3. DISARMAMENT (A ~~Discussion~~ Paper presented to The First Pugwash Conference, July 1957)

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The problem of disarmament is considered here in relation to the question: What is the best and most feasible way (a) to minimize the danger of the outbreak of a nuclear war during the transitional period which separates mankind from the stable final situation of permanent peace, and (b) to accelerate the aproach to this ultimate solution. The probability of nuclear war occurring before the final stable state is reached, is proportional to the product of its probability at any given time, times the length of time mankind will be exposed to the danger; more precisely, to the time integral of this probability from now to eternity.

Two different answers to the problem of maximalization of mankind's chance for avoidance of the nuclear catastrophy have been suggested: these two answers are (a) maximum deterrence and (b) ~~partial~~ disarmament.

(a) The first solution is the "Amster-Sherwin" formula (Bulletin of A.S., May 1956). It has not many outspoken theoretical prononents, but is the - unadmitted - basis of the actual military nolicy of the United States as well as of other major nations. It postulates that the maximum security of continued peace can be achieved by maximum deterrent threat, making what the chemists would call the "activation barrier" of aggression as high as nossible. It is suggested by the proponents of this theory that the combination of practically indefensible economy and population with a practicably indestructible retaliatory power of the two major world powers can assure universal and practically nermanent peace.

However, while it can be argued, with considerable conviction, that for any given short period of time, the existence of a maximum capacity for mutual destruction by two potential enemies provides the greatest possible guarantee that none of them will make a deliberate (or careless) step leading to war, it is certainly not true that the danger of such a chain of events can be reduced by any extent of deterrent to zero - particularly, in the absence of a neat div-

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ision of the world between two camps, and the existence of ~~smaller~~ nations not entirely under the control of one or the other of the main adversaries. Therefore, if the state of mutual deterrence would have to be considered as indefinite in duration, the integrated probability that it would sooner or later end in the outbreak of a war would approach unity. The desirability of the deterrent state depends therefore on the likelihood that a prolonged state of metastable equilibrium can be utilized for the gradual emergence of a permanent system of peace - an integrated world community in which war will become an impossibility. This harmonic community will have to emerge from a rigidly divided world like a butterfly emerges from a seemingly lifeless pupa. This does not seem to be a likely outcome of a prolonged state of international fear and distrust, with sustained preparations for instantaneous mutual destruction going on without respite.

(b) The second alternative is to seek the maximum integrated probability of survival in the relaxation of the deterrent threat and of the associated political tension - through gradual ~~partial~~ disarmament. It must be admitted (1) that under the conditions of a continued division of the world into sovereign and politically warring fractions, such a disarmament is likely to increase rather than decrease the momentary probability of a thoughtless action which can possibly lead to war, and (2) that such a war - even if it should begin as a non-nuclear one - will probably develop into a nuclear conflict. These two admissions are almost inescapable in objective evaluation of the probable effects of partial disarmament. Nevertheless, the disarmament solution can not be rejected without considering the fact that it ~~is likely to~~ may provide a more congenial background for the gradual evolvment of a final, stable structure of peace. It is by no means <u>certain</u> that such will be the actual development, and the possibility of a nuclear catastrophy will remain high for a considerable length of time; in fact, it may even grow as disarmament progresses. Nevertheless, <u>chances</u> for successful approach

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to the final stable state will be much better in a partially disarmed and politically relaxed world, than under the conditions of maximum mutual deterrence. In other words, the momentary danger may be higher, but the time-integrated danger lower, than in the Amster-Sherwin deterrence solution.

It is clear from the above that the ~~partial~~ gradual disarmament solution is desirable only if it is used as a politico-military background for approaching, with maximum possible speed, the ultimate state of stable world peace. Its increased momentary risk of war can be justified only by a shortening of the period during which this risk will persist.

It is submitted here that this is the only context in which ~~partial~~ disarmament can be considered as desirable by a group which approaches the world situation with the attitude of scientists.

Stopping nuclear weapons tests; stopping the production of fissionable materials for military purposes; instituting aerial survey to detect warlike preparations or illicit atomic activities -- all these steps can help the advance towards ultimate peace in two ways: (1) if properly exploited by diplomacy, they can lead to relaxation in the relations between antagonistic nations, and (2) they can offer the possibility for the establishment and actual trying out of various mechanisms of international control, thus establishing precedents and perfecting blueprints for the ultimate creation of a world-wide peace organization capable of effectively enforcing the disarmament of every separate nation or group of nations.

This is, however, not the context in which disarmament is most often viewed by the public opinion and the political leadership of major nations. Rather, atomic disarmament is considered longingly as a mechanism to reverse the recent course of history and to return to the "pre-atomic" state of international relations, in which sovereign states have enjoyed freedom of movement in the world arena, which included a ultima ratio regis, a resort to war -- without the suicidal implications of a nuclear war. Plans to limit wars to non-atomic, or to "tactical" atomic weapons, or restrict the use of atomic weapons by a declared strategy of "graduated" deterrence,

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are outgrowths of the same desire to be able to carry over, into the age of nuclear technology, the traditions of national sovereignty in the choice between peace and war -- a tradition on which international relations have been based all through history. If gradual disarmament will be attempted in this "reactionary" spirit, with each step being considered as restoring in part the "freedom of action" of sovereign states (rather than as creating better conditions for permanent abolition of this freedom), disarmament will merely increase the probability of an ultimate catastrophy of an all-out nuclear war.

II

The first period of international atomic energy control negotiations in the United Nations Atomic Energy Committee, in 1946-1948 (when these negotiations bogged down), constituted an attempt to eliminate atomic weapons from all national peacetime arsenals completely, with foolproof controls. At that time, the impression of Hiroshima and Nagaski -- of two bombs that had ended a four-years war -- was fresh, and it seemed as if possession of even a few atomic bombs by a nation, in an otherwise atomically disarmed world, would give it a means to coerce and terrorize all other nations. The United States leadership, in monopolistic possession of a small number of A-bombs, had at that time the irrational, but psychologically understandable, belief in having a permanent bargaining advantage and was reluctant to sell this advantage for anything less than a completely air-tight system of international control. The American and other Western technical experts, agreeing with the Soviet experts that such a control is technically feasible, proclaimed (in the Lilenthal-Oppenheimer-Acheson plan, known in the UN as the "Baruch Plan", and later, in the much more elaborate "UN AEC Majority Plan" of September 8, 1947), that nothing short of international ownership, or at least of an "in trust" management of the whole atomic energy enterprise in the world by a UN agency could provide adequate guarantees against clandestine atomic activities, as well as against any diversion of a fraction of legitimate production of fissionable materials to the making of weapons. Certain groups of scientists went even further and suggested

that only a world-wide moratorium on large-scale production of fissionable material, even for peacetime uses, would create a situation, in which a UN control ~~mechanism~~ agency would be sure that not a single A-bomb ~~could be~~ is made in secret anywhere in the world.

The Soviet Union, when it finally produced, on June 11, 1947, a specific counter-proposal for the controlled abolition of atomic armaments, rejected the international ownership or management plan as an attempt to create a capitalist-dominated world atomic trust. It also rejected, as "reactionary", the moratorium plan (although it agreed -- at least for a time -- to the idea of national quotas for the production of fissionable materials). Instead, the USSR proposed a system of international inspection of declared national atomic energy activities, coupled with special mechanisms for the investigation of suspected clandestine facilities. Contrary to what the public opinion in the West is accustomed to believe, the USSR went much further at that time than on any later occasion (including the present London negotiations), in offering UN inspectors the necessary right of ingress in, and egress out of, their country, and of free access to all atomic energy plants within it. The inspection (at first characterized by the USSR as "periodic", but later admitted to be "continuous"), was to be ruled by UN agency majority vote and not subject to veto (which was, however, to be retained in the adoption of punitive measures against violators, which the USSR insisted should be the prerogative of the UN Security Council).

It is important to realize that the ultimate breakdown of UN atomic energy control negotiations in 1948 was due, not to Western insistence on adequate inspection and Soviet reluctance to admit any inspection of atomic facilities in their country, but to the belif of the West that no outside inspection -- in fact, nothing short of monopolistic international operation -- will suffice; and Soviet refusal to concede any control measures beyond continuous inspection.

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No technical development since 1948, and no official or unofficial reamraisd of the conclusions of the technical experts of 1945-47, who concluded that external inspection cannot assure complete prevention of illegal atomic arms production has taken place since 1948. On the other hand, the development of thermonuclear weapons which permits to multiply, by a factor of several hundreds if not thousands, the explosive power of every pound of fissionable material, has made the potential danger of every ounce of clandestinely produced plutonium (or U235) correspondingly greater. Yet, in the now proceeding international disarmament negotiations, we hear (and this time, from the Western negotiators) suggestions that further production of atomic weapons could -- and should be stopped by an international agreement, "supported by adequate controls". New technical studies, on which this American proposal is based, have never been released for publication, or even as much as officially summarized. This is in sharp contrast with the corresponding studies in US and the UN, which have provided the basis for the "UN majority plan" of 1947. The investigations by the so-called "task forces" of the Stassen office, have remained classified as "top secret" -- a situation which makes it extremely difficult for any independent group to evaluate the feasibility and reliability of the now proposed atomic disarmament steps. (The same situation prevails, incidentally, also in the field of atomic weapons tests, where the basic question of discoverability of tests by remote monitoring -- or of the minimum needed near-distance monitoring -- has never been officially illuminated, and remains a matter of conjecture: an extremely unsatisfactory -- and unjustifiable -- blackout of information essential for the formation of national policies.)

One new factor may enter into the control problem in the case of fission-fusion-fission bombs ("dirty" thermonuclear weapons) which derive energy mainly from the fission of ordinary uranium, U238. The amounts of the latter material needed for the production of weapons in the ten-megaton range must be very high -- of the order of, say ten tons per bomb. Perhaps mass production of such weapons could be controlled by supervision of the mining and production facilities for ordinary uranium more easily than is possible in the case of the production of the fissionable "detonator" material plutonium or U235.

In any case, there is no reason to believe that with the present conditions of "nuclear plenty" -- with mass production of uranium and plutonium getting under way in an increasing number of countries, it should be easier to detect the illegal production and concealment of fissionable materials sufficient for the making of a number of nuclear weapons, than has been the case under the past conditions of "nuclear scarcity" with which the UN Atomic Energy Commission has been confronted in 1946-48. Rather, it is safe to assume that this task is now more difficult than it seemed then, and will become increasingly difficult as time goes on. It is therefore obvious that proposals to stop the production of nuclear weapons with "adequate controls", if the proposals are inteded to be taken seriously, now must be based on a philosophy different from that in which atomic weapons control proposals have been considered in the now closed era. Such proposals cannot be seriously aimed at a foolproof, certain prevention of the production of even a small number of new nuclear weapons by any nation. Rather, they can address themselves only to a much less ambitious aim, to stop the main flow of atomic weapons production -- of their production "by the thousands", while closing the eyes to the possibility of a small trickle of such weapons continuing here and there.

The reason why even an imperfect control may now appear desirable to the West is not difficult to fathom: it is the existence of a large stockpile of nuclear explosives and finished weapons in at least two countries -- the US and the USSR. As pointed out repeatedly by scientists, and conceded by American government spokesmen, precise verification of such stockpiles as prerequisite for their controlled liquidation, is technically impossible. No means can be proposed to discover the existence of such stockpiles by methods other than denunciation and direct search. Because of their small volume, they are easily concealed, and the West can harbor no illusions that it will ever be able to rely on the absence of concealed reserves of nuclear weapons in the Soviet camp; no will the Soviet Union ever be absolutely certain that no hidden nuclear weapons reserves remain in existence in the West (although the risk of discovery will be greater in a country where the movement of people is freer, the ease of communication

greater, and the control of the state over the individuals less tight).

A considerable part of the existing stockpiles could probably be discovered and dismantled on the basis of present production records, and estimates of past production, which international inspection of major production facilities in the US and USSR should produce. However, the remaining margin of error will be inevitably large. In discussing now the cessation of the production of nuclear weapons, the US disarmament negotiations -- and their Soviet counterparts as well -- probably proceed on the assumption that in the future major nations will never be sure that their potential enemies do not own a secret stockpile of atomic and thermonuclear weapons, which may go into the hundreds if not thousands. Under these conditions, they may feel that a trickle of illicit production -- a few dozen bombs a year -- which can escape inspection, will not be decisive. In other words, negotiations now aim -- in fact, if not in word -- not at cleaning the world effectively of all nuclear weapons, but merely at slowing down the headlong race of mass production of such weapons. Obviously, even complete success of the present program -- a situation in which input and output checks on the declared major facilities for the production of fissionable materials -- Handford, Oak Ridge, Savannah, Portsmouth in the US, and their equivalents in the USSR -- will merely assure the world that the vast proportion of its output of atomic materials does not go into new weapons; it will not mean that the major nations lose the capacity to employ nuclear weapons in considerable numbers, even at the outbreak of a war, not to speak of their capacity to resume rapid production of such weapons after the beginning of a military conflict. One advantage of even an imperfect production control (perhaps, the one which pushes the major nations most strongly in the direction of such an agreement) would be the effective prevention of atomic weapons production in nations not now in possession of production facilities. These nations -- France, Germany, Japan, etc. -- will probably violently protest continuous exclusion from the "atomic weapons club"; but, in the long run, they might find this discrimination not too disadvantageous. The reasons have been clearly stated in the protest of 18 German

nuclear physicists, against Western Germany aiming to acquire its own production facilities and stockpiles of nuclear weapons. The "freedom of action" of a nation on the international scene, which has become associated, in the minds of many, with the possession of an arsenal of atomic weapons (in particular, after the collapse of the Anglo-French Suez expedition under the threat of Soviet atomic retaliation), and which has made the production of Britain's own thermonuclear bombs appear a matter of vital interest to the present British government, is probably not real (not even in the case of Great Britain); a nation of the size of France or Western Germany is not likely to acquire such freedom even if it were to possess its own atomic weapons. To believe otherwise would mean to transfer preatomic concepts into an entirely different atomic world.

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In the first part of this paper, the desirability of partial disarmament was related to the possible reduction of the time integral of the probability of the outbreak of a nuclear war, from now to the time of the establishment of a permanently effective mechanism for the maintenance of peace. It is in this light, rather than that of an a priori attachment to the idea of disarmament, that the questions of the atomic weapons control negotiations should be considered.

In the first period, 1946-48, when the aim to effectively remove all atomic weapons from the face of the earth, despite its division into competing states, still seemed feasible, the authors of the Acheson-Lilienthal-Oppenheimer plan hoped that if this elimination is achieved by positive means -- the integration of the atomic power developments all over the world under a single agency -- rather than by negative means of international policing, this may become a prototype for gradual "functional" fusion of nations into a single community -- a "functional" approach to world unity more promising than expectation of a political treaty establishing a world federation, or gradual endowment of the United Nations with the functions of a world government. (It will be noted that the same idea -- functional unity before constitutional unity -- is being tried out now in the integration of Europe via the Iron-Steel Community, Euratom and Common Market.) However, this long-range aim of the A.L.O. plan received a "stab-in-the-back" from America itself when Mr. Baruch introduced the provision for "condign punishment" of violators of atomic control by veto-free vote in the UN. In the eyes of enemies of the "Baruch plan," this provision acquired -- and still retains -- the central position, demonstrating that the ultimate intent of the plan was to coerce rather than to cooperate.

While the question of sanctions has dominated the criticism of the Baruch plan from the Soviet and Soviet-influenced side, the question of inspection has acquired the central role in the thinking of those more sympathetic to the plan, while the aim of cooperation was pushed into the background in both cases -- as if

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the plan was intended to operate indefinitely under the conditions of mistrust and hostility between nations. The American leadership did little if anything to draw the the attention of the world to the constructive aspect of the original plan, and to the fact that no international control of atomic weapons can survive, in the long run, in a static, divided world, but can become meaningful only in the context of a dynamic world, moving towards integration.

The Eisenhower atoms-for-peace proposal of December, 1953, and the just ratified UN Atomic Agency convention which developed from it, can be considered as perhaps the first political step revealing at least a dim realization of the necessity to establish a world community of interest in the atomic energy field as foundation for ultimate effective elimination of atomic armaments. This was achieved, however, at the cost of eliminating any direct relation between international cooperation in the atomic power development and atomic disarmament, foreseen in the ~~AEC~~ Baruch plan.

No new imaginative proposals for the functional integration of the world have come from either the West or the East since the Atoms-for-Peace proposal. What is missing, is a strong conviction of responsible political leaders (and of the broader groups which provide the fundamental philosophy of the national policies of the respective countries), that such an integration is an inescapable precondition for the survival of mankind in the scientific age, and that no negative policies, be it in the form of partial disarmament, or in that of international police controls, can provide an adequate substitute.

While only the dimmest awareness of the necessity of world integration can be discerned on the political level, a very decisive -- and probably irreversible -- development towards the rigidity of mutual deterrence systems has occurred in the military plans in all nations. Most outspoken in this respect has been the proclamation of the new military policy by Great Britain. The limited national resources of Britain are from now on committed to the development and maintenance of a deterrent strategic potential with only little -- and gradually decreasing -- effort being

contemplated in the field of conventional military power.

While the economic necessity is less stringent in the US, which (in theory at least) could afford the maintenance of both an effective strategic deterrent nuclear power and a more or less conventional mobile armed establishment, there is no doubt that the trend of the last years has been towards increasing the first one and reducing the second. While it is difficult to judge what is happening in the Soviet Union, it is quite likely that there, too, the necessity to utilize the limited human and economic resources for nonmilitary purposes, favors strongly the increased emphasis of long-range strategic deterrent power. If this is a correct evaluation, it means that whatever partial disarmament agreements can be reached in the foreseeable future, these are least likely to affect decisively the capacity of the major nations to threaten each other with nuclear devastation as a means to maintain a peace based on deterrence. What may be achieved, however, and is in the interest not only of the major but even of the minor powers, which may thus be permanently prevented from acquiring atomic armaments of their own -- is to slow down the headlong race towards more numerous and more destructive nuclear weapons and to stabilize the deterrent threat at approximately its present level. This could mean a certain relaxation of the acute world tension, which in turn could be used to press for the functional integration of the world. This "freezing" of the deterrent threat, and relaxation of tensions, seem to be on the minds of the negotiators in the London disarmament conference. The author of this paper believes that the main function of scientists in this situation is to urge the public opinion and the governments everywhere to realize that not only partial, but even complete nuclear disarmament, (which for purely technical reasons is highly unlikely under the conditions of atomic plenty) cannot undo what the scientific revolution of the last twenty years has wrought -- provided every major sovereign nation in the world for all future time with the actual or potential capacity to inflict complete destruction on mankind. It follows that only a gradual organic integration of mankind into a single community can eliminate the threat which will otherwise hang forever over mankind divided into competitive or inimical factions.

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If our concern is with reducing to a minimum the momentary danger of a nuclear war, while creating at the same time the most favorable conditions for the organic integration of the world, we cannot simply urge the removal of the "activation barrier" of deterrence. Rather, these barriers should be kept at a level sufficiently high to permanently discourage direct or indirect agressions; but the arms race should not be permitted to get out of hand, to become a national obsession and an aim in itself, but should be slowed down or even reversed to permit relaxation of international tension and abatement of fear. This is a very complex problem of statecraft and military policy. The evolution of a proper program and the popular understanding of its purpose -- so different from that of traditional military and foreign policies of nations -- is made extremely difficult, if not impossible, by the secrecy with which the relevant technical developments and policy decisions are now surrounded. It is the opinion of the author that scientists in all countries should strive to orient themselves, and to clarify the situation for the public opinion, by urging their own governments to release sufficient information. In its absence, they must use their own informed guesses to analyze the problems and to develop tentative answers -- rather than simply follow the natural tendencies of all men of good will, supporting all possible disarmament ~~measures~~ proposals and urging all possible comoromises between major nations.

As an example of the complexity of the situation, the following dilemma may be submitted. The deterrence weapons par excellence are large thermonuclear weapons, delivered by long-range planes or missiles. As mentioned before, it is unlikely that disarmament will decisively reduce the capacity of major nations for this kind of deterrence. However, it has been pointed out by many that the deterrent threat of such weapons may become illusory if they are the only ones available. In discussing

the appeal of the German nuclear physicists again atomic rearmament of Western Germany, Dr. von Weizsaecker argued that strategic nuclear deterrents will be discounted by a future aggressor whenever the object of aggression will be of no vital importance to the deterrent power. He will presume -- perhaps wrongly and then with catastrophic consequences -- that an attemnt to change by force the political system or internationl status of a country somewhere in Asia or Africa will not be considered by the population and political leaders of the major world powers in Europe or America as justifying the risk of an exchange of blows by the strategic deterrent forces. Once the deterrent proves a bluff in one case, it will be so regarded in the next one, and so on -- until a tragic miscalculation plunges the world into a nuclear war.

The usual conclusion from this consideration is that the West (and, by analogy also the Soviet block) cannot afford to give un weapons of lesser scope than the strategic nuclear bombs. It is argued, for examole, that the conventional military units of the NATO Alliance must remain at a level which would make them a defensive force in themselves, and not merely a trip wire to unleash strategic nuclear warfare. Yet, the trend of military technology and the pressure of economic necessities, pushes towards actual disintegration of military establishments other than the strategic atomic deterrent. Under these conditions, the argument of some proponents of continued nuclear tests that such tests should not be altogether stopped because they may lead to the development of small nuclear weapons without radioactive fall-out, cannot be dismissed out of hand. Rather, what is needed is to give the nations of the world the possibility to examine the validity of such claims, and to put the whole testing program under the effective control of public opinion -- instead of leaving it in the hands of small groups of individuals with vested interest in unrestricted continuation

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of their programs. It is not unlikely that such an open examination will lead to the conclusion that a contribution of continued testing of nuclear weapons to the improvement of a balanced deterrent power is much more problematical than its obvious contribution to the acceleration of the arms race and exacerbation of the feelings of the vast majority of the world population. However, a truly rational answer to this question cannot be given without close analysis — which the secrecy now surrounding this matter makes very difficult, even for scientists most inclined to look at the matter in an objective and unemotional way.

To sum up:

(1) Disarmament must be considered as part of the problem of minimizing the integrated danger of nuclear war in the foreseeable future.

(2) In the early period of UN AEC negotiations, under conditions of nuclear scarcity, total elimination of atomic weapons was a feasible aim, and, if successful, could have provided the most favorable background for the evolution of a permanently effective world peace structure.

(3) Under the conditions of nuclear plenty, total elimination of atomic weapons has become an unrealistic aim and disarmament has to be considered as a delicate problem of statecraft: retaining the deterrent barrier of atomic armaments at a minimum effective level, and at the same time, slowing down or reversing the arms race, to create most favorable psychological and economic preconditions for the development of world-wide control and functional integration projects aiming at the establishment of permanently effective world peace structures.

(4) The problem of nuclear weapons tests must be considered in the light of the same two aims — maintaining the deterrent barrier at the lowest and most all-around effective level, and reducing the tensions generated by the unrestricted arms race.

(5) The secrecy surrounding the technical and political aspects of the arms race makes an intelligent analysis of the problem of disarmament extremely difficult and endangers both the development of rational public policies in this field and the acceptance of rational solutions by the public opinion.

[1957 J1]

Proposal for the Establishment of an
International Center of Scientists
Concerned with the Impact of Science
on Public Affairs

Submitted to the Pugwash Conference by E. Rabinowitch

The problems to which the conference can address itself are partly of immediate, and partly of long-range significance.

The present scientific revolution--in particular, man's newly acquired mastery of nuclear forces--has led not only to acute dangers which must be met, but also to a need for permanent changes in human society.

Both the immediate and--even more so--the long-range problems are, to a considerable extent, determined by scientific and technological progress, with which scientists are more thoroughly acquainted than other groups of society and whose future developments they can best anticipate. Therefore, a more active participation of scientists in public affairs than has been customary in the past, is needed.

However, this participation can be fully justified only if, in facing the implications of the scientific revolution, for human society, scientists will attempt to remain true to their tradition of approaching the problems in the spirit of unprejuciced, factual inquiry.

It is submitted that such an analysis leads to the conclusion that in the future, any significant segment of mankind in possession of traditionally recognized rights of national sovereignty--which include the right to arm itself--will be able to acquire weapons sufficient for the annihilation of every other segment, or even of the whole of mankind. By acquiring weapons, it will be able either to impose its will on other parts of mankind, or to force them to acquire similar weapons to answer the threat with a counter threat.

The only objectively satisfactory way out of this dangerous and--in the long run--intolerable situation, is a reorganization of human society into an effective world community which would make it impossible for any of its parts to exercise unrestricted sovereignity in the field of armaments.

Such a community of mankind will be stable only if it is based on the awareness by mankind of its unity of interests in the scientific age, and the development of international ethics and loyalty similar to those which now assure the internal stability of individual nations.

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It is submitted that the above statements are not expressions of a political credo, but factual descriptions of a situation brought about by the scientific revolution.

Two tasks impose themselves upon scientists of the world in face of this situation. (1) How to accelerate the approcah of mankind to the ultimate, stable situation; and, (2) How to minimize the danger of the catastrophe of nuclear war during the--inevitably extended--period before this stable state is reached.

In the face of imminent dangers, there is a great pressure to concentrate our attention entirely on today's problems, such as those posed by the nuclear weapons tests. The following paper is based on the premise that an equally important contribution would be to stimulate the long-range advance of mankind towards a system which will permanently eliminate the dangerous discrepancy between the facts of the scientific revolution, and the traditional forms of social and political organization of mankind.

This is an educational task, and it is submitted here that the present conference could be a step towards the beginning of a world-wide, long-range effort aiming at educating mankind to the full realization of the dangers and potentialities of the scientific era.

It is further submitted that scientists belonging to groups with different national, economic, social, and political allegiances can nevertheless agree on the basic facts of the situation and carry out the needed educational work among their own peoples within the framework of their present loyalties.

An attempt is made below to formulate a set of statements to serve as basis for the suggested educational effort. However, formulations can be only tentative. Continued exchange of ideas and experiences between scientists of different countries will be needed to evolve a more adequate and widely-acceptable formulation.

It is therefore submitted that one of the problems with which the present conference should concern itself, is the evolution of a mechanism for continued communication between scientists in all countries concerned with the impact of the scientific revolution on human affairs. A center should be established to foster the exchange of ideas, to channel communications, and facilitate the getting together of scientists from different countries--in the same way in which the many existing international scientific organizations assist in the exchange of information in purely technical areas.

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Proposal Submitted by
E. Rabinowitch - Pugwash, July 1957

Such a coordination center could sponsor future, closer studies of different relevant problems, by initiating more authoritative and more representative international gatherings.

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Eugene Rabinowitch
July, 1957
Pugwash Conference

"APPEAL"

A large proportion of scientists in the world are now engaged, directly or indirectly, in "military research"--preparations for inflicting mass death and destruction on other countries, and reducing the death and destruction other nations could visit on their own. Much of mankind's intellectual power and ingenuity and economic assets, are now invested in the technological arms race.

Scientists--those who participate in military developments no less than those who are not involved in them--are unhappy and bitter about this situation. They believe in science asman's efforts to comprehend the world in which he lives, and as a means to advance the health and wealth of mankind. They resent the waste and misuse of science for the creation and accumulation of tools to destroy mankind.

Some scientists see a way out of this predicament in refusing to contribute to military effort, whatever country or cause it may serve. The majority are either unable or unwilling to seek this personal solution--their loyalties bind them to put their capabilities at the service of their countries and of the causes in which they believe, as do other citizens. But this does not reconcile them to the folly of the scientific arms race. Inventing and building tools of destruction merely to increase the hope that these tools will never be used--which is the common justification makes a little sense--certainly not as a permanent answer to the challenge of the atomic age. Scientists want science to be released from bondage to death and destruction. They want to work for the advancement in man's knowledge, for increased happiness and wellbeing of mankind. Scientists know that the way out of the deadlock into which history hasled mankind, is not easily found. They cannot--and do not--presume to tell the political leaders how they should proceed to establish stable peace--a world community in which science could turn its effort entirely to the pursuit of pure knowledge and to its constructive application. However, scientists of all countries--irrespective of the political, economic, and ideological framework within which they choose (or are constrained) to pursue their labors--share the knowledge of certain important aspects of the situation in which mankind now finds itself, and of the direction in which this situation is bound to change, since these aspects and trends owe their allegiance the precipitous advancement of science and technology in our time. Mankind is passing through a scientific revolution, the like of which has not occurred in the past; and scientists are inevitably more acutely

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aware of the extent and implications of this revolution than the rest of mankind. Without proper appreciation of these new facets of the world we live in, by the nations and their political leaders, the threat of self-destruction, which nowhangs over mankind, cannot be permanently removed.

The first responsibility of scientists to their own nations and to mankind as a whole, is to help make these new facts of human existence generally understood, to help their followmen to find their bearings in the world rapidly changed by science.

To this common task, scientists of all countriescan dedicate themselves without becoming untrue to their own nations and to causes which claim their loyalty.

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