion over the whole available amount of the material.

* This translation of the article is reprinted by permission of the *Bulletin of the Atomic Scientists* (Hans Thirring, *Die Geschichte der Atombombe* [Vienna: Neues Oesterreich Zeitungs-und-Verlagsgesellschaft, 1946]).

The difficulty of this idea, which appears so simple, lies in the fact that all temperatures that could be reached* under the previously available terrestrial conditions were many orders of magnitude smaller than the lowest known threshold of energy required for initiation of a nuclear reaction. In order to raise the average kinetic energy of a gas molecule to a value as low as one electron volt, it would be necessary to heat the gas to a temperature as high as 7,700 degrees on the absolute scale, a temperature higher than that of the surface of the sun. An average energy of one million electron volts could be reached only at a temperature of 7.7 billion degrees!

Before the discovery of nuclear fission and of the nuclear chain reaction, no one could envisage the possibility of creating such temperatures. A detonating atomic bomb creates, however, extreme conditions. In the moment of the explosion, billions and billions of atoms of fission products are created, which fly apart with energies of the order of 100 million electron volts. If these fission nuclei strike other atomic nuclei on their path—for example, the nuclei of a tamper material—they might be able to enter into nuclear reaction with them, or to transfer so much energy to the collision partners that these themselves become projectiles of high energy, able, in their turn, to produce nuclear reactions. Let us consider a concrete example:

We assume that the detonator is plutonium in an atomic bomb, and that it is surrounded by a substance which contains deuterium, such as heavy water or heavy paraffin. Outside this first sheath we can imagine the presence of a second one, made of heavy material which acts as a tamper to prevent the bomb from flying apart too soon. In the moment of explosion the plutonium will emit fission products with energies of the order of 100 million electron volts. These will undergo collisions with the deuterons in heavy water and transmit part of their energy to the latter. The energy acquired in this way by the deuterons is, it is true, only a small fraction (not more than 4 per cent) of the energy of the original fission products. Nevertheless, this energy may be high enough to permit the accelerated deuteron to undergo a so-called “*dd*-reaction” with another deuteron, which it might encounter on its path. This reaction will convert two deuterons, each with mass 2 and atomic number 1, into a helium isotope (helium 3) with mass 3 and atomic number 2, and a neutron with mass 1 and atomic number 0. Measurements made in

America have established that for this reaction to occur, the collision energy need not be higher than 1/10 mega electron volt (one megavolt is a million volt). The energy released in this reaction, which must appear as the kinetic energy of the two products—the neutron and the helium nucleus—is as high as 3.3 million electron volts. It is true that the fact alone that the energy liberated in this process is considerably higher than the energy required for its initiation, is by no means sufficient to conclude that this process, once initiated, will develop spontaneously into a chain reaction. The fast neutron formed in the *dd*-reaction will have to hit another deuteron under a specially favorable angle to transmit to the latter enough energy to allow it to undergo, in its turn, a *dd*-reaction by collision with still another deuteron, thus continuing the chain. Considering the low probability of nuclear hits, it is obvious that a sequence of two favorable hits will be very unlikely. Therefore, at all temperatures of less than several million degrees, a reaction of the considered type will practically never repeat itself in a chain. In other words, no *dd*-chain reaction is possible under presently known conditions, and this is good because otherwise our earth would probably long ago have vanished in a cloud of incandescent dust, to appear as a new star in the sky.

The *dd*-reaction will thus never develop on a large scale as the consequence of a single initial process, as is the case in the fission of U-235 or plutonium. However, if heavy water is placed in direct contact with detonating plutonium, what will occur, is not a single elementary reaction, but a simultaneous impact on deuterium atoms of billions of high-energy fission products, creating such enormous temperatures that a considerable fraction of deuterons will acquire the energy sufficient to undergo a *dd*-reaction. The occurrence of a large number of these secondary reactions will cause a further increase in temperature, and it is not altogether impossible, that a chain reaction will maintain itself through a purely thermal mechanism despite the enormously high temperature required. Under the pressures and temperatures existing in the interior of stars, thermal nuclear reactions are actually known to occur. It is, however, open to grave doubts whether, by the use of an amount of tamper material which will keep the bomb within reasonable dimensions, the plutonium-deuteron bomb could be prevented from flying apart much too fast to maintain the temperature required for the con-

tinuation of the thermal chain reaction. For this reason, the possibility of producing chain reactions of light elements is still open to grave question.

Another substance which perhaps could be brought to chain reaction by the detonating action of an atomic bomb, is a mixture containing lithium and hydrogen, for example, the compound lithium hydride. At a temperature of several million degrees, the lithium nuclei (mass 7, atomic number 3) can react with hydrogen nuclei (mass 1, atomic number 1) forming two nuclei of ordinary helium (mass 4, atomic number 2). The impact of a high energy proton on a lithium nucleus will produce an intermediate nucleus of mass 8 and charge 4, which will fission into two alpha particles (helium nuclei) of very high energy. American measurements have shown that here, too, the initiation of the nuclear reaction is possible with energies of less than 1/10 mega electron-volt, while the energy liberated in the reaction has the remarkably high value, for such light nuclei, of 17.3 million electron volts! . . .

One kilogram of lithium and hydrogen will produce almost three times as much energy as an equal mass of U-235! Remember that lithium is not a rare element, and that one could easily obtain as many *tons* of it, for use in a super-bomb, as are now available *kilograms* of plutonium for use in "ordinary" atomic bombs! The total energy of available nuclear explosives could thus be increased several thousand times compared to the energy that now can be stored in the form of plutonium and U-235 alone. God protect the country over which a six-ton bomb of lithium hydride will ever explode!

If this idea is at all capable of realization, it is obvious that a uranium 235, or a plutonium bomb of the present type will have to serve as a detonator in the new super-bomb. In contrast to the conventional detonator used to explode shells, this detonator cannot be made as small as may be desirable, because it has to fulfil the critical size condition required for the development of a fission chain reaction. Thus, if the rare materials, U-235 or plutonium are used successfully as detonating caps for super-bombs, it would not be possible to make thousands of such bombs from a single kilogram of fissionable materials. The "progress" achieved by the realization of the super-bomb (if you can call it progress) will therefore consist in considerable increase in the *power* of each single atomic bomb, not in a substantial increase of their *number*.

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THE ATOM AND WORLD POLITICS

●

MR. FOX: In the words of President Truman, the atomic bomb is too dangerous to be "loose in a lawless world."

No one could state more eloquently than you have already stated, Cousins, in your article in the *Saturday Review of Literature*, "Modern Man Is Obsolete," the awful urgency of the problem posed by the bomb.¹

MR. COUSINS: I am a layman; I am not a scientist; I cannot talk about this from any firsthand scientific knowledge. But I can speak as a layman and tell you of my own concern. I feel that the world is in grave peril today. I feel that this peril is not less than the world knew after Pearl Harbor, after Stalingrad, after Dunkirk, after every great crisis in the last ten years.

But the crisis today has become universal; it affects all the peoples of the world. I hope that, when President Truman reports to Congress and to the American people, he will recognize that the American people are ready to be told the truth. I trust that he will recognize that the American people are grown up and that they can be told the full implications of a destructive atomic energy and what is required in the way of international control to keep the atomic bomb from destroying mankind.

MR. FOX: You are a pioneer in nuclear physics, Szilard, and can speak better than the rest of us on the facts of our present danger.

MR. SZILARD: I take it that you would like to hear from me how long it would take another nation to have atomic bombs available and ready to drop on our cities. I am afraid that I am going to disappoint you if you expect me to give you what you might call the "inside dope." Of course, I should be glad to oblige, but someone might be listening to our conversation.

Let me remind you, therefore, that Churchill has taken a stand on this question. He said that the world has three years to put its house in order. I propose that we accept Mr. Churchill's statement as a basis of our discussion today.²

¹ See Norman Cousins, "Modern Man Is Obsolete," *Saturday Review of Literature*, August 18, 1945.

² Former Prime Minister Churchill, in a statement issued by Prime Minister Attlee on August 6, 1945, said, in part: "... The revelation of the secrets of nature long mer-

MR. FOX: The next question for today, then, is how the atomic bomb changes the problem which President Truman, Marshal Stalin, and Prime Minister Attlee have to face. How does the invention and use of the atomic bomb seem to affect the course of world politics?

MR. HOCKING: I should say that nothing in politics remains unchanged. I will mention a few points that occur to me now. The first is that the whole picture of security has altered. We have been seeking security, but what we have got is universal insecurity. No strategic boundaries are good. Armies and navies are such now that one bomb could destroy them.

In the second place, there is a new alignment of power in the world. At present it takes a great power to make a bomb, so that the great have become greater; and the small have become smaller. But some of the lesser powers may make the bomb. Canada, Belgium, and Czechoslovakia have uranium ores and science. The world will be divided upon a new division of the "haves" and "have-nots," which will mean having the bomb and not having it. Thereby all backward peoples have become more hopelessly outclassed in terms of power.

Again, a new type of pacifism has been sweeping the world with a demand that there shall be no more war. As the *Chicago Tribune* has put it, war has passed from irrationality to idiocy. There is a new drive for solutions other than for moral equivalents of war.

Further, there is a new argument for democracy—a discount on all heady leaders who might use the bomb.

And, finally, there is a new pressure toward world government; and at the same time world government becomes increasingly intolerable. Compulsory cooperation, without agreement of mind and conscience, is something which we cannot face without dismay.

MR. FOX: Is everybody as pessimistic as Mr. Churchill in believing that we have only three years to meet the problem posed by the bomb?

MR. SZILARD: No, there are some people who believe that it will take at least ten years until a potential enemy of the United States could have large quantities

cifully withheld from man should arouse the most solemn reflections in the mind and conscience of every human being capable of comprehension. We must indeed pray that these awful agencies will be made to conduce to peace among the nations and that instead of wreaking measureless havoc upon the entire globe they may become a perennial foundation of world prosperity" (*New York Herald Tribune*, August 7, 1945).

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of atomic bombs. I am not a prophet, and, for all I know, they may be right. But the arguments which they use to support their optimistic prophecy, I am sure, are wrong. They say, for instance, that other nations do not know how to make atomic bombs. But if one takes, for instance, the official release of the War Department, called the Smyth Report, one will see that we have told other nations along what road they have to move in order to reach the goal. Any organized group of scientists who move along this road will, step by step, discover what we have discovered and obtain the results which we have obtained.³

MR. COUSINS: That is a very good observation. Another interesting thing about the Smyth Report, you will recall, is that it mentioned that there were three separate experiments being conducted for the utilization of atomic energy. All three experiments were conducted independently. No one branch knew what the others were doing, and yet all three experiments came out successfully. We, therefore, have no right to assume that other nations are less smart than we are. Other nations have their scientists. So long as the mind can work anywhere in the world, there is the possibility, perhaps now the probability, that this device will be perfected.

MR. FOX: I suppose that we could agree that the new atomic weapons offer the great nations of the world the nearer certainty that each other's major cities, and civilian populations living within those cities, will be destroyed in the first hours of another war, if that war should unhappily occur. This gives a new urgency to the task of fashioning a durable peace, but perhaps it also gives new hope that the task can be done.

MR. COUSINS: Despite my seeming pessimism, I really am an optimist, because I have a great hope and a great faith in the peoples of the world. I think that, once the peoples of the world are acquainted with the danger—the extent and the imminency of the peril—which confronts them, they will move instinctively toward the type of control without which we will not be able to have world peace.

MR. HOCKING: The moving in that direction mentally is unquestionably, I believe, what is being done all over the world today. Whether we reach the point of world government I am doubtful.

MR. COUSINS: I am rather doubtful about it too. I do not think that world government will spring into being overnight, but I do think that there may be reasons for world government and that there may be a need for world govern-

³ See Waldemar Kaempffert's discussion of the Smyth Report (a 30,000-word report prepared by Professor H. D. Smyth of Princeton University and released by the War Department as a tract on the atomic bomb) in the *New York Times* on August 16, 1945 (page 8), for an excellent summary account of the development of the atomic bomb.

ment. The question before us is when we will be faced by this need. Will it face us three years from now; ten years from now; twenty years from now? Does it face us right away? If that need exists, let us work toward meeting it; let us work toward a campaign of public education so that people can realize finally that the time has come in the history of mankind when each person must grow up, become a world citizen, and develop a world conscience.

MR. SZILARD: If we all agree that we cannot have world government within the three years specified by Mr. Churchill (even though that is the only solution for permanent peace), we are faced with the question of what to do right now to get at least a durable peace.

I do not believe that an armed peace, in which rival nations pile up large stocks of atomic bombs, can be a durable peace. We need some sort of an agreement which will give us assurance that, so long as that agreement exists, there will be no violation of the agreement—that is, there will be no stocks of atomic bombs; there will be no manufacture of atomic bombs; and, if there are violations, that they will be detected and will become known to the world.

MR. COUSINS: I am afraid of agreements which may be made in a vacuum. Agreements, after all, must be binding. In order to be binding, they must have force behind them. In order to have force behind them, we must have central control and central administration. We must, in short, have government. I wonder whether we can have any agreements which are binding without government. Has it ever been done in the history of the world?

MR. HOCKING: Would you give us that little series of steps which you have mentioned before—the necessity of power and law to control?

MR. COUSINS: It perhaps goes somewhat like this: We are all agreed (certainly I have heard no disagreement here or elsewhere) that we do need control of the atomic bomb. Nor have I heard anyone say that we can have control without power. We need power in order to have control; but power is unthinkable—it is unconscionable—without law.






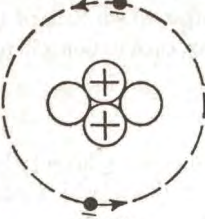
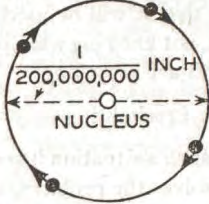
I would like to ask whether we can have law without government if that law is to be effective. I do not mean law that can be invoked once every so often, but law which will work and which will work for keeps and banish war.

MR. HOCKING: I should say that we can have law without government and that we can have power without law. Power without law is undesirable, but law without government has existed.

MR. COUSINS: As national government or as a national organization?

MR. HOCKING: As a matter of fact, international law has led a checkered existence for three hundred years, but it has grown in influence and in demand

THE ATOMIC "SOLAR SYSTEM"

<p>1. ATOM PARTS</p> <p>In Nucleus</p> <ul style="list-style-type: none">  PROTON, Mass=1 Electrical charge = +1  NEUTRON, Mass=1 Electrical charge = 0 <p>In Outer Orbit</p> <ul style="list-style-type: none">  ELECTRON, Mass=0*  Electrical charge = -1 <p>*Actually $\frac{1}{1850}$ of Proton weight</p>	<p>2. SIMPLEST ATOM</p>  <p>One electron Mass 0 Charge -1</p> <p>One Proton Mass 1 Charge +1</p> <p>HYDROGEN</p> <p>Atom weight=1 Atom number=1</p>
<p>3. TYPICAL ATOM</p>  <p>Two electrons Mass 0 Charge -2</p> <p>Two Protons Mass 2 Charge +2</p> <p>Two Neutrons Mass 2 Charge 0</p> <p>HELIUM</p> <p>Atom weight=4 Atom number=2</p>	<p>4. ATOM SIZE</p>  <p>ELECTRON</p> <p>Most of an atom is mere space</p> <p>If the nucleus were a baseball, the electron would be a speck 2,000 ft. away</p>

Source: "How Atom Splitting Releases Energy." *Business Week*, September 1, 1945

even though the actual power behind it has never been great enough to enforce it.

MR. SZILARD: I would admit that if we obtain an agreement, as I outlined it, we shall have to provide for inspection of factories and mining operations, but that all we could hope for would be that violations would be detected and become known to the world. We could not prevent, I believe, at present, any great power from abrogating that agreement. Do you think that there is any way of preventing a great power from abrogating such an agreement?

MR. FOX: Certainly not, so long as the world chooses to regulate its international affairs with the aid of such organizations as that created at San Francisco last spring.

MR. COUSINS: This brings us to the crux of the discussion. If we are going to have an inspection agreement, how can that inspection agreement operate unless

the states which agree to participate in that inspection service will waive the right to secede and give up the right to withdraw from any central organization? The League of Nations, we know, was ineffective, because at the moment a crisis came Japan was able to withdraw or Germany was able to withdraw. When the next crisis comes, unless we have a form of international organization from which no government can withdraw, that organization will be a failure. But if you do have the type of organization from which no state can secede, then that organization will be world government.

MR. SZILARD: I would be very glad if we could have such an organization, but if we cannot have such an organization, the situation is not hopeless. If we had an agreement which gave us all assurance that violations of the agreements would be detected, we would not fear a sudden attack by atomic bombs, because there would be no atomic bombs in existence. We would at least avoid the danger of a war arising out of an armament race or arising out of fear of a sudden attack.

MR. FOX: Certainly the danger posed by the bomb is twofold. There is not only the danger that it will be used but there is the danger which Szilard has pointed out that, not knowing what other nations are doing, each nation will fear the worst and will act accordingly.

MR. COUSINS: Precisely!

MR. FOX: In such a situation it seems to me that an inspection scheme, while it by no means solves the problem, at least creates the conditions which make possible second steps toward the solution of the problem.

MR. SZILARD: I would agree with you to some extent, but I believe that inspection alone is not enough. If we want to be assured that no moves are made toward manufacturing atomic bombs, we must go beyond inspection. We cannot rely upon the reports from agents of some international authority which would roam across the countryside; we can have assurance only if somehow we can obtain the cooperation of the native engineers and scientists. If we could rely upon them, or at least upon a certain percentage of them, they would serve to report violations of the agreement to some international authority.

MR. COUSINS: I am glad to hear you say that, because the violations of the use of atomic energy in themselves must be considered only in relation to the causes of war. Unless we do something about eliminating the causes of war, those violations will take place.

The basic cause for war in the modern world, I think you will agree, is that the world today is a geographic unit in the same way in which the Greek states were a geographic unit and in the same way in which the American states were a geographic unit, one hundred and sixty years ago. And that fact poses the problem, as Madison pointed out in the *Federalist*, that states within a geographic

unit must unite or fight. Now we belong to a world unit, but the world unit is unorganized so long as it remains in the present status. So long as all peoples and all nations have direct accessibility to each other for purposes of war, we will not be able to avoid war. Therefore, we are led, as I say again, to the strongest possible type of international organization. We need something in the field of international organization that is as powerful as the atomic bomb. The only thing which can be as powerful as the atomic bomb is the ultimate in organization, which is government.

MR. FOX: Of course, we are not going to get world government simply by convincing men of good will in the United States that world government is necessary. The will for world government must be pretty evenly spread all around the world in order to have world government achieved in the only way in which we want to achieve it—namely, by general voluntary consent.

MR. HOCKING: The problem of world government seems to reduce itself to this: There can be no power greater than the atomic bomb except the atomic bomb. In other words, world government must have a monopoly of the bomb if it is to be world government, for if it had the bomb and if we had the bomb, there would still be two independent powers, each of which was as strong as the other. Therefore, the alternatives are that we vest all our political power in one agency and resign that power ourselves or else that we cease to coerce independent states through use of the atomic bomb.

MR. SZILARD: If we can obtain what Professor Hocking proposes right now, I am all in favor of it. But if we cannot obtain it right now, we must examine what we can do right now. The type of agreement which I outlined might be quite satisfactory, but we must not forget to examine what will happen if, in the absence of a world government or world authority, a great power abrogates this agreement. This is a question which we have to examine.

Presumably five or ten years from now we will have atomic power plants erected on the territory of various nations, particularly if we help other nations to get into this field. Now, if this agreement is abrogated, the nations immediately will start to convert their atomic power plants for the manufacture of atomic bombs. The question will have to be examined of what restrictions have we to impose upon atomic power plants to make sure that, from the time when conversion starts, a time lag of perhaps a year should elapse before atomic bombs become available and ready for an attack.

MR. FOX: What sorts of restrictions would that actually impose on the free conduct of states?

MR. SZILARD: I am afraid that that leads into technical questions which we will not be able to discuss here.

MR. COUSINS: How would you bring these restrictions into operation? What authority would you have behind these restrictions? Who would operate them? After all, you are now talking about the highest and the most complicated type of regulation in the world—one requiring the most power. What would be the source of that power? By agreement? Agreement based upon what?

MR. SZILARD: I believe that Fox is in a better position to answer this question than I am.

MR. FOX: The chief sanction for such an agreement is the prospect of what would follow the early discovery of a violation by one of the powers of agreements which had been made not to make preparations to manufacture the bomb, for such early discovery would inevitably bring into being a grand coalition against the violator, which, I think, would make it very unlikely to want to proceed to commit that violation.

MR. HOCKING: So long as we are meeting force with force, we are accepting the general argument that there will be another contest of force. Would there not also be some possibility of evading these situations if we could look on the positive side of the new sources of energy opened up by nuclear physics? Perhaps these new sources of energy would be pertinent to those very causes of war—the economic causes—which have been so fertile in creating conflict.

MR. FOX: Let us hope so. But, in the meantime, let us examine some of the things which we as Americans may want to do besides work for international agreement.

MR. SZILARD: I share your optimism that if we had an agreement which gave us and other nations an assurance that no atomic bombs would be made, there would be a good chance that that agreement would last for a long time. In spite of this, I do not believe that we can neglect the possibility of an abrogation of that agreement.

In the United States, thirty million people live in cities of over two hundred and fifty thousand.⁴ One year after the agreement is abrogated, atomic bombs may be available in such a quantity that all these cities could be destroyed in one single, sudden attack.

The question thus arises whether we should not begin to think about the possibility of relocating thirty to sixty million people. If we had to do this relocation during an armament race and in a hurry, it would be a terrible burden upon our economy. But if we can do it on the basis of a ten-year plan, during peacetime, when we do not fear a sudden attack, it would cost us perhaps fifteen billion

⁴ In 1940 about sixteen million people lived in cities having a population of one million or more residents; almost fifteen million lived in towns of 25,000 to 100,000 inhabitants; and about twelve million lived in towns of 2,500 to 10,000.

dollars. That sum would be a tolerable burden, for my economist friends say that it would not reduce the standard of living appreciably during this transition period.

MR. FOX: You mean fifteen billion dollars per year for the whole transition period?

MR. SZILARD: That is right. That sum would mean that the total volume of the construction industry need not be expanded beyond its volume during the peak year in 1942.

MR. FOX: Would that give us protection against all kinds of weapons—not only those which we experienced in this recent war but those which we are likely to experience in the next war, if it should come?

MR. SZILARD: If you take the relocation of the population alone, without thinking of other methods to produce peace, I would say that in the long run these would offer us no protection. You probably saw that Dr. Oliphant said in England that he looks forward to bombs which correspond to a million and ten million tons of TNT. That would be a thousand to ten thousand times larger than bombs which we used over Japan. That would mean that the actual radius of such a bomb hit would be about ten miles.⁵

But even if we forget possible further developments of atomic bombs, there are methods of extermination of human beings, or there may be within the next five or ten years, against which the dissolution of our cities would offer no protection. Biological warfare—biochemical warfare—has so far not been seriously considered. I believe that the reason for this is the moral inhibition which most scientists feel when they think of these methods. I am not sure that we can count on such a moral inhibition any longer.

MR. FOX: Where do you think this discussion leads us, Hocking?

MR. HOCKING: It leads us to the question of whether these moral inhibitions are still capable of development. I feel very strongly that the peace to which men are driven by fear is not peace; that we must not act in a panic. The more the danger, the more steadiness is called for.

World government, which vests power in one central agency, is a step hard to undo. This side of that step, much can be done by *ad hoc* administration on the

⁵ In the House of Representatives on September 24, 1945, Representative Arends of Illinois declared: "I am advised on the most competent authority that our scientists and technicians have now created atomic bombs of such prodigious and multiplied destructive power that the explosion which killed 150,000 humans and obliterated the city of Hiroshima was only a small firecracker by comparison" (*Chicago Sun*, September 25, 1945).

basis of consent, beginning with agreements to outlaw the use of the bomb. Bertrand Russell does not believe sovereignty will be surrendered, on the ground, as he puts it, that 90 per cent of mankind would rather be dead than sensible. Sovereignty, however, will be surrendered to some extent, and 90 per cent of mankind would rather be dead than in needless chains.

Few men, as a matter of fact, are uneasy over the present temporary monopoly by the United States. Disagreements in London have not been noticeably less outspoken than before. But most men, who think about it, are aware of their own unreadiness and our national unreadiness to be trusted with omnipotence; and even atomic wars cannot be carried on without involving the consent of peoples. They will, therefore, prefer to approach world government slowly and, meantime, to build up the moral bases of control—first of all, by strengthening law; second, by concrete cooperation where a war might be starting; and, third, by exploring the relieving effects of a new economy of abundance which is made possible by atomic energy.

This country should not hasten to surrender its momentary monopoly but should use the moment to build a common mind.

MR. COUSINS: I fully agree with the difficulty of obtaining world government. I also recognize, I hope, the consequences of our failure to achieve world government. I do not think that we can achieve the benefits of world government (we all want the benefits) without actually having world government. I do not think that world government is a cure-all, but I do think that it is a minimum step and not a maximum step. Only world government can give us the time we need in which to work out these problems, because time is now running out.

Man today is similar to a person who is at the edge of a canyon with a forest fire raging behind him. He cannot retreat; he cannot go forward, because there is a sheer drop of several thousand feet, but (and this is a big "but" even though the canyon is only ten feet wide) if he can jump across that canyon, he can make the other side. It so may happen that this particular person may never have been able to jump ten feet before. There is nothing in his experience to indicate that he can jump ten feet, and yet the longer he waits the less space he will have in which to make that running leap. So, the thing for him to do is to make the leap right away, just as fast as he can.

I agree with Hocking that we must not become panicky. On the other hand, unless we recognize the nature and the imminency of the peril, fire will creep up on us, and we will have to jump from a standing position, or perhaps we may have to try to step across.

What is called for, perhaps, is a program of public education—education about the things which we have been discussing today and about the possibilities of real cooperation—the possibilities of world citizenship.

MR. FOX: I hope that we will also have an opportunity for a quick job of bridge-building and not have to jump.

All four of us have, I think, agreed that only a fundamental political reorganization of the world can bring absolute protection to the American people and to the world against the hazard of the atomic bomb.

Cousins wants no half-measures but wants to begin with world government within a very short time and follow with whatever else then appears to be necessary. Hocking, Szilard, and I would tend to agree that world government is not a short-run possibility and that absolute protection is not possible. We believe that we are confronted with choosing our policy from among a variety of imperfect, though not equally imperfect, alternatives. We agree that a proper first step is to ask for an efficient international inspection system. We hope that, with general confidence in the inspection system, it will become feasible and essential that states agree not only to outlaw the use of the bomb but to destroy existing stock piles and atomic-energy installations designed for bomb manufacture.



The ROUND TABLE, oldest educational program continuously on the air, is broadcast entirely without script, although participants meet in advance, prepare a topical outline, and exchange data and views. The opinion of each speaker is his own and in no way involves the responsibility of either the University of Chicago or the National Broadcasting Company. The supplementary information in this transcript has been developed by staff research and is not to be considered as representing the opinions of the ROUND TABLE speakers.



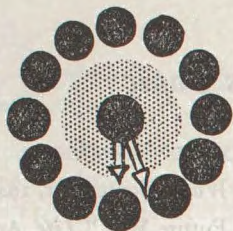
What Do *You* Think?

1. Assuming that the United States has three years' time to maintain its monopoly upon the atomic bomb, what policy do you think should be pursued during that period? What are the responsibilities of this country? Should we give away the secret? To the United Nations? Would publishing it put an end to armament races? Should we try to forget it? Discuss.
2. What should be the long-run goals of United States policy? Should we look toward world government? Can we have stable world government within the next three years? Will fear of the atomic bomb prevent war? Will it mean real peace? Should we use our knowledge of this weapon as a bargaining power in world affairs? Discuss.
3. Do you think that the advance of technical knowledge has increased the urgency of the obligation of men to their fellow-men? Does this stop at national borders? Do you think that the possession of the atomic bomb has increased the moral responsibility of this country? Do you think that the United States can make a plea against its future use after using it against Japan? Once at war, is there a real distinction between using one kind of weapon and another?
4. Do you favor the immediate establishment of a system of world government which will decide policy as necessity demands? Or would you prefer more gradual steps toward the eventual establishment of a real world government? If so, what interim policy do you favor in relation to control of the atomic bomb?
5. What do you consider the primary requisites for the achievement of a world community? Do you think that there is now a basis of moral responsibility which may bind us to our neighbors for common goals? Do you agree that "90 per cent of mankind would rather be dead than sensible"? Outline the bases upon which you believe a world government could be maintained.
6. What is the history of the influence of important inventions upon society—its social and economic institutions and its ideologies? What are the social "resistances" which might cause the potentialities of the use of atomic energy to develop slowly? Do you think that we should dissolve our cities? Go underground? Would this be a real protection?
7. It has been said that "any association which helps to carry out the true ends of government is not in opposition to the nation." Discuss this statement with regard to the future of international organization.



More on This Topic

- "America's Atomic Atrocity," *Christian Century*, August 29, 1945.
- ANGELL, NORMAN. "Man and the Atom," *Free World*, September, 1945.
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- BUSH, VANNEVAR. "Beyond the Atomic Bomb," supplement to *Fortune*, September, 1945. *Suggestions for the creation of a permanent office of scientific research.*
- CHASE, STUART. "Atomic Age Balance Sheet," *Common Sense*, October, 1945. *Discusses assets and liabilities of the atomic bomb—potentials for good and for evil.*
- "Future of the Atomic Bomb: Power for Peace or Chaos?" *United States News*, August 17, 1945.
- GEDDES, D. P. (ed.). *The Atomic Age Opens*. New York: Pocket Books, Inc., 1945. *A collection of documents on the atomic bomb.*
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- O'NEILL, JOHN J.; BALDWIN, HANSON W.; CHURCHILL, WINSTON; and HUTCHINS, ROBERT M. "The Blast That Shook the World," *Reader's Digest*, October, 1945.
- SHOTWELL, JAMES T. "An Interdependent World," *Survey Graphic*, September, 1945.
- SMYTH, HENRY DEWOLF. *Atomic Energy for Military Purposes*. Princeton: Princeton University Press, 1945.
- RABI, I. I. "The Physicist Returns from the War," *Atlantic*, October, 1945.
- RUSSELL, BERTRAND. "How To Avoid the Atomic War," *Common Sense*, October, 1945. *Says one hope of preserving civilization is a vigorous policy by the United States, before other powers possess atomic bombs, to build up an international authority such as the nations would create voluntarily if they did not prefer death to clear thinking.*



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OCT 5 - 1949

Around the Dial:

Scientists Discuss Atombomb And the 'Atlantic Community'

By Bob Lauter

The last session of the University of Chicago Round Table (Sunday, 9:30 p. m., WNYC), introduced as guests two scientists who participated in a discussion of "The Atlantic Community and the Atom Bomb." The scientists were Professor Harold Urey, Nobel prize winner, and Professor Leo Szilard, both of the University of Chicago.

The discussion highlighted what can be called—at best—the very uninspiring role which scientists have played in the fight to outlaw the A-bomb and preserve peace. Both Professor Urey and Professor Szilard are scientists of high standards, yet their contribution to the discussion was not that of scientists. They spoke as politicians, and although their Soviet-baiting was professorial, it remained baiting.

NEITHER SCIENTIST questioned the validity of that spurious invention known as the "Atlantic Community"—a "community" which is presumably large enough

to contain the very un-Atlantic Italy and Greece, and generous enough to leave an open door for fascist Spain and Portugal.

While they ridiculed the idea that the atomic fission in the Soviet Union was accidental, or that the bomb was stolen, Urey took the line that our headstart in building a stockpile is an important advantage. After hearing that control of atomic energy is "closest to the heart of scientists," the radio audience was subjected to an appeal for more stockpiling, a "stronger policy" in respect to the "defense" of Europe, and a plain, old-fashioned atomic armaments race.

Szilard, for instance, attacked the Soviet proposal for arms reduction. His reason was that a percentage reduction of arms would leave western Europe "at the mercy" of Russia.

In the face of such arguments, it is difficult to find anything but the most cynical hypocrisy in the statement that control of atomic energy "is closest to the heart of scientists." It is probably close to

the hearts of some scientists.

UREY concluded his discussion with a clear illustration of the reactionary character of the World Federalist Movement which poses as a sweet, idyllic, idealistic movement of political Peter Pans. Urey claimed that proper American policy was expressed by the Truman Doctrine (a doctrine which even Truman hesitates to call by name). It is also Urey's belief that Soviet possession of the atom bomb makes war more likely. He followed this with a call to pass the Atlantic Union resolution in the UN, and to make the UN a world government!

WE HEAR MUCH in America concerning the influence of politics on Soviet scientists. Yet Urey and Szilard made thoroughly political remarks. Any two senators, with no scientific training whatsoever, and absolutely no understanding of atomic fission, could have made exactly the same remarks, and no one would have been surprised.

MEMORANDUM

OFFICE OF THE RADIO DIRECTOR

TO: Professor Leo Szilard

Date October 13, 1949

FROM: George E. Probst

Time

My sincere, and regretably belated thanks for your cooperation in the Round Table on "The Atlantic Community Faces the Bomb". We are doubly in your debt: for your effective contribution to the discussion, and for the article which appears as supplement in the pamphlet. There have been many comments of appreciation on that -- and we expect more!

You may be interested in what the New York comrades had to say about the program. I enclose a clipping from the October 5th Daily Worker. Will you return this to the Radio Office when you have finished with it, please?

G.E.P.

THE UNIVERSITY OF CHICAGO



ROUND TABLE

THE ATOM AND WORLD POLITICS

A Radio Discussion by NORMAN COUSINS
WILLIAM FOX, WILLIAM HOCKING *and*
LEO SZILARD

4TH BROADCAST IN COOPERATION WITH
THE NATIONAL BROADCASTING COMPANY

NUMBER 393 * * * SEPTEMBER 30, 1945

Around the Round Table



NORMAN COUSINS, editor of the *Saturday Review of Literature*, was born in New Jersey and attended Teachers College, Columbia University. Mr. Cousins was an editorial writer on the *New York Post* from 1934 until he joined the staff of *Current History* magazine in 1935, where he served as literary and managing editor. In 1940 he became executive editor of the *Saturday Review of Literature*, and he has been the editor since 1942. During the war he acted as publication consultant and editor of *U.S.A.* for the Office of War Information. He is the author of *The Good Inheritance* (1941) and *The Democratic Chance* (1942) and the editor of *A Treasury of Democracy* (1941) and *An Anthology of the Poetry of Liberty* (1943).



WILLIAM FOX, research associate at the Institute of International Studies at Yale University, received his B.S. degree at Haverford College and his M.A. and Ph.D. degrees at the University of Chicago. He served as an instructor in political science at Temple University and was later at Princeton University. He joined the Yale Institute in 1943. At the San Francisco Conference on International Organization he served as the secretary of the Committee on Enforcement Arrangements. He has contributed articles to various professional journals and is the author of *The Super Powers* (1944).



WILLIAM ERNEST HOCKING, Alford Professor Emeritus of Philosophy at Harvard University, has been associated with the Harvard University faculty since 1914. Before that time he had taught at Yale University and the University of California. He has also served as a visiting lecturer in many other universities in the United States and abroad. He is the author of many books, among which are: *The Meaning of God in Human Experience* (1912); *Man and the State* (1926); *The Philosophy of Law and Rights* (1926); *Types of Philosophy* (1929); *Science, Value, and Religion* (1942); *What Man Can Make of Man* (1942); and *Contemporary Science and the Idea of God* (1944).



LEO SZILARD, a member of the Metallurgical Laboratory at the University of Chicago, was active in research work in the development of the atomic bomb. He was born in Budapest, Hungary, and he studied in Germany. In 1922 he received his doctorate of philosophy at the University of Berlin, where he specialized in physics. Recently, he was a fellow of the American Physical Society.

The University of Chicago
ROUND TABLE



**SECURITY
AND ARMS CONTROL**

An NBC Radio Discussion by
PHILIP JACOB, SIR BENEGAL RAU
and LEO SZILARD

Second in a series
PROPOSALS FOR PEACE
(PLANNED IN COOPERATION WITH THE AMERICAN
FRIENDS SERVICE COMMITTEE)

NUMBER 642

JULY 16, 1950



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THE UNIVERSITY OF CHICAGO ROUND TABLE

GEORGE E. PROBST, *Director*

CATHERINE D. JOHNSON, *Editor*

853d Broadcast in Cooperation with the National Broadcasting Company

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Security and Arms Control

*

MR. JACOB: Today we are discussing security and arms control, but today also we have a war going on in Korea. Why then do we discuss such a subject with a war already in progress?

Last week President Truman received from his top-policy advisers a call for an all-out war effort in the United States and an appeal to the United Nations countries to do likewise as a means to ending aggression and bringing peace. Will all-out mobilization bring us the security which we seek? Are there any other alternatives open to us and to the United Nations? Does preparation for war offer the best hope for stopping aggression? Is it foolish to talk about arms control now?

Sir Benegal Rau, you presided at the meeting of the Security Council at which military resistance by the United Nations to the North Korean attack was recommended. What do you think is the fundamental difficulty?

SIR BENEGAL: The fundamental difficulty in this problem is really the prevailing distrust between East and West. I agree that recent events have somewhat deepened this distrust, but the problem still remains of dissipating that distrust. One way of doing that would be, in my view, a high-level meeting between East and West.

MR. SZILARD: This is a very interesting proposal, Sir Benegal. I hope that later on we can discuss it in detail.

MR. JACOB: Mr. Szilard, you were instrumental in getting the United States government to take on the development of atomic energy in 1939. Do you believe that atomic armament is the answer to the problem?

MR. SZILARD: I do not believe that atomic armaments give us security. I think that atomic bombs give us insecurity.

MR. JACOB: I thoroughly agree that atomic armament is not the answer. For myself, the events of the last five years, and indeed of the last five weeks, are convincing that security and peace cannot be achieved when the major powers are engaged in an unrestrained arms race. To localize the Korean war and prevent future "Koreas," I believe that we must have international inspection of all national armaments. We must have it now, and we must couple with it a standstill agreement to prevent and to stop further production of major arms.

MR. SZILARD: It is very easy to agree that we need a standstill agreement or perhaps even a general disarmament agreement. The question is: Can we get it?

SIR BENEGAL: The problem of disarmament has a long and rather discouraging history. To go back no further than the League of Nations, I would point out that in 1925 the Council of the League appointed a preparatory commission to study the problem. That commission sat for nearly five years and produced a draft disarmament convention. Then a disarmament conference met to consider the draft; and in the end it achieved little or nothing, although it sat until the end of 1934. In fact, while the conference was still in existence, the world witnessed a return to competitive armaments on an unprecedented scale. Such was the result of nearly ten years' work in the course of which the subject of disarmament was discussed from almost every angle. That is why I said that the history of the problem was not very encouraging.

MR. SZILARD: Sir Benegal, if disarmament failed in the past, what reason have you to believe that we may fare better in the future?

SIR BENEGAL: I must confess that the effect of the events in Korea may make the problem more difficult rather than easier. The South Koreans, who, by force of circumstances, were lacking in armaments, were suddenly overwhelmed by well-armed and well-equipped forces in the North. That obviously does not encourage limitation of armaments.

On the other hand, the rapidity with which the United Nations rushed to the assistance of the South Koreans gives ground for hoping that in the future the world organization will secure support against aggression more effectively than in the past. If this hope is well founded, individual states may be more ready to limit armaments. So much for the effect of recent events on the prospect of disarmament.

MR. JACOB: Are not the prospects also better than in the past, because a great many people now realize the disastrous consequences of an unregulated arms race? They are convinced that this kind of situation cannot be allowed to continue if they are to have peace.

SIR BENEGAL: I entirely agree. I believe that there is today a greater realization of what the Charter of the United Nations calls "the dignity and worth of the human person" and a growing feeling that the resources of civilization should be utilized in preserving and exalting human life rather than in destroying it. On balance, therefore, I think that the pros-

pects of getting agreement on limitation of armaments will be better at the end of the Korean conflict than they have been in the past.

MR. SZILARD: Very well. If you are so optimistic about the possibilities of disarmament, let us see how far disarmament should go. And here I have some difficulties. You remember that the United States proposed the elimination of atomic bombs from national armaments and that Russia countered that she wanted to discuss a general limitation of armaments along with atomic disarmament. I can understand why eliminating atomic bombs alone would place Russia in a difficult position, because so long as it is permissible to destroy cities from the air with high-explosive bombs, so long as we retain long-range bombers, the elimination of atomic bombs alone does not give security to Russia.

Now, if we go one bit further, if we eliminate long-range bombers and high explosives but permit tanks and heavy guns to be retained, then I think that the Western powers are in a difficult position, because with tanks and guns Western Europe can be overrun. Does it not follow that disarmament, if it is to give us security, if it is to be acceptable both to Russia and to the United States, must go down to machine guns in national armament and perhaps heavy guns in fortifications (let us say that the Maginot Line may be retained) but that no mobile heavy armaments, no tanks, no heavy guns can be retained? Otherwise, I do not see how both parties can accept a disarmament agreement. And, of course, this brings in the problem of inspection. Inspection, I think we all agree, is necessary. We have to check whether disarmament provisions have been observed, and I find that inspection is acceptable, or should be acceptable, to countries like Russia only if disarmament goes sufficiently far. It is essential that there are no secrets left which are worth preserving. If there is no armament which is manufactured and there are no armament-manufacturing plants, the location of which has to be kept secret, then inspection may become acceptable to Russia.

MR. JACOB: In effect what you are proposing, if I understand you correctly, is total disarmament in so far as offensive weapons or weapons capable of offensive warfare are concerned. Are you suggesting that that can be accomplished now? Are you suggesting that that must be accomplished before anything else can be done in this direction?

SIR BENEGAL: I would like to mention in this connection that a very similar proposal, what was known as "qualitative limitation of armaments," was actually proposed at the Geneva Disarmament Conference

in 1933 by the United Kingdom. It received a large measure of support but ultimately broke down because of the difficulty of defining offensive and defensive armaments. Even if a similar proposal should break down again, I would welcome any step, however modest, in the direction of disarmament. It is not my thought that radical disarmament, such as I suggested, is feasible in the absence of a political settlement. I think that, if we want to get anywhere with any significant step toward peace, we will need an over-all political settlement—an agreement which settles the fate of Germany, settles the problems in Asia, and also provides for general disarmament. Of course, now, when we are engaged in a war in Korea, it is very unlikely that negotiations for such an over-all settlement will get under way for the time being. Yet this is the only significant advance toward peace which I can see, providing there is an advance toward peace at all.

MR. JACOB: It seems to me that we can take piecemeal steps toward the achievement of peace and security, that we do not have to have a full general agreement on all outstanding issues. If we concentrate upon the problem from the standpoint of establishing effective inspection, it seems to me that some of these other steps might follow.

MR. SZILARD: Are you talking about a "standstill" agreement or merely inspection without any arms limitations?

MR. JACOB: I am talking particularly about the machinery of an operating and effective inspection. With that could be coupled a standstill agreement on various points which might be undertaken later, but the crux of the matter, it seems to me, is not the total disarmament step at this stage of the game or a general agreement such as you propose but the establishment of an effectively operating international inspection system.

MR. SZILARD: I think that I disagree with you. I think that a standstill agreement with effective inspection will not yield many of the advantages of general disarmament. It is therefore more difficult to obtain. For this reason, I imagine myself to be in the place of the Russians, and I ask myself: Would I accept your proposal? As a Russian I would say to myself: The United States wants to send inspectors to my country on the basis of a standstill agreement, retaining bombers so that she can destroy my factories, retaining tanks with which she can invade my territory (all that you propose, Jacob, is inspection); and if I, as a Russian, would agree to it, I would merely disclose to the United States the location of my manufacturing facilities. And if no further progress is made

toward disarmament, if it comes to war, I, as a Russian, would be in a much worse strategic position, with the United States' being able to destroy with atomic bombs, with high explosives, my manufacturing facilities. So I think that, if I were speaking for the Russians, I would not accept your standstill agreement with inspection. I would accept, though, a political settlement *and* disarmament down to machine guns, including inspection, because then I would no longer have to fear that I would be attacked.

MR. JACOB: Is it not noteworthy, however, that the Russians have agreed consistently to the proposition of international inspection of armaments? To be sure, there is disagreement with reference to exactly what that might involve. But to the principle of international inspection they have agreed; and they have agreed consistently, and they seem to find in it a basic interest in common with the United States, which is an interest in the avoidance of a general war.

MR. SZILARD: I think very little of an achievement which consists in the great powers' agreeing on something in principle. The difficulties which came out in Geneva in 1932 come in defining the details. Implementation is where a real disagreement first pops up. But I agree with you that it is necessary to consider what progress we could make in the absence of a general agreement. And, as you know, there are a number of proposals. For instance, there is the Communist-sponsored peace appeal, which proposes that we should declare that the use of atomic bombs is prohibited and that the nation which uses the atomic bomb first is a war criminal.

There is something which puzzles me about this. This proposal is sponsored by the Communists, and it is opposed by the State Department. If I look at this proposal, it would seem to me that prohibiting atomic bombs but leaving conventional weapons—like long-range bombers—as legitimate means of waging the war would give an advantage to the United States rather than Russia. And, yet, Russia proposes this, and the United States opposes it. I do not understand why they do that.

MR. JACOB: A great many of us have a strong sense of the importance of trying to keep the atomic bomb from being used in warfare. As a matter of fact, Sir Benegal, I believe that you yourself have been most interested in trying to find a way out of the present deadlock on atomic-energy controls.

SIR BENEGAL: In November last, I actually put forward a resolution in the General Assembly suggesting, among other things, that the General

Assembly should construct a declaration on the subject. The declaration which I had in mind consisted of three articles—the first of which said that the control of atomic energy was a matter of international concern and the duty of every state to act in aid of such a system. The second article prohibited states and individuals from manufacturing or possessing or using atomic bombs; and the third article enabled any state that wished to do so, when ratifying the declaration, to make reservations. For example, a particular state could say that the second article, namely, the prohibition against the manufacture and use of atomic bombs, would not be operative against that particular state until the system of international control provided for in the first article was actually in existence. This proposal was actually put to a vote, with the result that fifteen states voted for it, twenty-four states voted against it, and eighteen abstained.

MR. JACOB: What was the stand of the United States and the Soviet Union on that?

SIR BENEGAL: Well, both of them voted against this proposal.

MR. JACOB: Is that not a tragedy? Here, it seems to me, is a situation in which there ought to be a great degree of unity among the countries in trying to accomplish, even with the Korean fighting on, agreement upon the kind of proposal which you have advanced.

MR. SZILARD: Sir Benegal, I wonder if you would agree with this: We have no international agreement on atomic bombs; we have no agreement on strategic bombing of cities or destruction of cities with high-explosive or incendiary bombs. But even though there is no agreement, some progress could be made, provided that the great powers would observe some restraint. It seems to me that the obligation of restraint goes with great power, and it seems to me that our hope for future agreement depends on the extent to which we exercise restraint, particularly when a big power fights a small power, like the United States and the United Nations today fight North Korea.

I wonder whether you could tell us, first of all, what the facts are concerning the position of the Security Council on the Korean war.

SIR BENEGAL: The facts are well known. They are embodied in the three resolutions of the Security Council passed on June 25, June 27, and July 7. The first resolution in effect asks the two parties to cease hostilities and asks the North Korean forces to withdraw to the thirty-eighth parallel. The second resolution, after reciting the fact that the first reso-

lution had not been complied with, recommended that all member states assist South Korea to repel the attack from the North. The third resolution was really concerned with details asking the member states which provided armed assistance to agree to a unified command, and it authorized the U.S.A. to name the commander and authorized the commander at his discretion to use the United Nations flag.

MR. SZILARD: Do you feel that any important advance was made by the Security Council's taking this stand?

SIR BENEGAL: I think that it may be regarded as a precedent for the future—that is to say, in the case of future aggression, where the Security Council would be satisfied that there had been an aggression, the United Nations Organization would intervene to punish the aggressor.

MR. SZILARD: Do we have any assurance in this respect? Is not this stand of the Security Council due to a number of accidents? The first accident is that the United States was interested in Korea and that President Truman decided to put in armed forces of the United States. The second accident is that the seat of China on the Security Council is occupied by the former Chinese government, which is in favor of this action, while this present Chinese government would probably veto it. And the third accident is that the Russians, even though they had the right to veto, for some reason which I do not understand, did not exercise that veto.

MR. JACOB: But regardless of the accidental nature, it seems to me we are in this situation now, and the really important question for us is to try to set the stage for some kind of an effective settlement at the end. And in that regard it seems to me that the exercise of restraint by the United Nations and by the United States in the conduct of hostilities in Korea is of extreme importance. Do you not agree with that?

MR. SZILARD: I do not know what you have in mind. But if you have in mind that we might use the atomic bomb in Korea, I think that I can reassure you. I do not think that the atomic bomb can be used, according to the existing statute, without President Truman's approval. And I doubt very much that President Truman would approve the use of atomic bombs in Korea. However, if you have in mind that the Army might use high-explosive or incendiary bombs first on the cities of North Korea and subsequently on the cities of South Korea which are occupied by North Koreans, then I am really not in a position to reassure you. I just wonder to what extent the United Nations here would share the

responsibility with the United States for the conduct of the war against civilians in Korea. I do not know whether Sir Benegal can say anything about it at this time.

SIR BENEGAL: There is nothing in the resolutions of the Security Council bearing on this subject, but you have raised an important point which I think will require very careful study.

MR. JACOB: I would like to emphasize myself the tremendous moral responsibility that the United Nations and the United States are under to see to it that the war in Korea is conducted, in so far as it is possible, with regard for the welfare of civilians. It seems to me that we have a situation here in which we are dedicated to the upholding of the sacredness of personality and that we cannot, under any circumstances, justify the use of atomic bombs or strategic bombing to carry out objectives when our basic commitments should be to central moral values.

MR. SZILARD: Sir Benegal, if the situation is going to improve, in what direction must we look for improvement?

SIR BENEGAL: AS I stated at the very beginning, the root of this whole world problem is the distrust which leading nations entertain of one another. In a recent statement of policy I read, "so long as dictatorship builds powerful armed forces, so long must democracies maintain an adequate state of preparedness." All dictator countries say the same thing, only the other way around. East and West each thinks that the other is preparing for aggressive war, and so this vicious spiral of distrust goes on mounting, and that of course is an obstacle to any limitation of armaments.

In the news today I noticed Mr. Winston Churchill called for a supreme effort on the highest level to bridge the gulf between the East and the West.

MR. JACOB: I wonder whether the United Nations Security Council, Sir Benegal, or the United Nations General Assembly is in a position where they could take up this idea of high-level meeting and try to promote a technique of resolving the differences between the Soviet Union and the United States.

SIR BENEGAL: It is an interesting suggestion. In this connection I would like to mention that we had a difficult situation in the Indian subcontinent at the end of last March. The relations between India and Pakistan were very bitter; there was deep distrust from both sides; and even re-

sponsible ministers said that the only solution is war. Then it occurred to the two prime ministers to meet, and, although they met without any specified agenda, the mere meeting broke down the tension. I hope that if any similar meeting takes place, as contemplated by Mr. Winston Churchill, a similar result may follow.

MR. JACOB: That was a meeting directly between the leaders of the two parties which were involved. I wonder whether it is not important to try to secure a successful result by having the United Nations itself call upon the parties to negotiate under the auspices of the United Nations.

MR. SZILARD: I do not know that I would share any optimism at all concerning such a meeting, because I do not see that anyone seems to have a conception of what the substance of an over-all settlement should be. Until we have a clearer idea about this, such a meeting might not be very useful. But, nevertheless, since all avenues have to be explored, I want to raise this question: Rather than having the United Nations do it, could not, let us say, Mr. Nehru invite Mr. Truman and Mr. Stalin to a meeting and be present at the meeting and serve as a mediator to bring about a better relationship and to give, through such a meeting, hope to the world that we can look toward an improvement in Russian-American relations?

MR. JACOB: You are suggesting, in other words, that Mr. Nehru, as an individual holding the respect presumably of both sides and without a personal commitment or national commitment on one side or the other, might perform a more effective task than the United Nations Security Council or the United Nations General Assembly as a whole?

MR. SZILARD: While I am not too optimistic about this approach at all, I should think that there would be more hope if a personal approach is made by Mr. Nehru than if a more formal approach is made by a world organization.

MR. JACOB: I am wondering if there are not certain other means of trying to eliminate the distrust which Sir Benegal has indicated is the fundamental factor involved in this problem of security. For instance, it seems to me, to return to an earlier part of our discussion, that the inauguration of international inspection coupled with a standstill agreement would go far toward alleviating this distrust. For instance, if an American inspector, under the United Nations, sets foot on Russian soil to check on the present state of readiness of Russian armies, and if, at the same time (I believe this has got to be simultaneous) a Russian inspec-

tor, as part of the United Nations team, sets foot on American soil, would that not create an enormous influence which would weaken the suspicions and fears that each would have of the other?

SIR BENEGAL, perhaps this is a question which you cannot deal with directly, but I wondered whether you would feel that some kind of symbolic act of this sort—concrete, definite—would not be necessary to dispel the distrust.

SIR BENEGAL: I entirely agree with a concrete act of this kind. If, as I said, there is a preliminary meeting between the leading powers at a high level, a concrete step of this kind would go a great way toward dispelling distrust, and the people would begin to feel that whatever was agreed upon was not a mere form of words but was meant to be implemented.

MR. SZILARD: I am sorry that I cannot share your optimism, because it seems to me that acceptance of inspection by Russia has, as its necessary condition, the removal of distrust which only a political settlement can bring about. The distrust has to be removed first; inspection can be agreed afterward. And I think that, in the remaining short time, we will not be able to fight this out.

MR. JACOB: I wonder whether the crux of this whole question, as we have seen it, is not that the problem of trying to achieve security is a problem of finding an alternative to competitive armaments. I would agree thoroughly, I think, with you, Szilard, that we need to proceed in the direction of a general agreement. I think that our only point of difference is how to do it. It seems to me that inspection is the most tangible, immediate, concrete way of approaching the problem.

MR. SZILARD: In the immediate future I think all that we can do is observe the obligations of a great power to exercise restraint, and if we cannot improve the situation in the next six months, at least we could see to it that the situation does not get worse. If we do not exercise such restraint, I think that, six months from now, we will be in a much worse position with respect to attempting an agreement than we are today.

SIR BENEGAL: I entirely agree with this general approach. I feel that we must find the causes of distrust and try every means to eliminate them.

MR. JACOB: It seems to me that it is clear that the essential obstacle is distrust and that the means by which we should proceed to resolve that is not competitive armaments.

MR. SZILARD: On this I think that we are all agreed.

AN OPEN LETTER TO THE UNITED NATIONS

JUNE 9, 1950*

By NIELS BOHR

I ADDRESS myself to the organization, founded for the purpose to further co-operation between nations on all problems of common concern, with some considerations regarding the adjustment of international relations required by modern development of science and technology. At the same time as this development holds out such great promises for the improvement of human welfare it has, in placing formidable means of destruction in the hands of man, presented our whole civilization with a most serious challenge.

My association with the American-British atomic energy project during the war gave me the opportunity of submitting to the governments concerned views regarding the hopes and the dangers which the accomplishment of the project might imply as to the mutual relations between nations. While possibilities still existed of immediate results of the negotiations within the United Nations on an arrangement of the use of atomic energy guaranteeing common security, I have been reluctant in taking part in the public debate on this question. In the present critical situation, however, I have felt that an account of my views and experiences may perhaps contribute to renewed discussion about these matters so deeply influencing international relationship.

In presenting here views which on an early stage impressed themselves on a scientist who had the opportunity to follow developments on close hand I am acting entirely on my own responsibility and without consultation with the government of any country. The aim of the present account and considerations is to point to the unique opportunities for furthering understanding and co-operation between nations which have been created by the revolution of human resources brought about by the advance of science, and to stress that despite previous disappointments these opportunities still remain and that all hopes and all efforts must be centered on their realization.

For the modern rapid development of science and in particular for the adventurous exploration of the properties and structure of the atom,

* This letter by the distinguished Danish scientist, addressed to the United Nations, was sent from Copenhagen, Denmark, June 9, 1950.

international co-operation of an unprecedented extension and intensity has been of decisive importance. The fruitfulness of the exchange of experiences and ideas between scientists from all parts of the world was a great source of encouragement to every participant and strengthened the hope that an ever closer contact between nations would enable them to work together on the progress of civilization in all its aspects.

Yet, no one confronted with the divergent cultural traditions and social organization of the various countries could fail to be deeply impressed by the difficulties in finding a common approach to many human problems. The growing tension preceding the second world war accentuated these difficulties and created many barriers to free intercourse between nations. Nevertheless, international scientific co-operation continued as a decisive factor in the development which, shortly before the outbreak of the war, raised the prospect of releasing atomic energy on a vast scale. . . .

Everyone associated with the atomic energy project was, of course, conscious of the serious problems which would confront humanity once the enterprise was accomplished. Quite apart from the role atomic weapons might come to play in the war, it was clear that permanent grave dangers to world security would ensue unless measures to prevent abuse of the new formidable means of destruction could be universally agreed upon and carried out. . . .

In the beginning of 1944, I was given the opportunity to bring such views to the attention of the American and British governments. I quote from a memorandum which I submitted to President Roosevelt as a basis for a long conversation which he granted me in August 1944.

It certainly surpasses the imagination of anyone to survey the consequences of the project in years to come, where in the long run the enormous energy sources which will be available may be expected to revolutionize industry and transport. The fact of immediate preponderance is, however, that a weapon of an unparalleled power is being created which will completely change all future conditions of warfare.

Quite apart from the question of how soon the weapon will be ready for use and what role it may play in the present war, this situation raises a number of problems which call for most urgent attention. Unless, indeed, some agreement about the control of the use of the new active materials can be obtained in due time, any temporary advantage, however great, may be outweighed by a perpetual menace to human security.

Ever since the possibilities of releasing atomic energy on a vast scale came in sight, much thought has naturally been given to the question of control, but the further the exploration of the scientific problems concerned is pro-

ceeding, the clearer it becomes that no kind of customary measures will suffice for this purpose and that especially the terrifying prospect of a future competition between nations about a weapon of such formidable character can be avoided only through a universal agreement in true confidence. . . .

The prevention of a competition prepared in secrecy will therefore demand such concessions regarding exchange of information and openness about industrial efforts including military preparations as would hardly be conceivable unless at the same time all partners were assured of a compensating guarantee of common security against dangers of unprecedented acuteness.

The establishment of effective control measures will of course involve intricate technical and administrative problems, but the main point of the argument is that the accomplishment of the project would not only seem to necessitate but should also, due to the urgency of mutual confidence, facilitate a new approach to the problems of international relationship.

The present moment where almost all nations are entangled in a deadly struggle for freedom and humanity might at first sight seem most unsuited for any committing arrangement concerning the project. Not only have the aggressive powers still great military strength, although their original plans of world domination have been frustrated and it seems certain that they must ultimately surrender, but even when this happens, the nations united against aggression may face grave causes of disagreement due to conflicting attitudes towards social and economic problems.

By a closer consideration, however, it would appear that the potentialities of the project as a means of inspiring confidence just under these circumstances acquire most actual importance. Moreover the momentary situation would in various respects seem to afford quite unique possibilities which might be forfeited by a postponement awaiting the further development of the war situation and the final completion of the new weapon. . . .

Without impeding the importance of the project for immediate military objectives, an initiative, aiming at forestalling a fateful competition about the formidable weapon, should serve to uproot any cause of distrust between the powers on whose harmonious collaboration the fate of coming generations will depend.

Indeed, it would appear that only when the question is taken up among the united nations of what concessions the various powers are prepared to make as their contribution to an adequate control arrangement, will it be possible for any one of the partners to assure themselves of the sincerity of the intentions of the others.

Of course, the responsible statesmen alone can have the insight in the actual political possibilities. It would, however, seem most fortunate that the expectations for a future harmonious international co-operation which have found unanimous expression from all sides within the united nations, so

remarkably correspond to the unique opportunities which, unknown to the public, have been created by the advancement of science.

Many reasons, indeed, would seem to justify the conviction that an approach with the object of establishing common security from ominous menaces without excluding any nation from participating in the promising industrial development which the accomplishment of the project entails will be welcomed, and be responded with a loyal co-operation on the enforcement of the necessary far-reaching control measures. . . .

This viewpoint was elaborated in a supplementary memorandum in which also the technical problem of control measures was further discussed. In particular, I attempted to stress that just the mutual openness, which now was obviously necessary for common security, would in itself promote international understanding and pave the way for enduring co-operation. This memorandum, dated March 24th 1945, contains, besides remarks which have no interest to-day, the following passages:

Above all, it should be appreciated that we are faced only with the beginning of a development and that, probably within the very near future, means will be found to simplify the methods of production of the active substances and intensify their effects to an extent which may permit any nation possessing great industrial resources to command powers of destruction surpassing all previous imagination.

Humanity will, therefore, be confronted with dangers of unprecedented character unless, in due time, measures can be taken to forestall a disastrous competition in such formidable armaments and to establish an international control of the manufacture and use of the powerful materials.

Any arrangement which can offer safety against secret preparations for the mastery of the new means of destruction would, as stressed in the memorandum, demand extraordinary measures. In fact, not only would universal access to full information about scientific discoveries be necessary, but every major technical enterprise, industrial as well as military, would have to be open to international control.

In this connection it is significant that the special character of the efforts which, irrespective of technical refinements, are required for the production of the active materials, and the peculiar conditions which govern their use as dangerous explosives, will greatly facilitate such control and should ensure its efficiency, provided only that the right of supervision is guaranteed.

Detailed proposals for the establishment of an effective control would have to be worked out with the assistance of scientists and technologists appointed by the governments concerned, and a standing expert committee, related to an international security organization, might be charged with keeping account of new scientific and technical developments and with recommending appropriate adjustments of the control measures.

On recommendations from the technical committee the organization would be able to judge the conditions under which industrial exploitation of atomic energy sources could be permitted with adequate safeguards to prevent any assembly of active material in an explosive state. . . .

With regard to such wider prospects, it would in particular seem that the free access to information, necessary for common security, should have far-reaching effects in removing obstacles barring mutual knowledge about spiritual and material aspects of life in the various countries, without which respect and goodwill between nations can hardly endure. . . .

In all the circumstances it would seem that an understanding could hardly fail to result, when the partners have had a respite for considering the consequences of a refusal to accept the invitation to co-operate, and convincing themselves of the advantages of an arrangement guaranteeing common security without excluding anyone from participation in the promising utilization of the new sources of material prosperity.

All such opportunities may, however, be forfeited if an initiative is not taken while the matter can be raised in a spirit of friendly advice. In fact, a postponement to await further developments might, especially if preparations for competitive efforts in the meantime have reached an advanced stage, give the approach the appearance of an attempt at coercion in which no great nation can be expected to acquiesce. . . .

The creation of new barriers, restricting the free flow of information between countries, further increased distrust and anxiety. In the field of science, especially in the domain of atomic physics, the continued secrecy and restrictions deemed necessary for security reasons hampered international co-operation to an extent which split the world community of scientists into separate camps.

Despite all attempts, the negotiations within the United Nations have so far failed in securing agreement regarding measures to eliminate the dangers of atomic armament. The sterility of these negotiations, perhaps more than anything else, made it evident that a constructive approach to such vital matters of common concern would require an atmosphere of greater confidence.

Without free access to all information of importance for the inter-relations between nations, a real improvement of world affairs seemed hardly imaginable. It is true that some degree of mutual openness was envisaged as an integral part of any international arrangement regarding atomic energy, but it grew ever more apparent that, in order to pave the way for agreement about such arrangements, a decisive initial step towards openness had to be made.

The ideal of an open world, with common knowledge about social conditions and technical enterprises, including military preparations, in every country, might seem a far remote possibility in the prevailing world situation. Still, not only will such relationship between nations obviously be required for genuine co-operation on progress of civilization, but even a common declaration of adherence to such a course would create a most favourable background for concerted efforts to promote universal security. Moreover, it appeared to me that the countries which had pioneered in the new technical development might, due to their possibilities of offering valuable information, be in a special position to take the initiative by a direct proposal of full mutual openness.

I thought it appropriate to bring these views to the attention of the American government without raising the delicate matter publicly (June, 1948).

In the years which have passed since the war, the divergencies in outlook have manifested themselves ever more clearly and a most desperate feature of the present situation is the extent to which the barring of intercourse has led to distortion of facts and motives, resulting in increasing distrust and suspicion between nations and even between groups within many nations. Under these circumstances the hopes embodied in the establishment of the United Nations Organization have met with repeated great disappointments and, in particular, it has not been possible to obtain consent as regards control of atomic energy armaments.

In this situation with deepening cleavage between nations and with spreading anxiety for the future, it would seem that the turning of the trend of events requires that a great issue be raised, suited to invoke the highest aspirations of mankind. Here it appears that the stand for an open world, with unhampered opportunities for common enlightenment and mutual understanding, must form the background for such an issue. Surely, respect and goodwill between nations cannot endure without free access to information about all aspects of life in every country.

Moreover, the promises and dangers involved in the technical advances have now most forcibly stressed the need for decisive steps towards openness as a primary condition for the progress and protection of civilization. The appreciation of this point, it is true, underlies the proposals to regulate co-operation on the development of the new resources, brought before the United Nations Atomic Energy Commission, but just the difficulty experienced in obtaining agreement under present world conditions would suggest the necessity of centering the issue more directly on the problem of openness.

Under the circumstances it would appear that most careful consideration should be given to the consequences which might ensue from an offer, ex-

tended at a well-timed occasion, of immediate measures towards openness on a mutual basis. Such measures should in some suitable manner grant access to information, of any kind desired, about conditions and developments in the various countries and would thereby allow the partners to form proper judgment of the actual situation confronting them.

An initiative along such lines might seem beyond the scope of conventional diplomatic caution; yet it must be viewed against the background that, if the proposals should meet with consent, a radical improvement of world affairs would have been brought about, with entirely new opportunities for co-operation in confidence and for reaching agreement on effective measures to eliminate common dangers.

Nor should the difficulties in obtaining consent be an argument against taking the initiative since, irrespective of the immediate response, the very existence of an offer of the kind in question should deeply affect the situation in a most promising direction. In fact, a demonstration would have been given to the world of preparedness to live together with all others under conditions where mutual relationships and common destiny would be shaped only by honest conviction and good example.

Such a stand would, more than anything else, appeal to people all over the world, fighting for fundamental human rights, and would greatly strengthen the moral position of all supporters of genuine international co-operation. At the same time, those reluctant to enter on the course proposed would have been brought into a position difficult to maintain since such opposition would amount to a confession of lack of confidence in the strength of their own cause when laid open to the world.

Altogether, it would appear that, by making the demand for openness a paramount issue, quite new possibilities would be created, which, if purposefully followed up, might bring humanity a long way forward towards the realization of that co-operation on the progress of civilization which is more urgent and, notwithstanding present obstacles, may still be within nearer reach than ever before.

The consideration in this memorandum may appear utopian, and the difficulties of surveying complications of non-conventional procedures may explain the hesitations of governments in demonstrating adherence to the course of full mutual openness. Nevertheless, such a course should be in the deepest interest of all nations, irrespective of differences in social and economic organization, and the hopes and aspirations for which it was attempted to give expression in the memorandum are no doubt shared by people all over the world.

While the present account may perhaps add to the general recognition of the difficulties with which every nation was confronted by the coin-

cidence of a great upheaval in world affairs with a veritable revolution as regards technical resources, it is in no way meant to imply that the situation does not still offer unique opportunities. On the contrary, the aim is to point to the necessity of reconsidering, from every side, the ways and means of co-operation for avoiding mortal menaces to civilization and for turning the progress of science to lasting benefit of all humanity. . . .

Also in other fields of science recent progress has confronted us with a situation similar to that created by the development of atomic physics. Even medical science, which holds out such bright promises for the health of people all over the world, has created means of extinguishing life on a terrifying scale which imply grave menaces to civilization, unless universal confidence and responsibility can be firmly established. . . .

Within any community it is only possible for the citizens to strive together for common welfare on a basis of public knowledge of the general conditions in the country. Likewise, real co-operation between nations on problems of common concern presupposes free access to all information of importance for their relations. Any argument for upholding barriers for information and intercourse, based on concern for national ideals or interests, must be weighed against the beneficial effects of common enlightenment and the relieved tension resulting from openness.

In the search for a harmonious relationship between the life of the individual and the organization of the community, there have always been and will ever remain many problems to ponder and principles for which to strive. However, to make it possible for nations to benefit from the experience of others and to avoid mutual misunderstanding of intentions, free access to information and unhampered opportunity for exchange of ideas must be granted everywhere. . . .

The very fact that knowledge is in itself the basis for civilization points directly to openness as the way to overcome the present crisis. Whatever judicial and administrative international authorities may eventually have to be created in order to stabilize world affairs, it must be realized that full mutual openness, only, can effectively promote confidence and guarantee common security.

EDITORIAL PAGE

San Francisco Chronicle, Monday, March 31, 1947

A SCIENTIST'S PEACE FORMULA

"What we need in this country now," says Professor Leo Szilard, "is a crusade for an organized world community--a crusade that will give a clear mandate to the Government to take the leadership."

We are inclined to listen with great respect to Dr. Szilard--one of the Nation's outstanding nuclear physicists--not because he is an eminent political scientist (he doesn't purport to be), but rather because he brings to his subject none of the conventional preconceptions which are ready at hand to the man who has spent his lifetime studying political science.

Dr. Szilard's springboard is the conviction that the world has found, in the atomic bomb, a ready means of destroying itself, and will so use it if traditional foreign policy paths are pursued. "The traditional aim of foreign policy is to prolong the peace, i.e., to lengthen the intervals between two wars," he told a meeting here last week. "We physicists find it difficult to get enthusiastic about that."

Difficult because, according to Dr. Szilard, it's now necessary, to preserve civilization, to think in terms of prolonging that interval ad infinitum, in other words, to eliminate war.

With a physicist's tendency to reduce probabilities to mathematical terms, Dr. Szilard estimates the chances of establishing permanent peace at about one in ten. He then proceeds to present his idea of how that one chance can be capitalized.

It must be done through the establishment of incentive, he believes--by demonstration to the world's peoples, and especially the Russians, that the

only chance for any of us is in co-operation for the common good. This entails, of course, a modification of existing national loyalties in favor of an ultimate world organization. Dr. Szilard perceives the establishment of a world community as the prerequisite of world government.

Establishment of such a community could be achieved, he believes, if each nation would contribute 10 per cent of its national income to the project. This money would be used to produce and move American farm products to needy countries; to build up a vast consumer goods industry in Russia and elsewhere; to cushion against the effects of American depressions abroad by manipulating the market; to stabilize the American economy by the same means.

So much for the material side. On the cultural side, Dr. Szilard would:

- (a) Finance large-scale exchange of students among the various countries and
- (b) establish and finance agencies to promote the widest possible interchange of information. Ultimately, under his plan, 20 per cent of the students in American universities would be foreign students; ultimately, the editor of Pravda would edit a daily page in the New York Times, and the Times editor would edit a daily page in Pravda.

It becomes clear, of course, why Dr. Szilard assigns his objective only a 10 per cent chance of becoming effective. But it also becomes clear that, as he says, "the problem which faces the world today can be solved only by the initiative of the American people"--the only people rich enough and, as he hopes, intelligent enough, to get the program started.

The kernel of the problem, he considers, is to persuade the American people that their national policies should be based on "those higher loyalties . . . which do not find expression at present in our national policy."

It would take a profound degree of such loyalty, he predicts, to persuade Americans to invest as much in the world peace effort as they invest, for instance, in national defense. And it would take even a more profound degree

of such loyalty to persuade the American people that the only return for their \$15,000,000,000 annual investment would be intangible--a greater supply of oxygen, let's say, to nurture the flickering flame of world peace.

Yet Dr. Szilard advances his case without batting a professorial eyelash, because, with his physicist's propensity for hard figures, he perceives that only a miracle can save the world, and accepts a colleague's definition of a miracle as "an event which has a probability of less than 10 per cent."

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The enclosed address was made to the Foreign Policy Association at Cincinnati on the 13th of January, 1947. The Cincinnati Enquirer, which co-sponsored the meeting, naturally reported in extenso, and this is of no further interest.

More interesting is the reaction of the Times-Star, which is owned by the family of Robert Taft and which is on the farthest right of the Cincinnati papers. This paper published the following editorial:

"INCENTIVE OR PUNISHMENT?"

"The Foreign Policy Association forum on atomic energy is a witness to the anxiety of scientists to control the deadly force which, for what seemed adequate reasons, they loosed upon the world. Monday night's meeting brought here two eminent and very much worried scientists, Professors Thorfin Hogness and Leo Szilard, of the University of Chicago.

Dr. Szilard, who brought to President Roosevelt the proposals that led to establishment of the Manhattan Project, has a novel plan for control. He believes that the UN cannot hope to restrain atomic aggression through fear of punishment. No world police force today could subdue either of the two most powerful nations, the United States and Soviet Russia, short of a general war. Instead, he advocates restraining aggression through incentives, such as participation in a world economic community to meet the basic needs of all peoples. The United States, as the richest power, would be expected to contribute the most to this set-up.

The obvious retort to this suggestion, that it would be an attempt to buy peace, does less than justice to Dr. Szilard's thinking. He does not propose to bribe any nation, but to relieve international fears and suspicions, based on economic lacks, through a broad scheme for world prosperity.

There is, unfortunately, a larger objection to the plan. It rests upon a conviction that wars are planned and started only by "have-not" nations. There are too many cases in history in which this was not true. Though national leaders may talk about being "have-nots", recent wars have been due much more to ideologies than shortages.

Russia today is clearly the chief obstacle to world atomic control. Yet Russia is potentially richer even than the United States. Either because her leaders want to spread Communism like a materialistic gospel or because they can see security only in a communized world, Russia today seems to have her own plan of world economy.

It is, to put it mildly, hard to imagine a country which now strenuously opposes punishment of atomic control violators, embracing a world economic scheme, financed chiefly by the United States, to relieve the needs of backward nations."

September 20, 1949

D-5

Notes to Thucydides' history of the
Peloponnesian War

Simons
Griffis
Adler

It is just a week ago that I read Thucydides away from town on vacation in the mountains. I was very much impressed and also I was considerably frightened. For this is what I said to myself: neither Sparta nor Athens wanted war, yet they went to war with each other. They fought a terrible war which lasted for 30 years. If this happened to Sparta and Athens, what then are ^{our} the chances that Russia and the United States can avoid war in a situation which is so very much alike to theirs?

[I do not mean to say of course that either the United States or Russia resemble Athens or Sparta. In many respects these Greek city-states were politically more mature. Their political systems were better adapted to the conditions of their days than are the political systems of the United States and Russia adapted to present day conditions.

In many respects both Sparta and Athens were much more democratic than are Russia or the United States. Foreign policy decisions were reached in these Greek cities in public discussions. The people not only approved by majority vote the ~~MA~~ foreign policy decisions but they also understood these decisions.

What is so ^{vers} similar is not the internal organization of the Greek city-states on the one hand and of Russia or the United States on the other; what is so ^(same) similar is the situation in which Sparta versus Athens found themselves 400 years B.C. and the situation in which the United States versus Russia find themselves today.]

Sparta and Athens did not want to go to war but both looked upon war between themselves as a possibility which could not be disregarded. Therefore each one felt impelled to take steps which would make it more likely that it should win the war if war came. Every such step which Sparta took to improve her chances in case of war and every such step which Athens took to improve her chances in case of war, was of necessity a step which made war more likely to occur. Finally the time came when

reluctantly and
 Sparta ~~regretfully~~ decided that war was inevitable; that it had better set a date for it and prepare in earnest against the day. ~~The date set was not a very close one; rather it was a fairly distant date.~~

When Sparta arrived at this fateful decision, it did not break ^{off} diplomatic relations with Athens. It kept on sending delegations to Athens, addressing to Athens exhortations. The last of these exhortations was the simplest and the most sweeping of all: "Sparta desires to maintain peace", it said, "and peace there may be if Athens will restore independence to the Hellenes". These exhortations sound to me exactly like the exhortations which we are addressing these days to Russia.

When the Peloponnesian War finally started, it did not start as a war between Sparta and Athens. It started as a war between an ally of Sparta and an ally of Athens. Albania is an ally of Russia. Just a week ago or so one of our allies ^(The present part of Greece) threatened to attack Albania.

By what right do we assume that we have a better chance of escaping war than had these Greek city-states? Admittedly the present leadership of the United States is not too bad; certainly it could be much worse. And the Russian leadership undoubtedly could be ~~much~~ worse also. But what about the leadership of Sparta and Athens? Can we seriously say that Mr. Truman is a better man than was Pericles, or that the Kremlin can be expected to show more wisdom than did the leaders of Sparta?

What I am trying to say is not that war between Russia and the United States is inevitable but rather ^{some new element!} that some element that was absent in Greece, will have to enter into the picture or else history is going to repeat itself. As long as we ^{think} ~~consider it~~ ^(this) more important to ^{improve the} have the best possible chance of winning the war, if there is one, than to ^{improve} diminish the chance that ^{we shall avoid} there will be a war, we will move along the same path as did Sparta and Athens.

It is easy enough to understand what made Sparta and Athens act the way they did. They acted as one hundred per cent patriots must act. One hundred per cent

patriotism was considered a virtue in Greece, and maybe at that time it had its usefulness. But ^{same} ~~many~~ things have changed in these last two thousand years. The ~~fastest~~ ^{It took the longest} courier ~~took~~ longer to get from Sparta to Athens than it takes the slowest plane to ~~fly~~ ^{fly} from London to Moscow today. The Peloponnesian war was fought with bows and arrows -- our war will be fought with atomic bombs. One hundred per cent patriotism in the twentieth century is not a virtue, but a crime, and as long as we ~~shall~~ ^{shall} consider it a virtue we shall live in mortal danger from here on.

There are other things which have changed in the last two thousand years. We cannot say that there was an evolution in the human race. As human beings we may not be superior to the Greeks, but something happened nevertheless. Something happened when Christ was born. The Gods of the Greeks resided in Greece, on Mount Olympus; our God does not reside on Pike's Peak in the United States of America.

Is this relevant? I hesitate to say. For our policies are shaped by statesmen and statesmen do not commune very much with God. Occasionally they ^{do} speak of him and undoubtedly they consider themselves as Christians. [But suppose that a neighboring planet were equipped with a powerful telescope and the scholars of that planet could visually observe every move and action of our statesmen without being able to hear what they are saying. Would these scholars find any evidence indicating that our statesmen are Christians?] Our statesmen say that they have sympathy for the Russian people. The poor Russians, they say, are captives of their government. But our statesmen think that their sole responsibility is to the American people for the Russians are, after all, foreigners. Do they really think that God considers them as foreigners?

It seems to me that as long as we look upon one hundred per cent patriotism as a virtue and permit our statesmen to act accordingly, we shall not be able to do any better than did Athens and Sparta. Because wars have become worse, we shall probably do worse.

You may ask: why blame the statesmen -- why not blame the people. In America at least, you may say, it is the people who determine policy. In a sense they do and in a sense they do not. The people in Greece had more influence on the shaping of foreign policy than the people have today. I know what I am talking about for I am one of the people. How can I influence the shaping of our policy when I cannot even find out what our policy is? I can see that we are building up an alliance in Western Europe, but I can also see that this alliance must of necessity break to pieces as we move toward the time when the Russians will be prepared to hurl atomic bombs, mounted on rockets, at Paris, Amsterdam, Brussels and London, and when that time comes we shall be unable to protect these cities. What then is the purpose of building up these alliances? Or have we like Sparta made up our minds that there will be war and have we set a date for it? Have we decided that there shall be war before our allies will be at the mercy of Russia?

I am raising these questions; the answers I do not know. Our Secretary of State, Mr. Acheson, strikes me as a reasonable man; a man of intelligence and goodwill. I assume that he must have a policy that may make sense, but I am damned if I know what it is.

I, as one of the people, am asked if I am in favor of the Marshall plan, and I say that I am. I am asked if I am in favor of the Atlantic Pact, and I say that I am. But all this time I know that I am being asked the wrong questions.

For this is a question our statesmen ought to put before the American people: The United States could adopt a generous -- yes, a magnanimous -- policy towards Russia. that will offer a chance to peace. explain But if ~~she~~ ^{we} does so ~~she~~ ^{we} will take a risk. For if such a magnanimous policy is adopted and fails, and if then there is a war we shall be less certain of winning that war than if we played the game close to our chest. Are the American people willing to take a lessened chance of winning the war, if more cannot ~~there is a war~~, for the sake of having a chance of winning peace?



Handwritten notes and scribbles:
 A large, dense scribble of blue ink at the bottom of the page, possibly containing the words "and peace" and "Progress".

The Russian government ought to put the same question to the Russian people.

No one has the right to say in advance what answer the American people, what answer the Russian people, might give to this question once they properly understand it. For all we know they might very well give the wrong answer. If they did, then the statesmen would have a clear mandate for acting out their part in this Greek Tragedy; then the statesmen would have a clear mandate with flags waiving to lead us down the road to destruction.

But first the statesmen ought to declare a moratorium in foreign policy, until every American and every Russian has had a chance to read the story of the Peloponnesian war.

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Statement for Mr. Morgensfern by Leo Szilard, September 23, 1949

The question how long it will take Russia to make an atomic bomb was the subject of a public controversy at the time of the congressional hearings on the atomic energy legislation. At that time the scientists went on record with surprising unanimity, saying that it should take Russia less than five years to make an atomic bomb. This estimate was based on the knowledge that it took us two and a half years --- from the ^{late} fall of 1942 when our serious effort started to August, 1945, when the bomb was dropped on Hiroshima --- to make the first bomb and we thought that the Russians might take twice as long perhaps but hardly any longer.

General Leslie R. Groves went on record with an estimate of 15 to 20 years and Dr. J. B. Conant, president of Harvard, who guided the wartime development of atomic energy in the OSRD, thought that ~~the~~ Russia would take 15 years.

Russia had, it seems, gotten the bomb one year earlier than most of the scientists thought she would. It is gratifying that the scientists, at least, were not guilty of grossly underestimating their Russian colleagues. But even though there may be some small consolation ^{this and in} in/being able to say, "I told you so," the situation which faces all of us is pretty grim.

We just recently ratified the Atlantic Pact, which we concluded lest western Europe should be at the mercy of Russia. When Russia will have atomic bombs in quantity in the near future and either rockets or other suitable means to deliver these bombs anywhere in western Europe in case of war, when the people in Europe will realize that Paris, Brussels, Amsterdam, and London will be gone 24 hours after war breaks out, and that there is nothing that American can do to prevent the destruction of those cities, will they then still wish to retain the Atlantic Pact? Have we not reached a stage of development when nations will of necessity be at the mercy of each other?

In these last two years we sought safety for ourselves and for our friends by putting our trust in the atomic bomb. In what are we going to put our trust now?

Revised

~~7/12/03 LS to Stevenson~~

~~6/29/49 LS to MacMahon~~

~~" " " Teller~~

~~" " " Gordon Dean~~

Statement for Mr. Wenzel by LS 9/23/49

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For the Discussion

To me it seems that the situation which has arisen between Russia and the United at the end of the last war is very much like the situation which existed between ~~Greece~~ ^{Vostok} and Athens in the 5th century before Christ. Sparta and Athens did not want to go to war with each other. ~~and~~ ^{and y} yet 15 years after they had concluded a peace treaty ~~with each other~~ they were at war, and their war lasted for 30 years.

What were the causes of that war? Should we believe the statesmen ^{in of} Athens or ~~should we believe~~ the statesmen ~~of~~ Sparta? Clearly we should believe neither. Rather ~~Thucydides wrote~~ / ~~We should~~ should believe Thucydides who wrote the history of that war and who tells us that the real reasons for that war were the fact that Athens' growing power threatened the security of Sparta.

~~I believe that the present difficulties between Russia and the United States are in no way different from the difficulties that arose between Sparta and Athens.~~ ^{war similar in origin.} It is true that the United States is a democracy and that Russia is a dictatorship. ~~It is true that is perhaps even more essential that we enjoy a freedom~~ ^{and more important} guaranteed by a Bill of Rights which is absent in Russia. ~~But it is my conviction~~ that these differences between the two countries, great though they are, are not the real cause of our difficulties. ^{that neither} I believe Russia and America ~~do not want~~ ~~to go to~~ war ~~with~~ each other. ~~If nevertheless there should be war it will come because Russia and America~~ ~~may manoeuvre themselves into a situation~~ ~~which they cannot extricate themselves~~ ^{the men is common} which does not leave them any other alternative. This can easily happen if we do not ~~watch out.~~ ^{There is no change of policy in the near future.}

This at least is my analysis of the situation. I know that Professor Urey here thinks otherwise. I believe he thinks that Russia is bent on world domination -- that there is no use making any treaties with Russia because she would not keep them. He thinks that if it was impossible to arrive at any agreements with Russia since the war the responsibility for that must be laid mostly, if not solely, at the doorstep of Russia. Professor Urey and I thus start this discussion with different premises, and therefore of necessity we must come to different conclusions.

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It seems to me that the situation that faces us is pretty grim. You might say that ~~after all~~ ^{all along} we had expected the Russians to get the bomb sooner or later and we had planned for it. That we expected them to get the bomb might be true, but that we planned for it is not true. It seems to me it is better to admit that we are in a difficult position and it might be of some value to remember how we got ourselves into ^{the} ~~this~~ position ⁱⁿ ~~in~~ ^{which we found ourselves.}

During the war while we worked on the bomb, we ~~scientists~~ ^{thought for} a while that we were in a neck-to-neck race with the Germans, and that getting the bomb first might ^{make the difference between} ~~mean~~ winning or losing the war. But when Germany was defeated ~~and~~ the time approached when our first bomb was ready to be tested, many of us became uneasy about ~~how the existence of the bomb would affect the~~ the proposed use of the bomb in the war with Japan. Many of us were uneasy about how the existence of the bomb would affect the position of the United States after the war.

After President Roosevelt's death ^{and} six weeks before the bomb was tested in New Mexico I tried to reach the White House and called upon Mr. Byrnes. There were three of us who went to see Byrnes, ^{and} Dr. Urey, was one of us. Byrnes was not at that time Secretary of State but he knew of the bomb and had given some thought to ~~maintain~~ ^{the} the ensuing problems of foreign policy. The question of whether the bomb ~~should~~ should be used in the war against Japan ~~naturally~~ came up for discussion. Mr. Byrnes ~~is a~~ ^{is a} sincere man by nature. He did not argue that it was necessary to use the bomb against the cities of Japan in order to win that war. He knew at that time, as the rest of the government knew, that Japan was essentially defeated and that we could win the war ~~without an invasion~~ ^{for} just by sitting tight another six months.

At that time Mr. Byrnes was already much concerned, ~~as we were all~~ ^{con-} ~~cerned~~ ^{cerned} about the spreading of Russian influence in Europe. Rumania, Bulgaria, Jugo-Slavia, Czecho-Slovakia and Hungary were all living under the shadow cast by Russia. When our visit with Mr. Byrnes was over it was clear to me that he thought that our possessing and demonstrating the bomb would make Russia and Europe more manageable. ~~When a few weeks later I learned that Mr. Byrnes had become Secretary~~

(2)

~~of State that news frightened me~~ I could not imagine any premise more false or disastrous upon which to base a foreign policy, and I was dismayed when a few weeks later Mr. Byrnes was appointed Secretary of State.

On my return to Chicago
When I returned to Chicago, sixty-three of us scientists sent a petition to the President asking him to withhold his approval from the use of the bomb against the cities of Japan. Our attitude was by no means shared by all scientists. There was another group of scientists, centering on Los Alamos under the leadership of Dr. Oppenheimer, who had no objection to the use of the bomb against Japan but laid emphasis on fully informing the Russians of our intentions before we dropped the bomb. This view was shared by Secretary Stimson who urged President Truman to inform Marshall Stalin at Potsdam of our *plan to* impending use of the bomb.

Mr. Byrnes relates in his book, "Speaking Frankly", how President Truman made an attempt at Potsdam to tell Stalin about the bomb. Stalin happened to be engrossed at that moment in discussing Russian transportation problems and double-track railroads. He did not show any particular interest when he was told that we had a very powerful bomb which we proposed to use against Japan, and so Mr. Truman dropped the matter. One could hardly say that the attempt to inform Mr. Stalin was a very vigorous one. Mr. Truman did not say, "Excuse me, Mr. Stalin, but you do not seem to understand that I am not speaking of just another bomb. I am speaking of something that will get Russia and the United States into the greatest difficulties after the war unless we find a solution to our problem". So the bomb was dropped at Hiroshima and caught the Russians by surprise.

With the ending of the war Russia and America had lost their common enemy. The Potsdam conference and the year that followed were crucial for determining the pattern of future Russian-American relations. The pattern set was most unfortunate.

ended
When the war ended the question of how long it would take Russia to have a bomb was a matter of public controversy. Hearings were held in Congress on atomic energy legislation and at that time many scientists went on record saying that it would take Russia less than five years to get the first bomb. This estimate was based on the knowledge that it had taken us 2-1/2 years from the start of our large

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scale effort in the late fall of 1942 until the first bomb was tested in New Mexico in July 1945. We thought the Russians might be a little slower but we did not see how they could possibly be more than twice as slow. So we arrived at an estimate of five years.] The issue was both important and highly controversial. The estimate of General Groves, who headed the Manhattan District of the War Department, was fifteen to twenty years, and Dr. Conant, President of Harvard, who was in charge of this work ~~on behalf of the United States government in the somewhat~~ ^{in Washington in} earlier stages, gave an estimate of fifteen years. Actually it took the Russians four years to get the first bomb after they learned of our use of the bomb at Hiroshima.

To me it was always a matter of great regret that the estimate which was given by those scientists who were actively engaged in this matter ~~with surprising unanimity~~ was not taken more seriously, and that it had apparently very little influence on the shaping of our foreign policy.

This being a democracy the people are supposed to have some influence on foreign policy, and in one sense they do have an influence but in another they don't. Take myself, for instance, I am one of the people and I am asked if I am in favor of the Marshall Plan, and I say that I am; or I am asked if I am in favor of the Atlantic Pact, and I say that I am. But all this time I know that I am being asked the wrong questions.

How can I influence the shaping of our foreign policy when I cannot ^{even} find out what our foreign policy is? I can see that we are building up an alliance in Western Europe but I can also see that this alliance must of necessity break to pieces as we move toward the time when the Russians will be in a position to hurl atomic bombs in case of war at Paris, Amsterdam, Brussels and London, and that when that time comes we shall be unable to protect these cities. What then is the purpose of building up these alliances?

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To me it was always a matter of great regret that the estimate given by the scientists who were actively engaged in developing atomic energy during the war was not taken more seriously by those responsible for the shaping of our foreign policy. There are thoughtful men not only among scientists but in all walks of life, but it is not easy for the voice of wisdom to penetrate behind the closed doors of the State Department. Mr. Byrnes was followed by General Marshall as Secretary of State. By the time he took office the pattern was set. The Marshall Plan and the Atlantic Pact were necessary consequences of the policy initiated by Byrnes. The

~~majority~~ ^{now} of the American people ~~was~~ ^{were} in favor of the Marshall Plan and ~~was~~ in favor of the Atlantic Pact. I as an individual was in favor of the Marshall Plan and was in favor of the Atlantic Pact.

But if you ask me whether the Atlantic Pact will lead to peace I must say I do not believe so. — I am not even sure that the Atlantic Pact can survive more than one or two years when the Russians are in a position to threaten the cities of Europe with atomic bombs. — I am not sure that the cities of Europe will be able to withstand the cities of Europe with destruction in case of war. —

instant

I am raising these questions; the answers I do not know. Our Secretary of State, Mr. Acheson, strikes me as a reasonable man, a man of intelligence and goodwill, and I would like to assume that he has a policy that may make sense. Maybe he has such a policy but I am damned if I know what it is. XXXX XX

You may say to me -- if you are so critical of what others do, why don't you tell us how to do it better? To this I answer that I would love to tell you how to do it better but I cannot tell you in one-half hour or the small fraction of one-half hour allotted to me on this program. If you want me to, I can give you a facetious solution which may be foolish but hardly as foolish as what we are actually doing.

This is then what I would propose half as a joke and half in earnest. Let us offer three billion dollars yearly to Western Europe on condition that they spend a good share of this on armaments. Let them then go to Russia and say this: "We in Western Europe are building up a defense position. We wish to be neutral. If the United States should make war on you, they will not be permitted to go through our country. We have an army and we are going to fight them."

If this were done, Russia would have no interest in occupying Western Europe if there is a war or ⁱⁿ ~~any~~ anticipation of a war. With Western Europe neutralized, we would have solved this problem and we would have removed a large fraction of the trouble which may lead to war between the United States and Russia. It may sound funny that we should give Western Europe financial support for the purpose of enabling them to fight us, and in a sense it is funny. Yet I am throwing this out as a challenge but I suppose it illustrates an aspect of the situation which will be an essential element from here on in the general picture.

The headlines say, "Russia has the bomb." Where does this leave us? Clearly we are in a difficult position, and it might be of some value to remember how we got ourselves into this position.

During the war while we worked on the bomb, we scientists thought for a while that we were in a neck-to-neck race with the Germans, and that getting the bomb first might make the difference between winning or losing the war. But when Germany was defeated many of us became uneasy about the proposed use of the bomb in the war with Japan. Many of us were uneasy about how the existence of the bomb would affect the position of the United States after the war.

After President Roosevelt's death and six weeks before the bomb was tested in New Mexico, I tried to reach the White House and was directed to call upon Mr. Byrnes. There were three of us who went to see him, and H. C. Urey was one of us. Byrnes was not at that time Secretary of State, but he knew of the bomb and had given some thought to problems of foreign policy. The question of whether the bomb should be used in the war against Japan came up for discussion. Mr. Byrnes did not argue that it was necessary to use the bomb against the cities of Japan in order to win the war. He knew at that time, as the rest of the Government knew, that Japan was essentially defeated and that we could win the war in another six months. At that time Mr. Byrnes was much concerned about the spreading of Russian influence in Europe; Rumania, Bulgaria, Yugoslavia, Czechoslovakia, and Hungary were all living under a shadow cast by Russia. Mr. Byrnes' concern about Russia I fully shared, but his view that our possessing and demonstrating the bomb would make Russia more managable in Europe I was not able to ^{share} accept. Indeed I could hardly imagine any premise more false or disastrous upon which to base our policy, and I was dismayed when a few weeks later ^{I learned that he} ~~he was appointed~~ Secretary of State.

On my return to the ~~University~~^{University} of Chicago 63 of us scientists sent a petition to the President. We asked him not to set a precedent for the use of atomic energy for purposes of destruction by approving the military use of the bomb against the cities of Japan. Our attitude was by no means shared by all scientists. There was another group of scientists, centering on Los Alamos under the leadership of ~~Dr.~~^{Dr.} Oppenheimer, who had no objection to the use of the bomb against Japan but laid much emphasis on informing the Russians of our intentions before we dropped the bomb. This view was fully shared by Secretary Stimson, who urged President Truman to inform Marshall Stalin at Potsdam of our plan to use the bomb.

Mr. Byrnes relates in his book, Speaking Frankly, how President Truman made an attempt at Potsdam to tell Stalin about the bomb. Stalin happened to be engrossed at that moment in discussing Russian transportation problems and double-track railroads. He did not show any particular interest when he was told that we had a very powerful new bomb which we proposed to use against Japan, and so President Truman dropped the matter. One could hardly say that the attempt to inform Stalin was a very vigorous one. Mr. Truman did not say, "Excuse me, Mr. Stalin, but you do not seem to understand. I am not speaking of just another bomb; I am speaking of something that will get Russia and the United States into the greatest difficulties after the war unless we find a solution to the problem which it poses." Mr. Truman said nothing of the sort. So the bomb was dropped ~~in~~^{on} Hiroshima and caught the Russians by surprise. "We have gambled two billion dollars and won," said the President's statement announcing the bombing of Hiroshima.

With the ending of the war, Russia and America lost their common enemy. The Potsdam conference and the year that followed were crucial for determining the pattern of future Russian-American relations. The pattern set was most unfortunate. "Patience and firmness" was the slogan. "Containment of Russia" was the policy.

Mr. Byrnes was followed by General Marshall as Secretary of State. By the time he took office, the pattern was frozen. In a sense, the Marshall Plan and the Atlantic pact were necessary consequences of the policy initiated by Byrnes.

This is not the place to discuss whether our policy was good or bad--and, anyway, the terms "good" and "bad" may be the wrong terms to use--but who can doubt that this policy is totally inadequate to cope with the problem which now confronts the world?

Harrison Brown, 1946, "Must Destruction Be Our Destiny"

*Harrison Brown
Schenectady
N.Y.*

"All of us must recognize that in another three years the United States of America may not stand alone as a possessor of atomic bombs." page 26.

~~September, 1945~~

Statement of the Atomic Scientists of the University of Chicago,

September, 1945.

~~Standing with the knowledge~~

"It took the Anglo-Americans three years to achieve the transformation from the laboratory to the plant scale. Working with the knowledge that this transformation has actually been achieved, even those nations with lesser resources than those of the United States will be able to produce atomic bombs within two to five years."

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[From Late Editions of Yesterday's Times.]

10-YEAR EDGE SEEN FOR U. S. ON A-BOMB

Gen. Walter Bedell Smith Says Russians Need That Long for Mass Production

Soviet Russia will need at least ten years to mass-produce atom bombs on the scale now existing in the United States, it was said last night by Lieut. Gen. Walter Bedell Smith, commanding general of the First Army and former Ambassador to the Soviet Union.

General Smith said Russian possession of the atom bomb should have caused no surprise in this country. He recalled that Vyacheslav M. Molotov, Deputy Premier of the Soviet Union, had told a meeting of top Soviet leaders in Moscow eighteen months ago that "the atom bomb was no longer a secret." The First Army commander addressed 400 reserve officers of all services at their annual meeting at Essex House.

Despite Soviet possession of the bomb, he said, American industrial production and war potential are still so great as to make aggressive war by Russia an unprofitable gamble.

Aid by Others Is Cited

"When Mr. Molotov made his declaration in Moscow, it was reasonable for us to suppose that Russia had solved the problem of nuclear fission, at least in the laboratory," General Smith said. "They had German scientists working in the Soviet. Regrettably, one must admit that they also had certain sources in the Western Hemisphere, as the Canadian spy trials so clearly demonstrated.

"Since Soviet science is the equal of any in the world, there was no reason to assume that its possession of the atom bomb would be long delayed," he said a month ago at the Governors Conference in Colorado that they would probably test the bomb in a few months.

"However, I believe that it will take Soviet Russia at least ten years to get to the point of mass-production that we have now reached. I know that American techniques and industrial skills are far better than the best the Soviet can offer. There is no reason for the Soviet to reach, in less than ten years, the mass-production that we have reached now."

Difference in Concepts Seen

In 1946, General Smith said, the United States had learned that the Soviet Union "was turning its back on our concept of world peace."

"The American people go to war like a man getting up on a cold morning to empty the garbage can," he remarked. "It's a damned unpleasant duty. Regrettably, other nations do not have the same concept of war that we have. They have read Von Clausewitz, and they believe that war is merely politics transferred to another sphere. Soviet Russia began maneuvering for a good post-war position even before it was sure that it was going to win the last one."

Since the war, the general said, the Soviet Union had acquired far more territory than the Red armies had conquered in battle. With Russian power now stretching from mid-Europe to mid-Asia, he said only strong opposition would check their "dynamic expansionism." This opposition, he added, was contained in the Atlantic pact and American pledges of aid to its Western neighbors.

"There are not more than 60,000 or 70,000 Communist party members in the United States and unfortunately half of them are in the First Army area," he continued. "Their thousands and thousands of followers constitute a far greater danger than the party members."

Opposition in Unions Noted

"We see a strong feeling in all ranks, and in labor particularly, that the Communist minority must not be permitted to seize control of key unions. Recently we have seen the struggle in the United Electrical Workers Union, where the non-Communist elements were defeated. The issue now lies between the CIO and what you might call the rebellious element. Phillip Murray, head of the CIO, is an anti-Communist and thoroughly democratic.

"Large industrialists in other countries, notably Switzerland, are following a short-sighted policy with the Communists. One of the largest industrialists in Switzerland is one of the heaviest contributors to the Communist party war chest. Of course they avoid labor trouble now, but they will be the first to be swallowed up if the Communists gain power."

General Smith said he could not agree with the Soviet Union's expectation that economic collapse in the capitalistic countries was inevitable. Having tried and failed to achieve peace through weakness, he said, the Western world would now try for peace through strength.

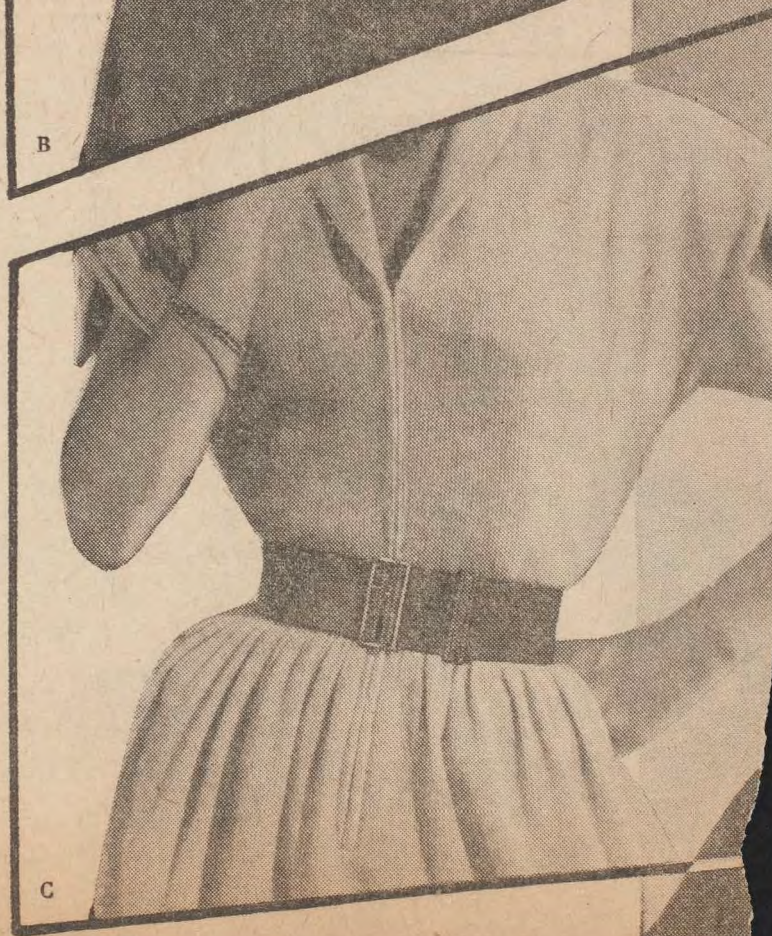
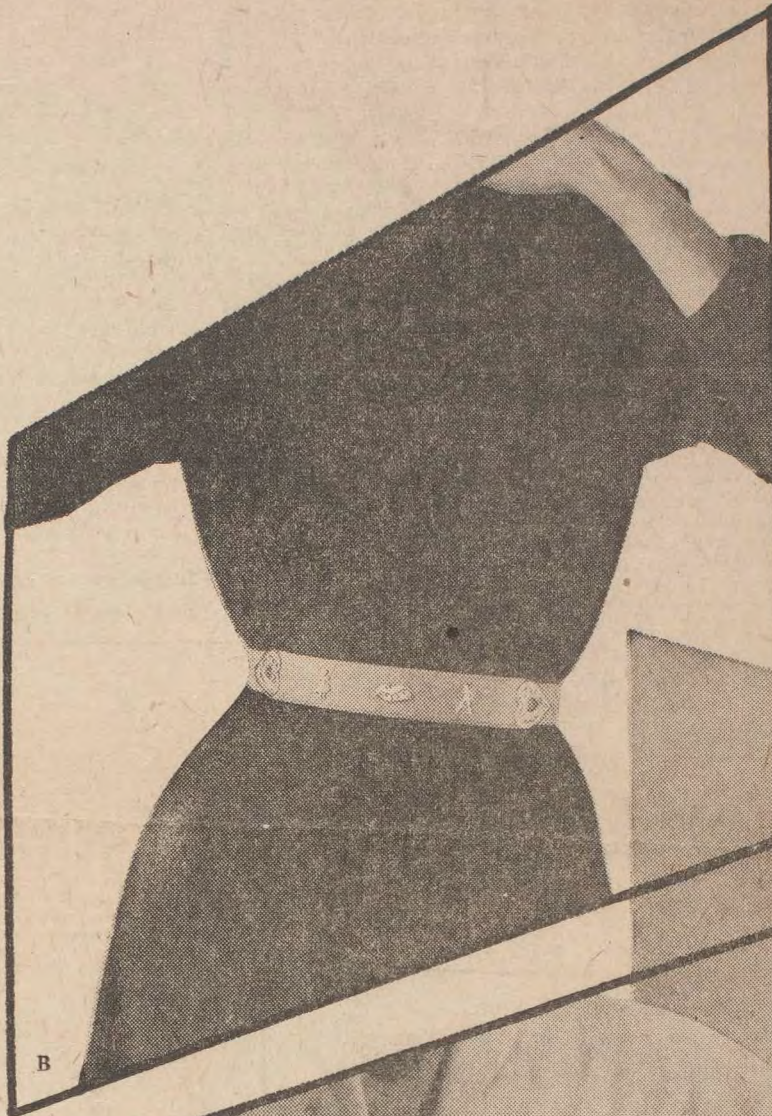
Other speakers at the meeting included Col. Walter E. Hopper Jr., ORC, state president of the Reserve Officers Association; Rear Admiral Carl Holden, commandant of the New York Naval Shipyard, and Brig. Gen. Wendell Westover, executive for reserve affairs on the Army special staff. High-ranking officers of the Navy, Army and Air Force attended the meeting.

BUTTERWORTH CHOICE CONFIRMED BY SENATE

WASHINGTON, Sept. 27 (AP)—The Senate overrode Republican criticism of the Administration's China policies today to confirm, by 49 to 27, the appointment of W. Walton Butterworth as Assistant Secretary of State.

The vote came after Senator Styles Bridges, Republican, of New Hampshire, told his colleagues that approval of the nomination would add up to an endorsement of "the complete failure of American diplomacy in China."

He said he had no personal objections to Mr. Butterworth, but that the appointee, as head of the State Department's Far Eastern Division, had become a "symbol" of unsuccessful American policies in China.



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The New York Times of September 26, 1949, quotes General Walter Bedell Smith, former ambassador to the Soviet Union, speaking of Russia's production of atomic bombs as follows:

"I said a month ago at the Governors Conference in Colorado that they would probably test the bomb in a few months.

"However, I believe that it will take Soviet Russia at least ten years to get to the point of mass-production that we have now reached. I know that American techniques and industrial skills are far better than the best the Soviet can offer. There is no reason for the Soviet to reach, in less than ten years, the mass-production that we have reached now."

We, the undersigned, are aware of the problems involved in the ^{large-scale} production of atomic bombs. To our regret, we have to say that the above statement, attributed by the New York Times, to General Bedell Smith, has no basis in fact.

September 29, 1949

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September 29, 1949

Footnote to be put at the end of Round Table Discussion

If 50 tons of neutrons are absorbed by a natural element which is transformed into a radioactive element that emits between one and two gamma rays per disintegration having an energy between one and two million volts, and if the radioactive substance produced is uniformly dispersed over the surface of the earth, then a person who is exposed to the gamma rays will receive an X-Ray dose of the order of 10,000 r units by the time the radioactivity decays. If an X-Ray dose is given within a short period of time, 1000 r would be lethal; but if the dose is given over a period of years, a larger dose is required for killing.

Fifty tons of neutrons should be produced if about 500 tons of heavy hydrogen is actually "burned." Since not all the neutrons emitted will necessarily be captured in the natural element which is incorporated in the bomb and since not all the heavy hydrogen in the bomb need necessarily be "burned" in the explosion, the actual amount of heavy hydrogen that has to be accumulated might be considerably larger than 500 tons.

If ten thousand tons of heavy hydrogen were required, such an amount could be accumulated over a period of ten years without an appreciable strain on the economy of a country like the United States. The quantity of the natural element which has to be incorporated into the bomb in order to capture the neutrons will, however, increase correspondingly with the quantity of heavy hydrogen contained in the bombs. And if we have to incorporate roughly one atom of the natural element for each atom of heavy hydrogen, there might be limitations on the raw material side for some of the longer-lived radioactive elements.

--Leo Szilard

Footnote to be put at the end of Round Table Discussion

If 50 tons of neutrons are absorbed by a natural element which is transformed into a radioactive element that emits between one and two gamma rays per disintegration having an energy between one and two million volts, and if the radioactivity substance produced is uniformly dispersed over the surface of the earth, then a person who is exposed to the gamma rays will receive an X-ray dose of the order of 10,000 r units by the time the radioactivity decays. If an X-ray dose is given within a short period of time, 1000 r would be lethal; but if the dose is given over a period of years, a larger dose is required for killing.

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--Leo Szilard