

# THE FUTURE OF COSWA

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## I. Introduction

The Bulletin has given, in recent years, repeated attention to international conferences of scientists from the East and the West, called "Pugwash Conferences" (from the location of the first of them in July 1957) or, more recently, "Conferences on Science and World Affairs" (for short, "COSWA"). Several of these conferences were reviewed in the Bulletin by the Editor<sup>\*</sup>, and many papers presented by the participants were published as articles in the Bulletin. The two latest conferences of this series were held in England (the 9th in Cambridge late in August and the 10th in London early in September 1962).

At first, the "Pugwash Conferences" had been suspected in the West of being a new variety of "peace movement," orchestrated or manipulated by communists. A study prepared in 1961 by the staff of Senator Dodds' investigating sub-committee revived this suspicion; but it could quote in its support no other arguments except the obvious fact that some leading participants from the Soviet Union were communists, and that some European participants (and the financial sponsor of three early conferences) had shown pro-Soviet bias. This criticism found little response in the face of the fact that most participants from the West were of independent mind--including some out-spoken critics of Soviet policies--and that many of them enjoyed a position of trust with their governments. Papers prepared by Western participants, and statements emanating from the COSWA conferences, have shown no evidence of Communist inspiration.

Recently, an opposite view has arisen: that the COSWA conferences may be semi-official get-togethers of experts trying to find, in private discussions, a way out of the deadlock in which nations had found themselves in the official disarmament negotiations in Geneva. With the arrival of the

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Democratic administration in Washington, many active COSWA participants have become government advisors. Dr. Jerome Wiesner is Chairman of the Presidential Advisory Committee of Science; other COSWA participants are members of this committee. Professor Walter Rostow, who had taken part as observer in the COSWA Conference in Moscow in 1961, is one of President Kennedy's principal foreign policy advisors. Professor Frederick Seitz is now President of the National Academy of Sciences, and Professor Harrison Brown its foreign secretary. This new status of some participants has inevitably affected the style of the discussions, so that one of the new Russian participants was moved to remark that before he came to the Cambridge conference, he thought the COSWA conferences to be "officially unofficial," while they now appeared to him to be "unofficially official."

For the group responsible for the organization of these conferences--the "COSWA Continuing Committee"--this second interpretation was only little more welcome than the first one. Their aim has been to establish a truly independent forum for contacts between scientists (and other scholars) in the East and the West, to discuss important problems of international life either first created by science, or at least, strongly affected in our time by scientific considerations. The bringing together of experts in the field of disarmament, trusted by their governments, was considered by the Committee as a most urgent item on the program; in fact, five out of the ten COSWA conferences to date have been specifically devoted to this purpose. Informed and influential scientists, whose participation in disarmament discussions appeared most important, preferred these Conferences to be private, with no public statements issued, so that participants could feel free to express their opinions, and try to understand the points of view of others. The success of these conferences was measured not by a consensus reached, but by the feeling of the participants that, in its sessions and even more in its working groups and private conversations, certain prejudices had been destroyed and certain ideas put across. Many participants in these disarma-

ment discussions were opposed, not only to significant broadening of participation, but also to the inclusion in the program of topics other than disarmament. Some of them believed that the only justification for scientists from East and West getting together to discuss matters other than those of their professional competence--be it nuclear physics or biochemistry, computer technology or microbiology--was their acquaintance with the nature and capacities of modern weapons, with the technical aspects of their control, and with the strategies imposed by their existence--knowledge largely acquired by acting as advisors to their Governments in matters of armament and disarmament. These scientists were suspicious of an attempt to merge these conferences into a broader program, into something like an international "Pugwash movement" of scientists.

The desire to restrict the subject matter of the COSWA conferences to disarmament came also from another source--from some who did want above all a "movement," but a movement dedicated entirely to propaganda of disarmament; who believed that scientists should assume leadership in a world-wide popular campaign directed first of all, against the testing and use of nuclear weapons. They, too, had little sympathy for broader and more long-range plans, which they felt can contribute only indirectly, if at all, to the stopping of the arms race and achieving disarmament.

The influence of these two groups led to the recommendation, by a working committee of the London Conference, that the Continuing Committee should make disarmament the major topic of all future COSWA Conferences, and assign only a secondary role to other subjects. It is clear, however, that the two groups could not work together in the implementation of this recommendation, since they envisage two mutually exclusive styles of work.

The nine-men Continuing Committee, first appointed at the third conference in Kitzbühel, Austria in September 1958, was confirmed in London, but members from other countries were added to it, so that it now consists of two British, three American, three Soviet, two West-European, one East-

European and one Asian scientist; the Secretary-General (Professor J. Rotblat of England), was made an ex-officio member. This enlarged Committee is to consider the future COSWA activities--which could include, in addition to conferences, also international study groups, and the publication of a journal, or of collections of papers. (Here again, a certain divergence of opinion showed itself as to whether the subject of the journal should be restricted to disarmament or not.) A repeatedly suggested creation of an international membership organization of scientists was generally felt to require great caution; for the time being, nothing was decided except encouraging the work of already existing, and the formation of new, national groups of scientists concerned with the implications of science for world affairs, each group responsible for its own structure and program.

In the first three years, the Conferences have received little public attention. The summary of the common beliefs of their members in the so-called "Vienna Declaration" of September 1958, was not considered "newsworthy", because it contained nothing that had not been already said on many occasions by individual scientists (and non-scientists as well). The fact that this evaluation of the world situation was agreed upon by scientists from communist, uncommitted and Western countries--among them liberals and conservatives, militant pacifists and weapons experts--was not enough to attract public attention. And yet, the pronouncement did contain propositions of fundamental importance, which are as yet far from universally recognized--not to speak of accepted as guides for international behaviour. The statement not only warned of the overwhelming destructive capacity of nuclear weapons and the dangers of radioactive fallout; it also asserted the obsolescence in our time of the adage "defense always catches up with offense." It argued the need not merely to exclude nuclear weapons from national arsenals, but to eliminate war itself in all its forms from future international intercourse. It proclaimed the capacity of science to destroy civilized society (if not to wipe out mankind itself), but asserted also its capacity to provide satisfactory life for all, and called for broad international cooperation in this area. These

assertions resulted not from common ideological convictions or moral beliefs, but from rational estimation of the likely consequences of alternative policies, based on common background of scientific knowledge.

While the early Pugwash Conferences have received little public attention, the interest in them has grown among scientists in all parts of the world--in Europe as well as in America, in India and Japan, as well as in the Soviet Union. Scientists and scholars from areas not represented in the original conferences, appealed to the Continuing Committee. The conferences were initiated by physicists concerned with the implications of nuclear energy; they were early joined by chemists and biologists. Now, social psychologists, anthropologists and other behavioural scientists argued that the problems of stable peace have, in addition to physical and biological, also behavioural aspects, and that without radical innovations in education, and systematic re-direction of other forces affecting national behaviour, nations will not be able to adjust themselves to the challenge of the scientific revolution, particularly the need for permanent peace. They asked the COSWA organization to help them finding an opportunity to discuss these problems with their opposite members from different parts of the world. In London, two such pleas were presented, one on behalf of a distinguished group of psychologists and anthropologists, and the other on behalf of an equally outstanding group of educators. These suggestions aimed at further broadening of the COSWA program rather than restricting it. These pleas sounded like outside recognition of the success of COSWA in creating important channels of communication between the West and the East. So did increased public recognition, that became obvious in London--in a remarkable opening speech by the Minister of Education, Lord Hailsham, \* and in telegrams from President Kennedy, Premier Khrushchev, U. N. General Secretary U Thant, Premier Nehru and other chiefs of states. While the telegrams from Khrushchev and Kennedy spoke only of contributions scientists could bring to disarmament, the speech by Lord Hailsham suggested a much broader responsibility.

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\* BAS, December 1962.

This situation calls for a critical review of the achievements of the past COSWA conferences, and sober evaluation of their future possibilities.

## II. The COSWA Disarmament Conferences

The first question is: did the COSWA conferences on Disarmament achieve something? Obviously, they have brought about no spectacular breakthrough, because as of this writing, the deadlock in Geneva continues. However, it is not impossible, and even likely, that they did significantly affect national policies, both in the West and in the Soviet Union, making agreements in the area of disarmament more likely.

### (a) Suspension of Nuclear Tests

When the first of the five COSWA disarmament conferences was held in Spring 1958 at Lac Beauport, Quebec, the Soviet Union had just suspended nuclear tests, and called on the United States to do the same. On the American side, there was little trust in the Soviet suspension, and little inclination to stop testing.

Since then, properly controlled cessation of nuclear tests has become an official aim of Western policies. An unagreed moratorium has been in force for two years, and suspicions of Soviet underground testing during this time have received no official credence in America. Late in 1958, the conference of scientific experts in Geneva reached agreement on techniques of inspection; the Soviet Government has long stuck to this document (although it called for numerous internationally-manned monitoring stations within the Soviet Union and for international on-the-spot inspections of suspicious seismic events). If the United States government did not at that time use this agreement to establish the agreed inspection system, it was because some American scientists had raised the problem of muffling nuclear explosions in large underground chambers, and thus caused the United States to ask for reconsideration of the agreed control system.

While the theory of muffling was valid, even if quantitatively uncertain,

many scientists believed that construction of large underground chambers for clandestine tests would be too expensive, and that improved seismic instrumentation would, in foreseeable future, make the likelihood of detection too high for any nation to embark on an extensive clandestine testing program, using caverns, abandoned salt mines or artificial chambers to conceal them.

This expectation appears to have been correct. Subsequent changes in American official attitudes made it clear that new experiments had considerably lowered the limits of detectability of underground explosions. The Soviet Union, according to Soviet statement, had carried out only one underground explosion to test seismic detection, and concluded that underground explosions down to 5 Kiloton equivalent could be discovered at a distance of several thousand miles. When American negotiators went back to Geneva early in 1961, they were disappointed by Soviet revocation of their past agreement on control methods. The Soviet Union now asserted that the improved state of the seismic art makes the previously conceded international monitoring unnecessary, and stamps insistence on it as an attempt to legalize espionage. At the present writing, the American representatives in Geneva insist on only one provision of the originally agreed control system--international on-the-spot inspection of suspicious seismic events registered abroad; no mention is made any more of the danger of "muffled" explosions, which had caused the negotiations to break down two years ago.

Neutral nations, represented in the Geneva Disarmament Conference, suggested leaving to the nation where a suspicious seismic event had taken place, the initiative to invite an international on-the-spot inspection team. The Soviet Union accepted this proposal; but the West insisted on the right of the International Control Commission to dispatch a study group without a need for invitation. At the Cambridge COSWA Conference, it was argued that a refusal to invite international inspection in case of an objectively suspicious seismic recording would mean the same as a refusal to admit an inspection team in case of obligatory inspection--it would amount, in practice, to termination of the whole agreement. This is plausible; but if so, then

why does the Soviet Union refuse inspection by right rather than by invitation? It seems that on both sides, it is now a matter of principle that stands in the way of agreement, not a technical disagreement. The Soviet Union wants to avoid acceptance of obligatory inspection as a principle, while the United States wants this principle to be accepted. (One reason is that without it, a test ban agreement is not likely to be sanctioned by Congress and public opinion in America.) At London a proposal was made by several Russian and American scientists, suggesting that the remaining gap could be narrowed by setting up a considerable number of unmanned automatically registering seismic recorders, \* particularly in known areas of seismic activity. What the plan would achieve, is to reduce greatly the number of cases where international on-the-spot inspection would be called for; and this could make the resolution of the controversy "obligatory vs invited inspection" easier. (It was not claimed that "black boxes" will make on-the-spot investigation altogether unnecessary.)

The proposal was conveyed--together with other materials from the Conferences--to the relevant governments; it has since been brought up in Geneva by the Soviet delegate. Its genesis is described here as an example of propositions first discussed at the COSWA Conferences, which had later turned up in official negotiations. More important, however, than such specific proposals, had been the indirect influence of the COSWA discussions on the general attitudes of the governments to the problems of the test ban and of its control.

#### (b) General Disarmament

In the much more difficult field of general disarmament, too, the most important influence of the COSWA discussions may have been the encouragement of serious disarmament thinking on both sides, rather than the formulation of specific compromise solutions.

Among the specific points on which COSWA conferences have helped

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\*BAS, November 1962.



to achieve greater mutual understanding, one may quote the relation between the extents of inspection and disarmament. At the beginning, the West had proposed an universal arms census as the first step of disarmament; and the Soviet Union had denounced this proposal as "control over armaments" instead of a "control over disarmament." The associated inspection was described as "legalized espionage." After some time (during which discussions at several COSWA Conferences have intervened), the Soviet Union had clarified its point. At the Moscow conference in December 1961, the Russians made it clear that the USSR was willing to accept international monitoring of the number of weapons destroyed in every stage of disarmament, and unlimited inspection for hidden arms after total disarmament. It was not willing to permit, at any stage except the last one, any checking of remaining weapons. During the Moscow Conference, Western participants have tried to put across the idea that even if disarmament were to begin with inspection of destroyed weapons only, time would come when illegally retained weapons could cease to be insignificant compared to the legally remaining ones; at that time a check of remaining weapons will become a condition sine qua non of further disarmament. This point, illustrated by graphs on a blackboard in the best tradition of scientific colloquia, was hard to contest; and the most recent Soviet statements suggest that it has finally found its way into official Soviet thinking. On the other hand, there is no evidence that the suggestion that first stages of disarmament could be carried out with no control except over the number of weapons destroyed, has found official acceptance in the West.

Among ideas first expressed in one of the COSWA Conferences and later incorporated in Western official propositions, was that of sampling by areas. It was first developed by Louis Sohn at the COSWA Conference in Moscow in December 1960. So far, the official Soviet reaction to this idea, which would limit the inspection of remaining weapons at each stage of disarmament to certain limited areas in each country, has been negative: it, too, was called "legalized espionage."

One conception for which certain American scientists have tried particularly hard to find understanding among their Soviet colleagues was the one designated rather inadequately as arms control. Its basic proposition is that, since the main reason for distrust of insufficiently controlled disarmament is the possibility of retention of concealed weapons of mass destruction and of means for their delivery--weapons whose possession may give one side decisive immediate advantage in case of war (or a means of powerful pressure in a critical diplomatic conflict)--the thing to do is to sanction, by international agreement, the possession by each side of a certain limited number of "second-strike" nuclear weapons (i. e. weapons which could not be put out of action by an enemy in a first nuclear attack). Their presence should be sufficient to guarantee each side that it will not be exposed to a sudden nuclear attack (or diplomatic blackmail) with no deterrent capacity for retaliation. The number of such "permitted" nuclear weapons could be much smaller than that now accumulating in national arsenals--much too small to threaten the enemy's capacity for nuclear attack, but enough to inflict intolerable retaliatory damage on its population and economy. This concept was first described by several American representatives at the Lac Beauport Conference in 1958.

Whether the "arms control" solution is realistically feasible, is uncertain. The Soviet attitude towards it has been, for a long time, entirely negative. It was denounced as an attempt to avoid disarmament; but it had originated with scientists looking anxiously for a practicable first stage of disarmament. A certain sympathy for the idea in military circles in the USA may have been related to the worry that existed at that time about a possible "missile gap"--a supposed capacity of the Soviet Union to destroy, by a first strike, the retaliatory capacity of the United States. This fear was proved unfounded by the U2 reconnaissance flights, and the American military doctrine has since developed in the opposite direction: instead of aiming at second-strike capacity only, it has put considerable emphasis on development of a credible first-strike threat. Last winter, Defense Secretary

MacNamara announced a new American strategic doctrine, according to which American nuclear weapons were aimed primarily, not on centers of population or economy, but on military installations. Divested of its superficial humanitarianism, this doctrine implied a switch from second-strike to first-strike capacity--because an attack on rocket bases and air-fields must be a first strike. It does not have to be an unprovoked nuclear aggression, but could be, for example, the answer to a non-nuclear military attack in Europe. The statement by President Kennedy to Joseph Alsop early in 1962 that the United States "will not hesitate to use nuclear weapons first," which provoked a great outcry of Soviet propaganda, referred to such a situation. Soviet desire to match the creditability of American first-strike threat may have been behind their attempt to establish nuclear bases on Cuba.

In one of the recent Soviet propositions at Geneva, it was suggested that an agreed number of nuclear weapons carriers could be left in the possession of both sides in the first stage of disarmament (which, according to earlier Soviet proposals, called for complete abolition of all such vehicles). This may signify that the long-denounced "arms control" idea has begun to make sense to the Russians. Exposure to this idea in several COSWA Conferences may have had something to do with this development. Unfortunately, increased capacity of American first-strike weapons, while helping to open Soviet eyes to the desirability of eliminating such weapons, may have made American military leaders less willing to consider such a plan--particularly after this capacity has proved decisive in assuring the withdrawal of Soviet rockets from Cuba.

This summary suggests that not only in the special problem of nuclear arms tests, but also in the broader field of general disarmament, discussions between scientists at COSWA conferences have been of some significance, and are worth continuing. Even more useful in this respect could be a continuously working international study group (or groups) on different aspects of disarmament. A proposal of this kind was first made during the second COSWA Conference of Lake Beauport in 1958; its implementation

has been long delayed, among other reasons, by the need to raise a considerable amount of money--which may now be approaching solution.

The great question mark concerning the disarmament discussions at the COSWA Conferences (as well as the official negotiations in Geneva!) is: do both sides really want and not merely wish disarmament? No doubts need to be cast on the good will of both sides in their statements concerning the desirability of complete disarmament, or their agreement on a set of principles to be followed in reaching it. The matter is quantitative, not qualitative. (If scientists can bring something new into international relations, it may be a greater appreciation of the quantitative aspects, compared to the qualitative approach common in political arts and sciences!) Is disarmament a political aim of sufficiently high priority for the great powers to push it forward in the face of many obvious difficulties? Do they want its success with a will permitting to accept the risks inherent in it? Do they desire it stronger than their other political aspirations--above all, that of an increase (or at least, maintenance) of their relative military power?

### III. COSWA Conferences on International Cooperation

The question posed at the end of the preceding section: can disarmament be successfully approached without a higher priority being first assigned to it by the major powers compared to their other political and military aims--can be posed also the other way round: Is not a necessary precondition for disarmament the abatement of acute political conflicts in the world, and other international developments which would create an improved international climate of "cooperative coexistence"? Every time a crisis breaks out somewhere in the world--be it in Laos, Berlin, Cuba, or in the air high above the Urals--disarmament is forgotten and the arms race receives a powerful fillip!

The COSWA Conferences have not concerned themselves directly with the various political conflicts in the world, except for some aspects

closely related to disarmament, such as the possible creation of demilitarized zones. The conferences have, however, dealt with the broadening of areas of mutual understanding and cooperation. If peoples and governments would become aware of important common interests, their exclusive preoccupation with their conflicts would be reduced, and disarmament could be approached in a more promising atmosphere. This has been the rationale of extending the subject matter of COSWA Conferences to several aspects of international relations which are strongly affected by the scientific revolution of our time--in the hope that by promoting cooperation in these areas, scientists could improve the climate of international life.

#### (1) International Scientific Cooperation

The problem of intensifying international cooperation in science was brought up already at the first conference, in Pugwash in 1957, and again at the third conference at Kitzbühel in 1958, where emphasis was put on the need and possibility of cooperation, not only in pure but also in applied science. It soon became obvious that in this field, a genuine readiness for cooperation exists on all sides. The need for such cooperation appeared to be felt by Soviet scientists as much if not more than by scientists from the West. In 1961, it was decided to hold a special conference on this subject at Stowe (Vermont), prior to the disarmament conference scheduled in the same place. This conference met in September 1961, when the political horizon was particularly black because of the resumption of nuclear weapons tests by the Soviet Union; but it became a wonderfully exhilarating experience to all participants. Scientists from all countries vied in suggesting areas in which the advancement of mankind could be helped by world-wide scientific and technical cooperation. In five days, a report was prepared and adopted, proposing an extensive and ambitious program.

This report covered several general areas. The first and most obvious dealt with world-wide surveys, similar to those undertaken during the International Geophysical Year. They could encompass the geophysical

survey of the earth (including boring through the earth's crust); the composition, dynamics and biology of the world oceans; world-wide monitoring of thermal and mechanical energy exchange between the oceans and the atmosphere (which is a decisive factor in climatology); etc. The group was aware that much of this work is already being carried out, largely under the sponsorship of specialized agencies of the United Nations. What the group proposed, was a substantial increase in the scale of this work, giving it a much greater financial support, and attracting a more active interest and wider participation of scientific communities everywhere. Some of the projects, such as boring through the earth crust (the "Mohole" operation on the West Coast of the US, and its Soviet counterpart in Sakhalin) require enormous efforts, so that their duplication may endanger their success.

Similar survey programs were suggested also in world health and world agriculture, where the World Health Organization (WHO) and the Agricultural and Food Organization (FAO) are doing excellent work, but on a scale and with financial means which could be enormously enlarged.

Less obvious, but more imaginative was the second type of Stowe proposals: cooperation in scientific research projects in which intensity rather than broadness of coverage is essential. The most obvious of these is space exploration. At present, considerable and steadily increasing fractions of the national budgets of the United States and of the Soviet Union are consumed by space projects. As these programs get under way, they require not only more and more money, but also--what may be more critical--an increasing fraction of national scientific and technical manpower. In the United States, the now envisaged moon expeditions alone will call for a substantial part of the national technically-trained manpower; the drain must be equally strongly felt in the Soviet Union. Much of this work is duplication. Of course, construction of large rockets, their fueling and instrumentation, are military secrets; but some day it will probably turn out that the solutions obtained on both sides were not too different, and that

cooperation would have made little difference for the relative military power of the US and the USSR, while it could have saved both sides great amounts of money and time in space exploration.

Even in military research, jealously kept secret by both sides, they ultimately help each other--the development of atom bombs in America has stimulated the realization of nuclear weapons capacity in the Soviet Union; the building of giant Soviet rockets has smoothed the path for a similar development in the US. But in these areas, the short-range interests of competitive success are of the essence--because the purpose of progress in military art is not a certain absolute achievement, but only to be stronger than the potential enemy. There is no long-range common interest in this field, to counteract the short-range competition!

Unfortunately, East-West competition is now the main driving power behind the investment of national funds and manpower in the two space projects; the "race to the moon" has become a symbolic struggle for technological priority between two social systems, something like a "combat of God" in medieval justice; whoever wins the race, leads the world! However, there are limits beyond which no purely national effort in space will be able to reach, and where both competitors will have either to stop, or to pool their efforts. Scientists must hope for growing rationality in human affairs; and from the rational point of view, the earlier and the more far-reaching will be international cooperation in space research, the better.

Similar, although less spectacular situation exists in other areas of scientific research. Particle accelerators for research in high-energy nuclear physics have become so expensive that European nations had to combine their efforts in the Geneva CERN laboratory, to build one of them. In the same way, nations of the Eastern block have been made partners in the Soviet Accelerator Center in Dubna, near Moscow. The straight-line accelerator projected at Stanford University is to cost hundreds of millions of dollars; Congress has twice balked before appropriating this money. Combining funds and scientific manpower from the East and the West in a common effort to reach deeper into the mysterious world of elementary

particles, by building much more powerful accelerators than are in existence or under construction now, has been repeatedly proposed by physicists in recent years. This proposal was taken up in the Stowe report. It was suggested that <sup>the World Accelerator Center be combined with</sup> a "World Computer Center," containing computing machines of a complexity which no single nation can easily afford. Such a center would provide unique facilities not only for work in nuclear physics, but also for biological research--the unraveling of the structure, and understanding of the function, of proteins, nucleic acids and other macromolecules which are the "stuff of life."

The accelerator and computer center could become a true "world capital of science," staffed with international personnel, to which scientists from all parts of the world would flock to work with its unique instruments and to participate in discussions with colleagues from other countries in a more regular way than this is possible now at various international Congresses, Conferences and Symposia.

A suggestion was made, and received with sympathy on both sides, that locating this world scientific capital in West Berlin could help securing its future because all nations would have a stake in the maintenance of open <sup>with this capital</sup> communications; this specific proposal was not included in the report, in recognition of the fact that this would have taken it too far into a controversial area of contemporary politics.

With the proposed projects requiring sums substantial even in comparison with the military budgets of the major nations, their implementation would make peoples and regimes who now consider all their interests as antagonistic, conscious of considerable areas of common interest. The Stowe report argued that recognizing the existence of such common interests, and making a large financial investment in them, could be an important contribution to the creation of an atmosphere of international trust, badly needed for successful resolution of political conflicts, not to speak of successful disarmament negotiations.

Science has always been recognized as an international activity, a common effort of all mankind; but only recently nations have begun to



understand the importance of this activity, and to invest a sizeable proportion of their income in it. In the last fifteen years, the understanding has grown that practically all important advances in the useful arts of medicine and technology are fed from the deep sources of disinterested scientific inquiry, and would soon stagnate if these sources were to dry up. A few years ago, a Secretary of Defense in the American Administration, could announce that he does not care "why grass is green," (which was to him a good example of useless knowledge); he did not see why the American Government should support research into this or other, similarly impractical, fields. It may be not too optimistic to say that this blindness has by now been largely overcome, not only by Secretaries of Defense but also by a sizeable proportion of Senators and Congressmen; a similar awakening is going on, more or less rapidly, in other advanced countries of the world. What the political leadership and the public opinion still only dimly realize is that supporting science, in its pure as well as its applied form, means supporting an international effort, ultimately benefiting all mankind, even if these benefits may not accrue to all nations at once. The billions of dollars now spent annually by the different nations on "Research and Development," are contributed--whether the individual nations intend it or not--to fill up a single reservoir of scientific knowledge and technological know-how. Broad cooperative international development of science and technology would merely make clearer this intrinsic universality of the scientific endeavors of mankind.

The Stowe report on Cooperation in Pure and Applied Science was submitted to all governments and has been received with signs of approval in Washington, and apparently also in Moscow. At least, not so long afterwards, proposals for international cooperation in space research, which have been under vague international discussion earlier, received a spectacular support in the cable from Khrushchev to Kennedy, sent after the first successful American orbital flight; and in Kennedy's immediately favorable response to it. Since then, negotiations on this subject have progressed slowly to a point where agreement on cooperation on meteorological satellites

and on the use of satellites in the study of the magnetic field of the earth, is ready for signature. \* The agreement is limited, but it is exactly what was proposed as first step in the Stowe report--a similarity which may or may not be accidental. As stated in the Stowe report, more spectacular forms of cooperation in space, such as sharing of manned vehicles by American and Soviet cosmonauts (which could have a tremendous psychological impact on the attitudes of both peoples!) is now near to impossible because of the military role of large rocket motors; but a wide field of cooperation is open even short of "rides together into space."

Whether the other points in the Stowe program will also be taken up through official negotiations, remains to be seen; but it has been shown again and again that, while political conflicts remain deadlocked and attempts to settle them by one-sided action lead mankind to the brink of war, and while disarmament negotiations are marking time, projects of international cooperation in science and other areas of common interest prove to be the only outlets for constructive agreement. It is to be hoped that one (or both) sides in the world conflict will soon pass from occasional introduction of specific proposal in this area to a large-scale, systematical pursuit of cooperation as a major aim of its (or their) foreign policy. In this field, COSWA conferences could be consistently useful. True, mechanisms do exist (partly governmental ones, through the United Nations, and partly non-governmental ones, through the International Council of Scientific Unions) which offer themselves for such projects; but COSWA conferences could be significant in exploring new possible areas of cooperation, and in mobilizing popular support for it--both among the scientific communities of the world, and in the public opinion and political leadership.

In this field, as in that of disarmament, it may be advantageous to support ad hoc efforts possible in COSWA conferences, by a more systematic and consistent study by one (or several) International Study Groups.

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\* It has been signed on December 5, 1962.

## (2) Technical Assistance to New Nations

If international cooperation is to have a substantial impact on the consciousness of peoples all over the world, cooperation should be pursued particularly in areas in which the usefulness of results is most easily recognizable. Medicine occurs first in this connection; certainly, medical art has been always considered as serving all mankind, and available even to enemies in war. There was no worse demonstration of barbarity of German racism than its attempts to put medical science to the service of an allegedly superior race and to the destruction of allegedly inferior ones; and one can think of no worst excesses of the cold war than attempts to stop the flow of medical knowledge across the "iron curtain"--as this did happen on the Western, as well as on the Eastern side of it!

Perhaps even more important would be the establishment of the community of interests of all civilized mankind in the advancement of agriculture, education and technology in the developing countries. This field is now treated as a theater of cold war--a minor theater for traditional military minds, a major one for some more modern politicians. As conflict decision between the two power blocks by the traditional mechanism of military contest becomes blocked by the threat of mutual nuclear destruction, the outcome of the cold war is becoming associated, in their minds, with the mobilization of "non-committed" nations under the technological leadership of one of the two major powers.

As the investment of billions of dollars in the "race to the moon" is justified by fear that the "other side" may come there first, so the spending of billions on assistance to developing nations is justified by the danger of being "beaten to it" by the other side. And yet, to a large extent, the scientific awakening and the rise of industrial and agricultural productivity of the developing nations, as well as the improvement of their health, are matters of common interest of all industrialized nations. They all have a common interest in putting an end to the cancerous state of the body of humanity, in which one half of its cells are undernourished, a state that the de facto integration of mankind by modern communications (another contribution of science!) has made dangerous to all of them. Whether the

Soviet Union or a Western nation builds the Aswan dam, or a steel mill in India, or a fishing harbor in Cuba, (provided it is really a fishing harbor!) may appear, in the short run, a move on the chess board of the cold war; but intrinsically, and in the long run, they are contributions to the--universally desirable--increase in the viability of the developing nations; as such, they are cooperative and not competitive actions. Here, as in many other fields, the difference between the attitudes of the Soviet Union and China is notable. The Chinese leaders now--as the Russian leaders in Lenin's time--consider it a waste of effort to assist a people that has not embraced communism. The Bolsheviks had once denounced attempts to improve the economic status of workers, or to feed starving peasants of pre-revolutionary Russia, because "the more miserable the masses, the more hungry peasants are driven into the city, depressing the economic status of the proletariat, the closer the inevitable victory of communism." Did not Marx outline the royal road to communism through disappearance of independent peasantry, and growing misery of industrial proletariat? But the march of history, which China alone for the time being refuses to join, has led the Soviet Union to a different attitude, and caused it to embark, to the extent of its capabilities, on a program of assistance to countries which, instead of going through the purgatory of capitalist mass misery into the paradise of communism, try to develop a viable economy by a pragmatic mixture of feudalism, capitalism and state socialism. The Soviet Union may justify this unorthodox activity, in the secret councils of the party, by the need to prevent the technological and economical development of these countries from being monopolized by the capitalist West--a consideration symmetrical to one which is still widely used in America to justify American foreign aid. But the American policy has evolved, not without continuing rear-guard flights, from the initial concept of aid as price for political and military alignment, to the realization that aid must be given without any strings attached, simply because viability and growing prosperity of every part of the world is in the ultimate interest

of our own prosperity and security. With the US political leadership and public opinion beginning to understand this long-range concern, independent from considerations of cold war; and the Soviet leadership--hopefully--on its way towards a similar understanding, would it be too unrealistic to think about gradual integration of the two assistance efforts in a common program? The Special Fund (and other agencies of the United Nations), supported by contributions from all nations, are the beginning of such a unified program. At present, their budget is only a few percent of the economic and technical assistance budgets of the separate nations (like the budget of the National Science Foundation is only a few percents of that of the military research agencies!); but both ratios should (and do) grow with time.

The scientists, who by their training and mental orientation are apt to seek intrinsic relations behind superficial appearances, must recognize the paradox of competitive efforts in technical assistance, and the logic of their coordination--as they see the logics and rationality of converting competitive space exploration efforts into a cooperative program. They cannot fail to see that even projects initiated in the framework of competitive assistance programs, become, in practice, parts of a cooperative effort. If one side builds a hydroelectric establishment, and the other a chemical plant utilizing its power, they work de facto together, and may be even forced to cooperate openly; if the power station provides a certain type of current, the chemical plant must install machinery that can use it. Examples of this kind can be multiplied, and attempts to ignore each others activities can be easily brought ad absurdum.

Cannot the West, or the Soviet Union, or both, sooner or later, make manifest what is in the essence of things, and establish, as their considered policy, international cooperation in technical assistance to underdeveloped nations? Can they agree to transfer an annually growing proportion of their assistance funds to the United Nations agencies? Ideally, activities such as those of the American Peace Corps also could be internationalized!

Of course, in technical assistance as in space research, one must realistically admit that elimination of the competitive element is likely to decrease national interest in programs now being supported by the fear that "if we don't do it, the others will." Also, while the developing nations themselves would prefer to receive assistance through the United Nations, with no political strings attached, the possibility of playing the two sides against each other in angling for bigger help, is for them a temptation, even if it necessitates walking on a political tight rope. But again, from the point of view of scientists, it is to be hoped that sooner or later, rationality will prevail over partisanship, and things which are intrinsically cooperative will be done more cheaply and more effectively in an openly cooperative way.

In the Stowe report, the proposal of cooperation in technical assistance was made in a rather general way, because of the feeling that one treads here dangerously close to very real political and ideological conflicts; that technical assistance, political penetration and ideological conversion are not easily separated. However, the experience of recent years must have shown to the American as well as the Soviet leadership, that the best that can be expected from technical and economic assistance is an increase in viability of a new nation, making it better able to choose its own way of political and economic development--and hope that this choice will be "favorable." Building the Aswan dam by the Americans would not have automatically tied Egypt to the American political system or to American economic philosophy, any more than its building by the Soviet engineers is tying it to the Soviet political camp and communist ideology.

In one case only, that of Cuba, economic aid rapidly led to political integration into the communist system; but this was due to the geographic and economic closeness of Cuba to the United States, and the consequent inability of American leadership to consider the situation with sufficient detachment. Elsewhere in the world, however, the leaders of the developing countries have been consistently able to play Soviet assistance

against Western assistance, and avoid alignment with either of the two power blocks.

### (3) Behavioral Sciences and Education

As mentioned in the introduction, the COSWA conferences have received relatively little public attention; but the awareness of these conferences, and a (perhaps exaggerated) belief in their success, have spread among scientists, and suggestions arose of widening their participation and broadening their subject matter. An economist from a developing country first suggested at Kitzbühel that the mechanism of consultation between scientists could be utilized for cooperative exploration of the economic problems of such nations. However, the idea of pooling the efforts of economists and scientists found little response among Western economists; and clearly, in order to be justified, the discussion of the problems of new nations in a predominantly scientific group has to be centered on their technical, scientific and educational aspects, rather than on their economies. This was the way the subject was approached at Stowe in 1961 and is intended to be treated in a conference planned in India in 1963.

A psychologist had first participated in the Baden conference in September 1959 in the discussion of disarmament. As mentioned in the introduction, a paper was presented at the London conference in September 1962 by a distinguished group of psychologists advocating a broadening of the COSWA program in this direction. It was argued that mass psychology is an essential, if not the most essential, cause of wars--particularly in our time, when wars have ceased to be rational methods for attaining political aims. How to prevent one nation from converting another into the image and symbol of evil, while seeing itself as image of virtue, thus creating a deadlock from which war seems the only outcome--appeared to the authors of this paper more fundamental than how to destroy weapons and to disband armies. Psychological disarmament, they argued, could alone make physical disarmament possible.

No attempt was made to bring to London psychologists from the Soviet Union; nevertheless, it was of some significance that not a single Soviet scientist rose to discuss this proposal. The concept of the psychological origin of wars is contrary to the communist theory of wars as consequences of economic or class conflicts. The idea that wars can originate in symmetrical distortion of the mutual images of two nations, is bound to appear abstruse even to Soviet physicists, not to speak of economists or jurists, some of which were present in London. Of course, in the West, too, this concept is alien to political scientists, as well as to the national leadership and public opinion; but at least it can be publicly argued, and supported by analytical studies of press and public opinion. In the East, public opinion is difficult to distinguish from an orchestrated rendition of official "Leit-motives." Furthermore the "symbols of evil" created in the East, are not Americans as a nation, but the mysterious entities called "capitalists" or "ruling circles"--while friendly sentiments continue to be professed--and displayed--towards Americans--scientists, artists, "plain people" and even visiting capitalists. In America, too, a bogey is created of communist rulers, rather than of the Russian people. On the local level, there may be a tendency to foster, in the traditional way, distrust and hatred of Russians as a people--similar to the hatred Americans have held during the last war against the Japanese (or Russians against the Germans!); but these feelings are not the chief reason for the collision course which the Soviet and the American political ships are pursuing!

However, even if one does not attribute the danger of war mainly to mutual misunderstanding of nations, social psychology clearly could contribute importantly to the solution of the central problem of our time--how to establish stable peace, which is condition sine qua non for human survival in the scientific age. In addition to analyzing the relation between nations, psychology could be applied also to the understanding of relations between economic classes and ideological creeds. Members of a different class, or followers of a different religion, always have been and still re-



main the favorite incarnations of evil in all parts of the world!

Whether problems of social psychology should be included in future COSWA conferences, hinges on whether it is possible to obtain open-minded Soviet participation in such discussions. This, only further experience can show.

Another type of problems first mentioned in early COSWA conferences by Dr. Thirring are those of education. The scientific revolution poses many grave problems in this area. An obvious one is that of education in science. How should one teach science when a teacher trained twenty years ago can have no full understanding of the living science of today, and when only exceptionally broad minds can keep in sight more than a very limited special area of a single scientific discipline? This problem, common to all countries of the world, could be usefully discussed on an international basis. (At Stowe, a somewhat related topic was raised--that of world-wide cooperation in the organization of scientific knowledge and its documentation.) However, this is not a good reason for education to be included in the COSWA program, because these conferences aim at making science a tool for peace, and not at assisting the progress of science as such. (Many critics of American education, such as Admiral Rickover, consider improvement of science teaching primarily as factor in strengthening American position in the arms race!)

A more relevant educational problem is that of educating coming generations to life in the scientific era--an era when stable peace will have to be coupled with continuous revolutionary changes in the conditions of life everywhere. For this, coming generations must be not merely given a minimum acquaintance with science; new general concepts must be evolved and communicated to them, concerning the position of mankind in the universe, of nations and creeds within mankind, and of individuals in society. This problem of education for the age of science is common to all societies; this should be recognized (and undoubtedly is to some extent recognized), by scientists in the East as well as in the West. At the first Pugwash

conference five years ago, a Soviet scientist objected to the very term "scientific revolution." He thought this an exaggeration of the fact of steady scientific growth. Soon afterwards, however, the term "scientific revolution" began to appear in public utterances of the highest Soviet leaders. (I doubt, however, that it is being used in Peking.) Many Russian scientists undoubtedly have as much understanding of the full scope of this revolution as their Western colleagues, and are aware that it sweeps over the differences between the different contemporary forms of society, and calls for their close cooperation. (even if many Soviet scientists may see communist society as giving the best opportunity to utilize science, without undue delay, for the material betterment of the people).

The problem of education for the scientific age, for the age of rapid change, encompassing all people and all societies and transforming them into a single human community, could be an eminently proper subject for conversations between scientists of the East and the West--if, and this is a big if--the pressure of conformity had by now loosened enough <sup>in the USSR</sup> to permit an open-minded discussion of problems such as the interpenetration of scientific, behavioural and humanitarian disciplines in education, to which the official dogma provide its pat answers. This, too, must be explored.

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To sum up, the author's belief is that the establishment of a stable, peaceful world is a much wider and a much longer-range problem, than merely finding technical compromises in the field of disarmament. The potential role of science in this world-wide national and international re-adjustment, and re-education of future generations, is fundamental and scientists of all countries have a legitimate and important role to play in it. Consequently, however important would be any contribution scientists could make in the immediate future to an agreement on disarmament, it should not be COSWA's only concern. Broader, long-range problems of bringing together two now basically hostile societies, should not be neglected--how to achieve a common understanding of the challenges, and

make possible the cooperative use of the potentialities, of the scientific revolution.

What must be avoided, in the broadening of the COSWA program, are two pitfalls: one is an easy diversion of the COSWA conferences into the discussion of programs which would benefit science and help scientists as such, without regard to possible contribution of these programs to peace. The other is to indulge in controversies over subjects in which as yet no basic common background exists, and therefore no useful give-and-take discussion is possible. If COSWA is not permitted to degenerate either into self-centered society for the promotion of science, or into a forum for idle ideological controversies, then--I believe--it would be proper for these conferences (and for other programs which could be sponsored by the COSWA Continuing Committee, such as study groups or international publications) to expand into new areas, provided (a) that scientists have a competence in them, and (b) that they open possibilities for increased international understanding and constructive cooperation.

Without becoming a single peaceful world community, mankind can have no viability in the age of the scientific revolution; and scientists have the responsibility to contribute all they can to the emergence of such a community.

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