

A MAGAZINE FOR SCIENCE AND PUBLIC AFFAIRS

Bulletin of the Atomic Scientists

VOLUME XI • NUMBER 8
OCTOBER • 1955
PRICE FIFTY CENTS

p. 297

U.N. CONFERENCE ON ATOMIC ENERGY

Geneva, August 8-20, 1955

Leo Szilard: Disarmament and the Problem of Peace

BULLETIN OF THE ATOMIC SCIENTISTS

Founded in 1945 by
Hyman H. Goldsmith and
Eugene Rabinowitch

"It is our solemn obligation, I think, to lift our eyes above the lesser problems that seem to monopolize our time and to discuss and act upon what, by any standard, is the supreme problem before our country and the world."—SENATOR BRIEN McMAHON

EDITORIAL BOARD:

Editor: Eugene Rabinowitch

Associate Editor: Mrs. Alan Simpson

Members: John Simpson
Edward Shils
T. H. Davies
Richard Meier
Alexander Langsdorf, Jr.

Assistant Editors: Eunice Gram
Ruth Adams

Art Editor: Martyl

Washington Editor: Clifford Grobstein

BOARD OF DIRECTORS EDUCATIONAL FOUNDATION FOR NUCLEAR SCIENCE:

Peter Axel
Alexander Langsdorf, Jr.
Donald H. Miller, Jr.
Eugene Rabinowitch
Edward Shils
John Simpson

Legal Counsel: Walter J. Blum

BOARD OF SPONSORS:

J. Robert Oppenheimer, *Chairman*
Harold C. Urey, *Vice-Chairman*

H. A. Bethe
Detlev W. Bronk
A. H. Compton
E. U. Condon
F. Daniels
L. A. DuBridge
James Franck
S. A. Goudsmit
T. R. Hogness
F. W. Loomis
Philip M. Morse
H. J. Muller
Linus Pauling
G. B. Pegram
I. I. Rabi
Julian Schwinger
Cyril S. Smith
Leo Szilard
Edward Teller
V. F. Weisskopf
Hugh C. Wolfe
Sewall Wright
J. H. Zacharias

Vol. XI

October 1955

No. 8

The Lesson of Geneva

Ralph E. Lapp 275

Sidelights on Geneva

Alice K. Smith 276

A Theoretical Physicist at the Geneva Conference

Victor Weisskopf 278

The Peaceful Uses of Atomic Energy

Homi J. Bhabha 280

The Future of Atomic Energy

Sir John Cockcroft 285

Japan and the H-Bomb

Herbert Passin 289

Sir Nuclear Fission

J. B. Priestley 293

The Scientific Method in Human Affairs: A Letter

 295

Disarmament and the Problem of Peace

Leo Szilard 297

Books

 309

News Roundup

 311

Bulletin of the Atomic Scientists. Published monthly (except during July and August) by the Educational Foundation for Nuclear Science, Inc., 5734 University Avenue, Chicago 37, Illinois. Entered at the Chicago, Illinois post office as second-class matter.

Editorial correspondence and manuscripts (in duplicate) should be sent to BULLETIN OF THE ATOMIC SCIENTISTS, 5734 University Avenue, Chicago 37, Illinois.

Advertising correspondence should be addressed to Advertising Manager, BULLETIN OF THE ATOMIC SCIENTISTS, 5734 University Avenue, Chicago 37, Illinois.

Subscription correspondence should be sent to the printer and distributor, The University of Chicago Press, 5750 Ellis Avenue, Chicago 37, Illinois. The Cambridge University Press, Bentley House, 200 Euston Road, London, N.W. 1, England, is an authorized agent for the British Commonwealth, except North America and Australasia.

Change of address. Subscribers are requested to notify the Press and their local postmaster in advance of change, giving both new and old addresses.

Subscription rates for U.S.A. and possessions: 1 year, \$5.00; 2 years, \$9.00; 3 years, \$12.50. Canada and Pan American Postal Union: 1 year, \$5.50; 2 years, \$10.00; 3 years, \$14.00. All other countries: 1 year, \$6.00; 2 years, \$11.00; 3 years, \$15.00.

Copyright 1955 by the Educational Foundation for Nuclear Science, Inc., Chicago 37, Illinois. The opinions expressed in the BULLETIN do not represent the official views of any organization. The BULLETIN is indexed in the *Readers' Guide to Periodical Literature* and in the *Bulletin of the Public Affairs Information Service*.

Disarmament and the Problem of Peace

LEO SZILARD

The role of Dr. Szilard in the early realization of the military potentialities of the discovery of atomic fission, his accomplishment, together with Fermi, of some of the fundamental experiments which had confirmed this prevision, and his initiative in bringing this possibility to the attention of the American government—thus stimulating the creation of our wartime atomic energy project—are a matter of history.¹ In addition to these proofs of a remarkable scientific and technological imagination, he has also been among the first—if not the first—to foresee—in more than a vague general form—the revolutionary consequences of the release of atomic energy for the future political developments in the world, and to try to bring them to the attention of the national administration² and the people.³

The failure of plans for the international control of atomic energy—in which Szilard put his early hopes—to come to fruition in the U.N. negotiations

did not cause him to cease thinking continually about the future of mankind in the atomic age, bringing into the scope of his thoughts also its great economic and demographic problems, nor from trying to find new, rational solutions to them—in the conviction that mankind cannot allow itself to solve them any more by the old ultimate means of war.

In the memorandum which we print here, Dr. Szilard has summarized once again his analysis of the situation, together with some of the proposals he had made before, and some new ones, as discussion material for a kind of international brain trust, which he hopes the nations will have sooner or later to bring together to put an end to the arms race and perpetual threat of war. It is easy to say that some of these proposals are unrealistic, or too cleverly contrived; but nobody can deny that they are ingenious, original, and stimulating.

THE Atomic Stalemate between the Soviet Union and America toward which we are now rapidly moving presents a new problem to the world. In the past foreign policies could be regarded as good if they prolonged the peace, i.e., if they lengthened the interval between wars. *And thus far that is all that any foreign policy has ever done.* But today it is not enough to *postpone* the war; instead we must somehow create a world that may remain perennially at peace.

No one man working alone is likely

¹ See "Letter from Einstein to President Roosevelt (8/2/39)" in *Report on the Atom* by Gordon Dean (Knopf, 1953), pp. 247-49.

² See "Atomic Bombs and the Postwar Position of the United States in the World-1945" (A memo from Szilard to Roosevelt, March 1945), *Bulletin*, III (December 1947), 351-53.

³ In Senate Hearings on Atomic Energy, December 1945. See *Bulletin*, I (December 24, 1945), 3.

to come up with an adequate analysis of all the problems involved. Moreover, it will take political and social inventions to evolve an organized world community that may remain indefinitely at peace. But real progress could, I believe, come rather fast if it were possible to gather—from among the several nations involved—men who would work as a team and, being free from governmental responsibilities, could experiment with ideas and explore the feasibility of various approaches without in any way committing their governments. There is room of course for more than just one such team to try their hands at the task.

I propose to discuss in this paper the narrower issues of disarmament and, in a very sketchy way, some general principles of a political settlement. Groping my way, I shall attempt to present one particular approach to these two related issues. It is difficult to describe such an approach in abstract terms and therefore I shall describe it in terms of specific measures.

Many of these measures may turn out to be inadequate upon further consideration and thus by suggesting them I may be merely raising questions in the form of assertions. But if, by any chance, I have succeeded in adopting the right approach, then the questions here raised are the right questions—at least this is what I should like to hope.

Underlying the particular approach here presented, is the assumption that it will be possible for the governments of the great powers to reach a meeting of the minds on just what kind of a world they would be willing to see in existence—say twenty-five or fifty years from now. What are the chances that this assumption is valid? How will the governments respond in the next few years to the threat of the hydrogen bomb that might force them to choose between an ordered world and a world in shambles? At this point, history does not provide us with a precedent upon which a reasoned prediction could be based and any *optimistic prediction* must therefore be based on

faith rather than on argument and proof.

There are perhaps a few hopeful signs. In the course of this current year the tone of governmental negotiations underwent a spectacular change. The shouting war has stopped, temporarily perhaps, but perhaps for good, and disarmament has ceased to be a "subversive" word. Yet, we are by no means moving in the direction of disarmament. President Eisenhower's proposal, for instance, that Russia and the United States conduct mutual aerial surveys has little to do with disarmament, but is rather aimed at giving the Strategic Air Force a few days notice of a surprise attack.

This unprecedented measure would relieve the Strategic Air Force from the apprehension of a sudden attack that must cause them serious concern in view of their special responsibilities. But if atomic war comes to the United States it is very unlikely that it will come as a sudden attack out of the clear sky. It is far more likely to come through a local conflict in which Russia and the United States line up on opposite sides and start using atomic weapons in tactical warfare. Only a far-reaching political settlement or the elimination of atomic weapons altogether could avert this danger. No political settlement is being seriously discussed today nor are we seriously trying to stop the race in arms designed for the waging of tactical atomic warfare. Yet, the very fact that it is now possible for statesmen to propose wholly unprecedented measures indicates perhaps that the lesson of the hydrogen bomb is beginning to sink in. *And once we are willing to adopt unprecedented measures we are rid of the greatest obstacle that stands in the way of finding an adequate answer to the problem of peace in the Atomic Stalemate.*

The Nature of the Stalemate

Just what do we mean by "Atomic Stalemate"? Such a stalemate will arise between the Strategic Air Forces of America and the Soviet Union in the near future, when America and the Soviet Union will be able to devastate each other with hydrogen bombs to the point where organized government may cease to exist. In this stalemate neither could knock out, by a surprise attack, the capacity of the other to retaliate, for, in the near future, America will be able to rely on intercontinental bombers which can refuel in air, and so will the Soviet Union; and

both will have a large number of airstrips dispersed throughout their own country. Thus there will be no real incentive for either nation to strike the first blow even if war were regarded as probably imminent. *And with no reason left to fear an attack, the Atomic Stalemate may acquire a certain degree of stability.*

Neither America nor the Soviet Union may have as yet gone far enough in dispersing their airfields to protect their Strategic Air Forces against a massive attack, but I am assuming here that this defect will be remedied in due time.

The Never-Never Land of the Stalemate

The Atomic Stalemate is coming about so fast, that few people have been able to adjust their thinking to it. *As will be seen once the stalemate has been reached, both America and the Soviet Union will be unconquerable, and from then on they may remain unconquerable forever.* Yet, even today thoughtful men continue to talk in terms of "Russia's war potential" and the "great strength which might accrue to Russia if the industrial development of China continues undisturbed," and in vague terms of "strength" in general. True enough, in the past one had always to keep in mind that the ultimate resolution of a political conflict might occur through war and that "strength" might determine who will be vanquished in that war. But today this kind of thinking is about to lose its validity forever. Only comparatively few people have, in this sense, grasped the significance of the hydrogen bomb, and even those of us who have grasped it will talk intelligently one day and another day we will lapse into our old habits of thought. What can we do to bring home to ourselves the need to operate with concepts that will be meaningful in the new setting of the Stalemate? I shall now try to take the reader into the "never-never-land" of the Stalemate and perform some mental gymnastics for the purpose of forcing him—and myself as well—to try to understand its real meaning.

We intend to talk here only about conduct guided by rational considerations, but conduct counseled by passions may easily masquerade as rational. Take, for instance, the following example:

It is generally believed that America would annihilate Russia in retaliation

for a Russian attack against American cities, and that such conduct would be rational on America's part. I consider a sudden unprovoked Russian attack against the cities of America as exceedingly unlikely but, for the sake of argument, we shall assume now that such an attack has occurred and that in one sudden single blow practically all of America's cities, and practically all of her essential production facilities have been obliterated. Now, it may be perfectly rational for America to threaten Russia with annihilation in order to deter Russia from attacking her, but after such an attack has occurred, would it then really be rational conduct on America's part to "annihilate" Russia? Would it not be more rational for America to say to Russia: "Our power to retaliate is undiminished and we could destroy you now. But we shall spare you on condition that you deliver to us half of the production of your industries for the rebuilding of our cities and of our production facilities." This, of course, is not what America would be likely to do, but this is what could be regarded as *rational conduct* on her part in such a situation.

I am stressing this for one purpose only, to caution the reader, and myself as well, about various other courses of action advocated which masquerade as rational, when in reality they are something quite different.

Right now we cannot even try to guess in what manner governments will actually conduct themselves after the onset of the stalemate. But we can analyze the various rules of conduct which the Soviet Union and America might conceivably adopt, and we can state the consequences of each rule on the assumption that the rules proclaimed would be actually followed. This, of course, might be an unwarranted assumption and thus the whole discussion here presented is moving on the borderline of fact and fiction.

Rules of Conduct in Never-Never Land

Since we are dealing with a quixotic situation, all our rules of conduct will be quixotic rules. If America adopts the rule of "all-out retaliation in kind" and proposes to hit Russia with all she has when one single bomb is dropped on one American city and if Russia adopts the same rule for herself, then we might have an all-out atomic catastrophe arising out of a lo-

cal war if either America or Russia start to use atomic weapons in tactical warfare and things go from bad to worse.

Suppose, however, America adopts the rule of bombing two Russian cities for every American city destroyed and suppose Russia adopts the same rule, are we then any better off? Such a rule may sound quite satisfying to "patriots" in both countries, and it need not lead to an atomic catastrophe quite as fast as the rule of "all-out retaliation in kind," but it can lead to an atomic catastrophe just the same if an atomic war gets started somehow, somewhere.

The Strategy of Rationed Demolition

Suppose now, for the sake of argument, that the Soviet Union and America decide, for some reason or other, to get rid of their military establishments—all of them except the Strategic Air Force and their bombs—could one of them in a conflict with the other rely on her Strategic Air Force for the protection of a territory within her sphere of interest? Under such circumstances, Russia and America could each take perhaps the following position: "We need not engage any longer in the kind of warfare in which people are killed in order to protect some area which we are committed to defend. We shall simply list all such areas, with a price tag attached to each one, and we shall specify that if Area No. 1, for instance, is invaded we shall demolish five medium-sized cities of the "enemy." If the "enemy" permits us to do this unopposed we shall name in advance the five cities to be destroyed and give each city one week's notice in order to permit their orderly evacuation. We shall expect the enemy to respond by bombing five medium-sized cities of our own and likewise to give us advance notice. If the enemy does not attack more of our cities than the war will end there.

The rule of conduct here implied reads: "Tolerate the destruction of one of your cities for each city you destroy" and it avoids the inherent instability of the rules cited before.

This strategy of rationed demolition might effectively protect Area No. 1, which is not locally defended, against a nation which may covet it, provided that the area is not worth the loss of five cities to that nation; and provided the defending nation would be really

willing, or would be believed to be willing, to sacrifice five cities of her own. Could America and the Soviet Union in certain circumstances adopt this strategy of rationed demolition and would each believe that the other would go through with her proclaimed intentions? And if a try were made would the other actually be willing to go through with it?

Who can tell, today, what Russia and the United States would or would not be prepared to do if they have to live for long with the Atomic Stalemate in the absence of a political settlement. And if there is a political settlement then we may never find out, which perhaps is just as well.



In all of our discussions so far we have only examined purely rational behavior and have not attempted even to guess what the actual behavior of the governments might be. Yet I believe that even from a discussion limited in this manner one can derive some points of general validity.

1. After the onset of the Atomic Stalemate neither America nor the Soviet Union need to fear an all-out attack by the other on her cities—coming, so to speak, out of a clear sky. As long as America and the Soviet Union (together with Great Britain) are the only powers in possession of atomic bombs, the stalemate can have a certain degree of stability.

2. After the onset of the Atomic Stalemate neither Russia nor America can be vanquished if they each adopt the proper strategy.

The United States has engaged in two world wars in this century; in both cases she was largely motivated by the belief that if she permitted Germany to win and to dominate the continent of Europe, Germany would become so strong that in a subsequent war she could vanquish America. Time and again great powers have gone to war in order to prevent an

adverse shift in the power balance and thus to avoid the risk of being vanquished in a subsequent war. But from here on, neither the Soviet Union nor America need to be guided by such considerations, and neither of them need to fear the emergence of any nation as a major industrial power, be it Germany, Japan, or China, because of her increased "war potential."

The Basic Approach to the Problem

In the discussion that follows, I shall assume that a political settlement has been agreed upon before the implementations of any *serious* disarmament provisions may begin. But before we can discuss any agreement, it is necessary first to meet the objection implied by the standard question: "Can Russia be trusted to keep an agreement?"

Neither the Soviet Union nor America can be coerced to observe an agreement if they no longer want to keep it in operation. Therefore, an agreement will remain in force only if it offers America and the Soviet Union (as well as some of the other great powers involved) strong and *continued* incentives for keeping it in operation. In this sense, the agreement must be *self-perpetuating* or else it cannot serve our purpose. What shall these incentives be?

Clearly, for the agreement to be really attractive, it should provide military security for the nations involved, political security for their governmental system, and economic prosperity for their people. We shall try to indicate later on in what manner an agreement could secure such results for America, the Soviet Union, and several other nations.

In the discussion that now follows we shall assume that somehow we have succeeded in devising a far-reaching agreement that both Russia and the United States want very much to keep in force, and with the validity of this assumption will stand and fall our conclusions.

Basic for the approach here presented is the further assumption that the agreement reserves both for America and the Soviet Union the right to abrogate it without cause either *in toto* or in part. There would be provided in the agreement a number of specific clauses of abrogation, differing in kind and degree and any of these could be invoked without cause either by the Soviet Union or America. A

few other nations, including all permanent members of the Security Council, i.e., including Britain, China, and France, might retain the right to abrogate, but no such right would be retained by the vast majority of nations. (This "discrimination" against the smaller nations may seem unjust. It may be necessary today, but it need not last forever. And, as time goes on, nations may voluntarily relinquish their right to abrogate, particularly if the agreement provides—as it perhaps should—economic incentives for doing so.)

The right to invoke abrogation clauses without cause might prove to be the magic key to the solution of a major difficulty. Clearly, in the existing circumstances both the Soviet Union and America want to make certain that there shall be no major secret evasions of the disarmament provisions of the agreement. But, if it were necessary to spell out in the agreement an inspection system that will provide ironclad guarantees for every conceivable contingency the lawyers might take years to write such an agreement—if indeed such an agreement can be written at all. If, on the other hand, the agreement provides for the right to abrogate, then—as will be seen—it is not necessary to spell out the provisions of any one particular system of inspection.

This does not mean that actually no inspection would be used. The nations may even adopt measures which go far beyond inspection in the conventional sense of the word. They would do so, however, not because these measures are explicitly demanded by the agreement but because of the manifest need to convince each other that actually there are no secret evasions.

If at any time after the agreement goes into effect the Soviet Union, for instance, fails to convince America that there are no dangerous evasions taking place in her territory, and if America can obtain no satisfaction on this point, then America has no choice but to invoke some of the abrogation clauses of the agreement. As time goes on she might even be forced to abrogate the agreement *in toto*. Therefore, if the Soviet Union wants to keep the agreement in operation—as we have assumed it is her interest to do—she will want to dispel any American suspicions of evasions. The same holds true, of course, in the reverse also, as America would not want Russia to entertain such suspicions. The

question that is really relevant in this setting may, therefore, be phrased as follows: *In what ways could the Soviet Union and the United States convince each other—assuming that this is what they want to do—that no major secret evasions of the disarmament provisions are taking place in their territory?*

All this presupposes is, of course, that the agreement has been entered into in good faith, i.e., that it has not been entered into with the intent to abrogate it. By making the "down payment" high enough we can make reasonably sure that this assumption is justified. We shall return to this point later when we discuss what kind and what degree of disarmament we have in mind.

General Principles of Disarmament

Disarmament will presumably go into effect in steps or stages with all steps agreed upon in advance and many of them going into effect according to a predetermined time schedule. What should those steps be and what should be the ultimate state of disarmament toward which these steps are directed?

We shall tentatively adopt here the following approach:

There shall be a *first period* during which disarmament may be carried *very far*, perhaps to almost complete elimination of all tactical heavy mobile equipment including planes suited for waging tactical warfare. But the Strategic Air Force of the Soviet Union and the United States, and the bombs will remain *wholly untouched* during this period.

The manufacture of machine guns and of defensive equipment such as anti-aircraft guns, short-range fighters and radar detection devices will remain free. Permitted also would be fortifications and heavy guns built into such fortifications.

We assume that the agreement that provides for disarmament also provides for a far-reaching political settlement. The political settlement is much more relevant, as far as the stability of peace is concerned, than the

level at which arms are maintained. Why then, one might ask, propose such far-reaching disarmament?

(a) The great powers would derive very substantial economic benefits from such disarmament, and this could provide a strong incentive for maintaining in operation the agreement that permits them to *remain* disarmed. And if the great powers yield an appreciable fraction—say one-fifth—of these benefits to a number of other nations, then these, in turn, would also have a strong incentive for wanting the agreement kept in operation.

(b) If a local conflict that breaks out in some remote region leads to fighting it may become a threat to world peace. But if the nations in those regions where such conflicts might arise are disarmed down to machine guns, then it is possible to devise a practicable method of enforcement that will keep any of the nations of the region from settling their conflict by force of arms. This will be discussed in detail further on under "Enforcement." *Such enforcement would not be operative against the great powers who have the right to abrogate but the methods employed would be capable of protecting the agreement from being violated by the smaller nations who have not retained this right.*

The First Period

The First Period may extend over a number of years and its duration cannot be fixed in advance in the agreement. If the political settlement reached works well during these years so that there are no conflicts that lead to fighting in which the United States and the Soviet Union line up on opposite sides, then the Soviet Union and America should be ready to start the second period of disarmament. During this second period the bombs will be eliminated together with the Strategic Air Forces, as well as all other means suited for the delivery of bombs, and all manufacture of such equipment will stop.

The very first step in disarmament may serve as a down payment large enough to convince the nations that none of them entered into the agreement with the intention of abrogating it. Also the first step, if it is a large one, will lead to an immediate reduction in arms cost.

This first step might involve the physical destruction of perhaps three-fourths of all guns, tanks, and other mobile equipment used in tactical warfare including planes suited for this



purpose. Manufacture of such equipment would stop at the same time and there would be a corresponding reduction in the size of the army.

We do not need an elaborate inspection system to supervise the destruction of this equipment or the stoppage of its manufacture. Both America and the Soviet Union, as well as the other nations involved, would specify in advance what equipment is going to be destroyed when and where, and agents of all these nations could witness and certify its destruction. A few American agents installed in the Soviet factories where such equipment has been heretofore manufactured, and a few Russian agents installed in the corresponding American factories could make sure that its manufacture is not continued.

America and Russia would have no easy way of determining just what fraction of the total available equipment has been destroyed. The agreement specifies only the absolute quantities of equipment to be destroyed. But if either Russia or America had not been satisfied that these amounts represent a sufficiently high fraction of the total available equipment, they would not have entered into the agreement in the first place.

Even though some system of inspection would be instituted and even though a very high percentage of inspectors in Russia could be Americans, and similarly a very high percentage of inspectors in America could be Russians, evasions remain, of course, physically possible during this period. Aerial surveys that would locate factories and single them out for inspection may perhaps remain unacceptable to Russia as long as the American Strategic Air Force remains in existence. But factories can be located by "pedestrian" inspectors who may follow the flow of raw materials without being able to locate the exact position of the factories on the map.

In judging whether evasions are likely, it is not enough to ask whether evasions are physically possible, but we must, above all, ask what reasonable motivation there would be for such evasions. At this point, the Strategic Air Forces are still retained and therefore no hidden manufacture of tanks or guns could vitally threaten either America or the Soviet Union. Evasions would involve the risk of provoking an abrogation of the agreement which both the Soviet Union and America would want to avoid, and evasions could not substantially affect

the outcome of the war to which such an abrogation might lead.

On the assumption that the Strategic Air Force of the United States will have available in adequate numbers intercontinental bombers which can be refueled in the air, and that America will have an adequate number of airstrips and air bases dispersed within her own territories, it should be possible to dismantle all outlying American air bases early during this first period without depriving the American Strategic Air Force of an essential facility.

Late in the first period, when disarmament in all tactical weapons has been carried almost to completion, could Russia or America cope in a remote region with an attempted invasion by a large, perhaps improvised army equipped with machine guns? Assuming that none of the great powers who have the right to abrogate are directly involved, it would not be appropriate to use the Strategic Air Force in such a case. It would seem far better to maintain in those areas in the world where such armed action is likely to occur, a regional police force that could prevent or render purposeless the resorting to arms. Such a police force could be small in numbers of men, but would have to be highly mobile and be equipped with high fire power—as will be discussed further on under "Enforcement."

But if—contrary to expectation—there is an armed conflict that involves the great powers themselves with, say, the United States and the Soviet Union lined up on opposite sides, then there will be a strong temptation to call the Strategic Air Forces into action. In order to avert the danger of an all-out atomic catastrophe in such circumstances, there ought to be evolved well in advance, a firm policy that clearly states *just what kind of hostile action calls for a response by the Strategic Air Force and also sets a strict limit to the response.*

The Second Period

As long as hydrogen bombs and the Strategic Air Force remain in existence a major element of danger will remain with us. What would be the right time for their elimination? Some difficulties would arise if this step were postponed until intercontinental ballistic missiles have been fully developed and manufactured in large quantities. Such missiles once they have been manufactured and placed in position can be easily hidden and therefore either

America or the Soviet Union might insist on measures of inspection that might be too harsh to be acceptable. This point argues in favor of the early start of the Second Period. If the political settlement works well for a number of years, so that America and the Soviet Union are ready to eliminate the bombs, the Second Period can begin—*provided both America and the Soviet Union are ready to adopt the novel measures that are needed to convince each other that there are no evasions occurring in their territory.*

What are these novel measures and why are they needed? During this Second Period bombs and air bases will be eliminated, equipment of the Strategic Air Forces will be destroyed, and manufacture of such equipment will stop. Clearly, it is not sufficient to eliminate bombs alone for the suspicion that bombs have been secretly hidden away would be difficult to dispell; great emphasis must therefore be put on the control of the means suitable for their delivery.

Step by step, as the Strategic Air Forces are dismantled and factories are closed down or reconverted, a larger and larger area in America and the Soviet Union might be opened up for mutual aerial survey. The purpose of such a survey would be to detect equipment, factories, and installations, and single them out for inspection if there is doubt as to their function. Such an aerial survey *should become acceptable at this stage* to the Soviet Union for the purpose of convincing the United States that the Strategic Air Force has actually been dismantled and that all manufacture of its equipment has stopped.

Russia and the United States might not be satisfied with these measures, however, if anything like the present degree of distrust should persist. Moreover, it is conceivable that new means for mass extermination will become available in the next few years which are wholly unforeseen today and which would remain undetected by any of the acts of inspection which we could specify today. Therefore, America and the Soviet Union might have to adopt a fresh attitude toward the whole problem of inspection and decide to legalize the position of the informer.

After the First World War there was an Inter-Allied Control Commission in Germany which had considerable difficulty in obtaining information, for any German who gave information about evasions of the disarmament provisions of the Treaty

of Versailles could be tried and convicted under the German Espionage Act which had never been revoked. Clearly, it is inconsistent to sign a treaty providing for disarmament and also to maintain an Espionage Act on the statute book and thus to prevent citizens from reporting violations of the Treaty.

Because the Treaty of Versailles was imposed on Germany, it is perhaps understandable that the German government tried to evade it. But this consideration would not hold for an agreement concluded by the Soviet Union, America, and a number of other nations. Such an agreement would not be imposed on anyone but would come about as the result of a meeting of the minds. It would be in the interest of the participating nations to maintain the agreement in force, and to convince each other that there are no secret evasions. Therefore, it might be that the government of the Soviet Union and the American government would decide to regard it as a patriotic duty of their own citizens to be prepared to disclose evasions of the agreement.

In a state of virtually complete disarmament, neither the United States nor the Soviet Union would have any military secrets. In these circumstances America and the Soviet Union might choose to permit each other to employ plainclothes inspectors, whose identities are not known, as the simplest way to convince each other that there are no evasions. America would want her plainclothes inspectors in the Soviet Union to be Soviet citizens who can go about unobtrusively within the territory of the Soviet Union. These plainclothes inspectors would carry a badge, and it would be understood that they would be immune from arrest. If the Soviet government were to arrest any of them when their identity is discovered, then it would become difficult for America to recruit inspectors. Similarly, if the Russian government arrested Soviet citizens who gave information to American inspectors, these inspectors would be unable to collect information. In either case America might be forced to abrogate, and it is therefore not in the interest of Russia to do any of these things. Of course, once the Russians discover the identity of an American plainclothes inspector his usefulness is ended, and unless he can find some other satisfactory way of earning a living, he may elect to leave Russia. At that point, he would become Amer-

ica's headache and cease to be the headache of the Russian government. Of course, all this is true in reverse also, and America would have to tolerate plainclothes inspectors of the Soviet Union.

One may perhaps ask: what is the difference between a plainclothes inspector whose identity is not known to the government and a spy? Today an American agent operating in Russia is a spy who serves the interests of America as well as his own interest; he does not serve the interests of Russia. But when the proper agreement has been concluded, then a plainclothes inspector operating on behalf of America in Russian territory serves the interests of Russia, as well as that of America for he is but the means chosen by Russia to convince America that there are no evasions.

The presence of American plainclothes inspectors in Soviet territory will not be acceptable to the Soviet government unless America can somehow convince the Soviet government that her agents are at worst spies and that they are not trying secretly to organize a political conspiracy that could become dangerous to the Soviet government. In order to convince the Soviet government on this point, America might have to facilitate spying on her inspectors by the Russian government. If the Russian government can discover each year the identity of a sufficient number of American inspectors, put them under surveillance, and observe their activities unbeknown to them, then the Soviet government can convince herself that these agents are indeed merely "spies." If this can be done, the Soviet government would have no reason—no rational reason at least—to object to their presence.

During this second period an abrogation might leave either America or the Soviet Union in an inferior position if, at the time of abrogation, one of these countries had completed the

development of intercontinental ballistic missiles whereas the other had not. For this reason, it is conceivable that both the Soviet Union and the United States might want to continue weapons research and development throughout the second disarmament period. Their research and development secrets could be safeguarded in the same way as industrial secrets are usually safeguarded. The ordinary "spy" is not capable of penetrating into this kind of secret; it takes a traitor to divulge them.

The second period reaches its end when the Soviet Union and America stop weapons research and development.

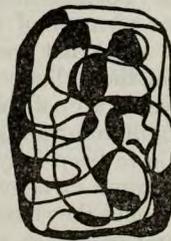
Enforcement

We have seen that the strategic atomic stalemate between America and the Soviet Union could possess a certain degree of stability during the First Period. This was predicated on the assumption that a political settlement has gone into effect, an adequate policy concerning *the limited use* of the Strategic Air Force is adopted, and that measures are taken to prevent an accidental triggering of an atomic attack. *But what about the stability of a constellation in which four, five, six, or seven nations add atomic bombs to their arsenals?* It would seem to me that in the absence of convincing evidence showing that such a situation can somehow be stabilized, it will have to be forestalled; for at stake, after all, is the survival of Man.

This menace alone would suffice to force us to face the problem of enforcement. No issue of enforcement arises with respect to any of the great powers who has the right to abrogate. But when is enforcement needed against a smaller nation that does not have such a right and how could it be accomplished?

What if one of the nations who has no right to abrogate should arrest inspectors of a nation who has the right to abrogate, and there is suspicion that illicit manufacture of atomic bombs or means for their delivery has been started, or is about to start?

How shall enforcement take place in such a situation? Certainly not by war against the offending nation. Economic sanctions might be effective in some cases, provided only we could be sure they would *actually* be applied. But, of course, we cannot be sure of this, for economic sanctions would hurt vested interests within the nations who are supposed to apply such sanc-



tions. Therefore, I personally wish to stress here another possibility, namely, enforcement through the arrest of the officials responsible for the evasions.

In order to accomplish this, we need not set up any centrally controlled international police force. Instead, in a number of areas (to begin with perhaps in Europe, Southeast Asia, the Middle East, and the Far East) there could be set up regional police forces. Each such police force would be under the control of perhaps seven to eleven member nations selected with the concurrence of the nations of the region and designated in the over-all agreement. The great powers who have the right to abrogate may not be members of any of these regional organizations and the need to allay the fear that the regional police might intervene in the internal affairs of any of the nations in the region should guide the selection of the member nations for each region. The regional police force would be more heavily armed than the police forces of any one of the nations in the region so that no national police force may be able to interfere with their operations.

One function of the regional police force would be to arrest officials of a national government in the region who are responsible for dangerous evasions or violations of the agreement.

Could the regional police force be relied upon to take action if there are dangerous evasions? Such evasions would presumably threaten the security of the member nations who control the regional police force, and these nations would almost certainly take action for their own protection. But they would probably take action for another reason also: The majority of the member nations would want to keep the agreement in force, and if they tolerated dangerous evasions in their region, they would risk an abrogation by one of the great powers.

What about the enforcement of peace? What will happen if one nation in the region sends her forces armed with machine guns across the frontiers of another nation of the region? No regional police force that can be maintained at a reasonable cost could seal up a long frontier and prevent the crossing of an army equipped with machine guns. But such a police force, if highly mobile and equipped with high (conventional) fire power can penetrate anywhere—it can penetrate to the capital and arrest the cabinet—it can penetrate to military headquarters and arrest the command-



ing general. Thus, such a regional police can successfully frustrate an invasion by improvised armies equipped with machine guns. They can frustrate such an invasion if they want to, but would they want to? The decision to do so would rest with the member nations who control the police force of the region and there might be no real pressure for such intervention from any of the great powers who might be geographically remote from the area of conflict. Thus, the regional police forces do not represent a fool-proof system of security though proper selection of the member nations for each region might make the system almost foolproof.

It would not be practicable to maintain regional police forces at all times everywhere. But if any nation feels the need of having such a force established or strengthened in her region because she fears an attack by one of her neighbors, she ought to have the unquestioned right to request that this be done—provided only that she is willing to contribute, say, up to 10 per cent of her national income toward the cost of maintaining such a force. The remaining cost would have to be covered by an international fund.

One could not count upon regional police forces to intervene in favor of the established government in case of a revolution. Therefore, governments that rely today on the possession of tanks and guns in order to keep themselves in office might be reluctant to give up those weapons in the course of universal disarmament. This might, for instance, hold for Iran, Egypt, Poland, or Rumania, as well as a few other nations. These governments might be permitted to retain those heavier arms—enough to protect them from their own population but not enough to resist the regional police—for a reasonable period of time.

In the long run, the general effect of this system of security will be to make revolutions easier. This is per-

haps not wholly desirable, but probably unavoidable. Presumably the revolutionists will have no difficulty in obtaining all the machine guns they want and the established government will presumably be in possession of all the machine guns it can use. The outcome of the fighting, with machine guns plentiful on both sides, will probably be determined by the efficiency of the organization and the determination of the two fighting factions. The revolutionists might be Communists and they might be victorious, but this does not mean that the victorious government would necessarily be subservient to the Soviet Union or to China or that it would remain subservient for long. In any case, the outcome of such revolutions has no bearing on the Soviet-American strategic power balance in the age of the Stalemate.

Can a better security system be devised that might be acceptable to America and the Soviet Union, than the one here described? It is none too early, I believe, to try and find an answer to this question.

Arms Cost and Economic Incentives

In the Soviet Union the population of the cities has risen from 27,000,000 in 1927 to about 80,000,000. Further rapid increase in the economic prosperity of the Soviet Union is possible only if the urban population will continue to increase at a fast rate. Today 20–25 per cent of the Soviet Union's national income is invested each year, but much of it is invested in facilities for arms production. Moreover, perhaps 15 per cent of the Soviet Union's national income is currently spent for the production of arms and the maintenance of an increasingly mechanized army.

The kind of disarmament which would permit the Soviet Union to reduce arms cost at an early date to the point where she could invest for the next ten years say 30 per cent of her national income in a productive manner would permit the Soviet Union to increase the take-home pay of the workers about 10 per cent each year for the next ten years and allow a correspondingly rapid increase in the standard of living of the rural population. *The standard of living of the Russian people might thus increase very fast, and a rapid and sustained increase in prosperity would contribute to the security of the political system of the Soviet Union.*

In the absence of a political settlement, the United States might spend in the next decade 30-50 billion dollars per year for direct military expenditures, for plant dispersal, and, above all, for effective measures of civilian defense. If the United States can divert this amount into the right channels, then the American people could enjoy great benefits, *depending on the channels into which the resources thus liberated would be directed. There is a political decision involved here which will be difficult to reach in America, and, in this respect, things are not going to be quite as simple for the United States as they might be for the Soviet Union.*

For the United States there are essentially three basic solutions:

1. America can increase its civilian consumption;
2. Consumption can be maintained and there could be a major increase in leisure. Leisure could take the form of, for instance, two months' additional paid vacations for everybody;
3. America could export capital or could purchase services abroad. She could give money away either in the form of direct foreign aid or in the form of payments to certain international funds.

Any number of combinations of these three possibilities could, of course, be also chosen: For instance, extended paid vacations would lead to a major expansion of the resort industries and transportation facilities so that we might have a combination of increased consumption and increased leisure. Or, if arrangements were made to make it easy for a large number of vacationers to spend their vacations abroad, then we would have a combination of increased leisure and the purchase of services abroad.

In the absence of disarmament, some nations might spend 10 per cent of their national income on their military establishments. A political settlement that makes it possible to disarm would enable these nations additionally to invest this much each year, with the result that their standard of living could rise an additional 3 per cent per annum. Disregarding all other factors, their standard of living would thus double every twenty-five years due to saving on arms expenditure alone.

Any population increase will, of course, lead to a corresponding reduction in the rate at which the standard of living may rise. For the sake of

simplicity we have not taken this factor into account.

Utopias of World Funds and the Principle of Compensation

In an article that appeared in May 1947 in the *Saturday Review of Literature*, I proposed that if disarmament can be obtained through an international arrangement, nations make sizeable contributions to an international fund that would use these contributions for developing the less industrialized nations. The defense budget of the United States was at that time about \$15 billion and I tentatively proposed that the contribution of the United States might be between \$7 and \$15 billion. At that time, most people, including myself, regarded this proposal as Utopian. *But it is not so easy to be Utopian as one might think.* Just about seven years later the statesmen assembled in Geneva in July, declared their intention of diverting for the development of less advanced areas, resources that will become available through arms reduction. Their declaration can be called Utopian also, for it is tied to real disarmament, and we are not headed at present toward such disarmament. Yet Utopias officially proclaimed by statesmen may be practical politics in the making.

When disarmament becomes a reality, funds should be made available to international agencies in the form of a world tax paid by the nations and assessed on the basis of the per capita national income. A very high personal exemption and above that a fixed percentage might be the basis for the assessment of this tax.

If such a world tax is to serve the purposes of an organized world community, the international agencies who have to spend these funds must be able to rely on obtaining them year after year. This, as well as other measures that might be provided for in the agreement, might make it necessary for the United States to pass constitutional amendments concomitant with the ratification of the agreement. It is

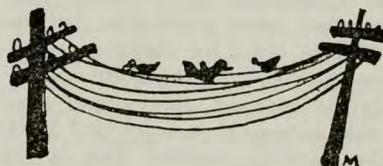
not easy to pass a constitutional amendment in America. But two amendments were passed within this century that established prohibition and repealed prohibition. We have no right to expect that perennial peace can be obtained at a lesser price than we were willing to pay for regulating the drinking habits of our people, and if we only live under the threat of the hydrogen bomb long enough to understand what that threat means, we might be willing to pay this much of a price.

Making contributions toward world development is only one of the uses to which a world tax might be put. Maintaining the regional police organizations is another likely use. Making funds available for paying "compensation" could be an important use also and we are going to turn now to this device.

Disarmament and other measures necessary to create an orderly world may be politically unacceptable unless it is possible to compensate vested interests who would suffer losses or forego profits when these measures are adopted.

After the First World War, the issue of whether or not the Germans should build battleships became a hot political issue in Germany which affected the outcome of elections to the Reichstag. Under the Treaty of Versailles, Germany was not permitted to build large battleships but was free to build cruisers up to 10,000 tons. After one such cruiser had been built, the question of whether Germany should go on building further cruisers became a political issue. The German Navy fought hard for those cruisers. I lived in Germany at that time, but I didn't understand what was going on until I had occasion to discuss the issue with an Admiral of the German Navy. When I asked him if he thought the possession of such cruisers would make any real difference in a war in which Germany and England fought on opposite sides, he said to me, "You do not understand. If we can't have capital ships, the whole promotion system of the German Navy will be in jeopardy."

From the point of view of the national interests involved, there ought to be a drastic shrinkage of the military establishments during the first period of disarmament. This might meet with irresistible political opposition in America and perhaps elsewhere also, unless the principle of compensation is applied to this problem.



All those who would be adversely affected by any of the provisions of the agreement ought to be amply compensated, in every nation affected, not only for losses they might suffer, but also for profits which they might forego.

All personnel of the United States Armed Forces, for instance, who may be retired because of the shrinkage of the military establishment ought to be compensated by an increase of, perhaps, 20 per cent in their retirement pay and, in addition, perhaps, by reimbursement of the income tax payable on their full retirement pay.

For a limited period of time, say for five years, compensation for profits which they will forego should be paid also to arms manufacturers, many of whom may have to reconvert to the production of other goods. And compensation ought to be paid also to labor in order to facilitate relocation and retraining.

In America, compensation for losses, and, even worse, for profits that corporations may forego, would subject Congress to strong pressures from the various interests if the compensation were to be paid by the government. Therefore, Congress might strenuously oppose in principle any compensation payable by the government. The same objection does not hold, however, if compensation is paid by an international fund set up for the purpose and according to rules set forth in its charter.

Great benefits would result from creating in certain regions of the world large free-trading areas with tariffs abolished and currencies freely convertible. It might be possible to accomplish this if compensation were paid both to manufacturers who might forego profits and to labor for relocation and retraining. The compensation paid to manufacturers need not amount to more than a fraction of the actual increase in import volume resulting from the tariff cut, since the loss in profit would be only a fraction of the loss in volume. If provisions were made to pay adequate compensation to those who forego profits because of tariff cuts, Western Europe, for instance might move very fast toward a customs union. From the ensuing increase in the trade and prosperity of Western Europe, the Soviet Union could derive marked benefits once East-West trade is fully revived.

The principle of compensation might also be essential for permitting the liberation of colonies, each at the ap-

propriate time that may be fixed by the general political settlement. Only very few colonies are profitable to the nations that hold them, but many colonies are profitable to certain groups of investors within those nations. The liberation of those colonies may become politically acceptable only if the agreement provides for the paying of ample compensation to the vested interests adversely affected by the liberation of the colony.

The thought of paying compensation to vested interests out of international funds is perhaps Utopian, but the belief that the needed measures can be put through without paying compensation to vested interests may be unrealistic.

Political Settlement

During the last war Wendell Willkie urged again and again that the United States negotiate a postwar settlement with the Soviet Union while the war was still on and they had a common enemy. Had that been done, the world would be a different place today—at least this is what I personally believe.

In a certain sense the hydrogen bomb may play today the role of the common enemy. Rather than to disarm first, eliminate the Strategic Air Force and the bombs and then try to negotiate each conflict separately, it would seem better to try to reach at the outset a far-reaching political settlement that would also provide for disarmament.

Many of the conflicts that may arise within the next 25 or 50 years are foreseeable, and they ought to be forestalled by the agreement. An agreement concluded today could, of course, not dispose of all of these conflicts in the sense that it would provide for the immediate implementation of the settlements that the agreement stipulates. Some of these conflicts can be disposed of by the agreement only at the price of setting a far distant date for the implementation of the provisions agreed upon.

If all these conflicts are dealt with at the time the agreement is negotiated, it may be possible to balance one against the other, and the desire to write an agreement that offers both nations strong incentives to keep it in operation may make it possible to arrive at a settlement of all these issues as one single package. But if these issues are left to be negotiated one by one at the time they become acute, each issue will be negotiated under

pressures at the risk of an abrogation.

The agreement that is needed may bear little resemblance to a peace treaty in the conventional sense of the word. It has to do more than to postpone the war and thus it has to solve a problem which has never been solved before. It will have to make provisions for gradual changes that will prevent conflicts from ever reaching an acute stage and therefore it may have to read more like a fifty-year plan than a peace treaty.

The political settlement must try to make certain that in none of the foreseeable conflicts will the Soviet Union and the United States line up on opposite sides. It should be possible to accomplish this, for today it is of no vital importance to America and the Soviet Union just how most individual conflicts are settled, as long as all of them are settled one way or another.

In arriving at a settlement, some of the old devices that have been used in the past in the field of foreign policy might have to be used again, but they will have to be used with important modifications.

After the Second World War, England and Russia tentatively reached an agreement providing for Rumania to be in the Russian sphere of influence and for Greece to be in the British sphere. President Roosevelt found this objectionable and therefore the agreement was not put into effect. Soon thereafter fighting started in Greece. Presumably in this instance President Roosevelt put the moral issue involved above the issue of avoiding war.

Reaching an agreement on spheres of influence has been successfully used for the preservation of peace in the past and this device may have to be used again; but today if we agree on spheres of influence we can do so only for a limited period of time and it will be necessary to make provisions for the liberation of each area at some later date. The principle of "predetermined gradualism" may be applied to this problem in general and to the liberation of the colonies in particular.

Predetermined Gradualism

The framework for a general time schedule for the liberation of all areas, which are at present under foreign domination, might be set by Great Britain, who has shown her awareness of the need for timely liberation. One might thus start out by asking Great Britain to submit a schedule that would set for each colony the date at which British power will be with-

drawn from the colony. Whether a colony might look forward to its liberation in fifteen or thirty years is less important than being certain that it will be free at a fixed and not-too-distant date.

The British are aware of the fact that they cannot keep the colonies forever. The earlier a date they set for the liberation of any one colony, the less trouble they will have with the native population. People will fight for the abstract concept of freedom with great fervor but few people are willing to die for something that they know will come to pass within the foreseeable future—whether they die for it or not.

Once such a schedule is proposed by Great Britain, it will be much easier to set the dates for the liberation for all the other dependent areas.

The colonies that may be liberated in the near future as well as other underdeveloped areas present a fertile ground for subversion. Subversion may be defined as the action of a nation that helps to bring about a change of government in another nation for the purpose of bringing into office a government that is subservient to the former, or at least not subservient to someone else. In this sense, one might perhaps say that the United States subverted Iran, whose present government is maintained in office by an army equipped with American tanks and guns. *For us here, the relevant point about subversion is that both parties can play at this game.* It is not a good game from the point of view of the native populations.

If the agreement provides for the kind of disarmament we discussed, then strategic consideration would no longer provide an incentive for trying to extend influence through subversion. But Russia and the United States may want to continue to exert influence for a variety of reasons and the question thus arises whether the agreement could regulate the means by which such influence may be legitimately exercised. Perhaps this could be done. However, the provisions of the agreement stipulating the permitted means could be evaded with comparative ease and therefore these provisions would have to be regarded as a package that may be abrogated as a whole.

The problem of influence and subversion would be far less troublesome if it were possible to establish stable native governments in underdeveloped areas. Unfortunately, here, we

come up against an unsolved problem that calls for a set of political inventions.

The parliamentary form of democracy is not very well suited for the self-government of the less developed countries. There is little doubt in my mind that other forms of government could be devised which would be no less democratic, in any meaningful sense of the word, than the parliamentary form of democracy, and be far more suitable for underdeveloped countries. Intellectual leadership in the West has been grossly remiss in neglecting this problem. As it is, there is a scarcity of ideas which makes practical experimentation impossible at present; but if ideas were developed as they certainly could be developed, there might be an opportunity for cautious experimentation as Great Britain proceeds to grant independence to one colony after another. We may assume that the Colonial Office is aware at least of the existence of the problem, and is willing to scrutinize solutions, if any well-thought-through solutions can be presented to them.

Another problem that must be solved is the problem of population control in the underdeveloped areas. There is no need for us to be concerned, however, about the political, social, and religious obstacles that today may seem to stand in the way of solving this problem. Before India was independent, the all-Indian Congress did not recognize the importance of controlling the birth rate. But the government of India faced with the need of keeping her people from starving has no choice but to acknowledge its importance. The Catholic Church is opposed to birth control, but the Catholic Church in Puerto Rico, where the need has become urgent, closes an eye. The Chinese government today might prefer to pin their hope on increasing agricultural production. But if they succeed in improving public health and infant mortality decreases, 25 years from now, China might be faced with a population explosion and the Chinese government will then change her position.

When means will be available, suitable for the use of controlling the birth rate in the areas where it is most needed, say a "pill" that can be taken once a month, those means will be used when the need is great enough. Not until the last few years has real work begun in this field. But when the means will be available, and

they may be available soon, then the "pill" will prove to be stronger, I am confident, than social custom, religion, or government. And it is not likely that it will be necessary to codify, in some international agreement, "freedom of access to the pill" as one of the basic human rights.

If this hope is not fulfilled, population pressure arising in the next twenty-five to fifty years could lead to the conquest without war of a number of nations through mass migration from overpopulated countries nearby. Or, if such immigration were blocked the population pressures could lead to stresses that might require intervention by the regional police forces.

We have so far talked about the political settlement only in general terms. Clearly what is needed now is to project a detailed image of a balanced political settlement that would cover every area of the world, and thus to show that it is possible to devise a settlement that the great powers would be likely to want to keep. It would be also desirable to show that such a settlement need not involve appeasement, i.e., that none of the great powers need to purchase peace by being generous at the expense of some of the smaller nations.

The most acute controversial issues, such as Formosa, Korea, and Indochina are products of the cold war. Once a new setting is created in which a major war is unlikely to occur, the great powers need not be concerned just how these issues are settled, provided only that they are settled one way or another. The unfortunate people who happen to live in these areas may of course be vitally affected by the settlement, and their real interests should be taken into account. Unfortunately, it is not clear how this shall be done; the wishes that they might express in an election might have some relation to their real interests and again they might not.

I shall not attempt here to spell out a global settlement and shall deal only with one problem—as an example—the problem of Germany.

Germany

If disarmament goes far enough, and if machine guns are essentially the only mobile weapons available in unlimited quantity to the national governments in Europe, the issue of whether or not Germany should be neutral or be permitted to form alliances will be void of any tangible meaning and will present no obstacle

to the unification of Germany. But what shall be done about the Eastern frontiers of Germany?

As we have stressed earlier, the political settlement which we are discussing will be satisfactory only if it eliminates the *foreseeable conflicts* before those conflicts become acute. The issue of the Eastern frontier of Germany is almost certainly one upon which sooner or later the whole German nation, without difference of party affiliation, will unite, and for this reason alone it would seem necessary to dispose of this issue. Here, again, the principle of predetermined gradualism might be applied. The agreement could provide that Germany would obtain from Poland each year a two-mile strip beyond the Oder-Niesse line until Germany has reacquired her pre-war territory in the East. Similarly, Poland might reacquire a two-mile strip each year on her Eastern frontier from the Ukraine.

Because these changes are slow, it should be possible to make available abundant compensation for the relocation of each family that moves out of either of these two zones. By setting the compensation high enough one may forestall the rise of political pressure in opposition to relocation and there might even be a demand on the part of the affected population for relocation ahead of schedule.

Stipulating a slow gradual expansion of Germany beyond the Oder-Niesse line would seem to be better than to cede those territories outright to Germany. For a while at least it will make Germany particularly anxious that there shall be no abrogation of the agreement that would automatically put an end to her eastward expansion.

The creation of a united and independent Germany in the center of Europe may afford a unique opportunity in the following respects:

The area of the greatest interdependence of nations today is Europe. What the German government does affects all her neighbors and what the French government does affects all her neighbors, yet this interdependence is not reflected today in the political organization of Europe.

It would be difficult to remedy this defect by creating supranational European authorities, for it is in the nature of government to resist any abridgment of its sovereignty. An entirely different approach to this problem might prove to be more feasible. When a United Germany is

created and Germany is about to decide on a constitution, the German Constitutional Assembly could take a new departure. Germany could make available a number of seats in the German Parliament (to which the German government will be responsible) for delegates from parliaments of the neighboring nations, who would serve as full members. The number of these foreign delegates could be initially quite small and increase slowly within about 25 years according to a fixed time schedule to perhaps 30 per cent of the total membership of the German parliament.

Within a fixed number of years, the French, the Dutch, the Belgians, the Danes, etc., would have to adopt similar provisions or else those among them who fail to do so would lose their representation in the German Parliament.

This kind of political organization of Europe would be likely to strengthen in all parliaments the parties of the middle. Clearly, French, Belgian, and Dutch Nationalists are not likely to vote in the German Parliament for instance with the German Nationalists, but rather with the German middle parties. The strength of the Communist parties in the European parliaments would on the average remain unaffected but it would be decreased in those parliaments where the Communists come closest to exercising control and it would be correspondingly increased elsewhere. The governments responsible to these parliaments would remain sovereign but they could not take decisions that would adversely affect their neighbors without losing support in Parliament. On the whole, this political structure would seem to be a natural expression of the interdependence that actually exists between the nations of Europe.

Concluding Remarks

Only an organized world community can remain perennially at peace and no global agreement that may be concluded within the next few years could be expected to set up such a world community. But it is none too early, perhaps, to begin to conceive the needed social and political inventions and then to proceed to draw an image of a functioning world community. For if we thus obtain a clearer concept of the goal toward which the world may move, it will be, perhaps, easier for the statesmen to arrive at global agreement that will leave unobstructed the road to progress.



RELEASED FOR THE FIRST TIME AT GENEVA

SIX VOLUMES ON RESEARCH AND ENGINEERING METHODS AND DATA

Prepared by

THE U.S. ATOMIC ENERGY COMMISSION

To aid scientists and technicians in
the development of scientific and
industrial uses of atomic energy

Here is an infinitely valuable reference for all who work with nuclear energy. Prepared as a contribution to the nations represented at the Geneva Conference, August 1955, to aid world-wide advance in the beneficial use of atomic energy, the information now is available to scientists and engineers of the United States, in six technical-engineering volumes published by McGraw-Hill. This information released by the Atomic Energy Commission shows much concerning the ways in which fissionable materials can be put to work in nuclear reactors for research purposes and for the production of power and radioisotopes.

These works are representative of the great strides already made in putting atomic energy to work in industry, agriculture, medicine, and research. They contain technical information and ideas that can contribute to even greater progress in the future.

RESEARCH REACTORS

406 pages, \$6.50

Detailed descriptions, complete with selected design drawings of six types of U.S. research reactors now in use.

REACTOR HANDBOOK: PHYSICS

804 pages, \$12.00

Discussion of reactor physics and nuclear-design data, including shielding theory and calculating techniques.

REACTOR HANDBOOK: ENGINEERING

1088 pages, \$15.00

Review of reactor technology, including basic reactor systems applicable to power development and a summary of experimental reactor designs.

REACTOR HANDBOOK: MATERIALS

614 pages, \$10.50

Data and background information on reactor materials; fuels and moderators, and shielding, structural and miscellaneous materials.

NEUTRON CROSS SECTIONS

363 pages, \$12.00

Recent compilations of neutron cross-sections data affecting reactor design.

CHEMICAL PROCESSING AND EQUIPMENT

316 pages, \$6.00

Process and engineering description of a separation system, together with a catalogue of special equipment for the safe handling of radioactive materials.

SEND FOR COPIES ON APPROVAL

McGraw-Hill Book Co., Inc.
330 W. 42nd St. New York 36, N.Y.

The Lesson of Geneva

(Continued from page 275)

have become intoxicated with the prospects for nuclear power. They will not be satisfied with gestures on our side, even if Sir John Cockcroft's excellent summary makes it clear that nuclear power can have only gradual and long-term impact upon their economies.

The military atom was *verboten* at Geneva. One talked about it only in private sessions, but it was on the minds of many. "Atoms for Peace" was the motto of the Conference. It stared at you from multi-colored and multilingual posters throughout Switzerland. (The Russian text asserted even more bluntly that "atoms will bring peace.") Undoubtedly, many scientists were uneasy about this propaganda label placed upon a scientific meeting. It seems to imply that atomic energy can somehow relieve us of its own threat. Yet, all peacetime applications of atomic energy, however beneficent, in no way remove or counterbalance the threat of nuclear weapons.

The atomic power is as yet but a prospect; but immense stockpiles of nuclear bombs exist today—sufficient to expunge our civilization, including any industrial atomic power plants which may be built. And when we actually have large-scale nuclear power production all over the globe, many nations which today do not have nuclear bombs will acquire the capability of making them. Are we fully aware of the risk of an "atomic bombs for all" policy? What kind of a world will we have when many nations possess stockpiles of nuclear explosives? Such questions were not discussed—were not to be discussed—at Geneva.

Some comment is in order upon the press at Geneva. To this observer, British news coverage of the Conference seemed very good—the *Economist* and the *London Times*, as well as the *Manchester Guardian* all doing a good job. On our side of the Atlantic, newspaper treatment left much to be

desired. However, *Time* magazine may be proud of its science editor, Jack Leonard. *The Atomic Industrial Forum* did excellent reporting, as did the *Columbia Broadcasting System*. While the Conference devoted all of its attention to nuclear power based on uranium fission, the press made a collective vertical take-off upon Bhabha's passing reference to the possibility of thermonuclear power based on hydrogen fusion. Neither Cockcroft's calm persuasion, nor Admiral Strauss' oblique pessimism could bring the press to earth. In the wild blue yonder of "tamed H-bombs" reporters looked down upon mere A-power.



Both U.S. and British officials admitted that they had secret research projects devoted to thermonuclear power. Admiral Strauss stated in a press interview on August 11th that H-power was at least twenty years away. One may ask: Is there any sense in "classifying" research on something which lies so far in the future?

Geneva proved that the United States is pitted against a capable opponent in the Soviet Union. Thousands of young scientists are being trained in the USSR, in what is apparently a prodigious attempt to wrest technological superiority from the free world. This is not just another Five Year Plan; it seems rather to have the dimensions of a Fifty Year Plan. We have had warnings in the United States that nuclear scientists and engi-

neers are in short supply, despite a sharp upswing in demand. Clearly, if we are to service the bilateral agreements thus far made, and maintain our projected program of domestic development, we need a bumper crop of nucleonics experts in 1960, 1970, and ever after. How odd it seems to have to encourage the youth of America to rally to this exciting new field of technical endeavor!

Certainly, the security stockade we have built around atomic energy has not helped to attract our youth into this new profession. Therefore, it would seem highly desirable to take stock of what happened at Geneva and realign correspondingly our peacetime AEC power program.

First, nuclear science should be freed from security restrictions of all types. It ought to be as open as any other science—zoology or pharmacology. It should be possible to make AEC installations such as Brookhaven and Argonne National Laboratories completely unfettered by security regulations. Young scientists should be free to visit and work at these sites without being "Q" cleared, and without subjecting their investigations to "declassification."

Second, nuclear power development ought to be thrown open to industrial participation without the present "L" clearance drawbacks for personnel and limited access to nuclear power data. Except for a small fraction (less than 5 per cent) of literature on nuclear engineering, industrial participants should need no clearance. Work that really needs to be kept secret can be relegated to a few AEC installations, such as the Los Alamos Laboratory in New Mexico.

Third, all biological and medical work of the AEC ought to be open and easily accessible. This means, among other things, that the biological and medical data from bomb tests should at last be fully available to the men who can do something with them. Inside the AEC, research results in biology and medicine should be "born free," just as in any university or research institute.

Geneva provides us with an optimistic note for the opening of the Second Decade of Atomic Energy. Reopening of the lines of communication with scientists of the world augurs well for the future of atomic science and technology. However, it provides us with no reasons to forget Hiroshima and Bikini.

—RALPH E. LAPP

"If man does find the solution for World Peace it will be the most revolutionary reversal of his record we have ever known."

—GENERAL GEORGE C. MARSHALL
Report of the Chiefs of Staff
September 1, 1945

“This is a time of peril; we need the best leadership we can get, and also the best informed followership—if we are going to dig our way out. . . .”

—ELMER DAVIS, in *The American Scholar*

Every significant social, political, and moral issue of our day is being dramatically influenced by the new power made available through nuclear fission—and many of them are made more clear by “the dreadful illumination of the atomic bomb.”

It is the main purpose of the BULLETIN OF THE ATOMIC SCIENTISTS to provide a monthly commentary upon the revolutionary—and the evolutionary—changes brought about or portended by the present impact of science upon society—and the equally important impact of society-in-crisis upon science.

By presenting objective fact and thoughtful opinion—by placing the news of the day in a perspective of the traditions of science and of history—the BULLETIN seeks to help at home—and abroad in the fifty countries where it is read—with the problems of communication between the scientific community and the rest of the world.

In the BULLETIN you will find articles by men whose creative thought, expert opinion, and reporting of events are helping to shape the news of tomorrow.

Discovery, the distinguished British journal of science, says:

“There can be no doubt that the American scientists who organized the monthly *Bulletin of the Atomic Scientists* have made a valuable contribution to world thought, for ever since 1945 this excellent journal has been the most important periodical providing for the discussion of the social relations of atomic energy.”

THE BULLETIN OF THE ATOMIC SCIENTISTS

Yearly subscription \$5

Address all subscription inquiries to: Bulletin of the Atomic Scientists
5750 Ellis Ave., Chicago 37, Illinois
