50th Pugwash Conference on Science and World Affairs
'Eliminating the Causes of War'

"FIFTY PUGWASH CONFERENCES:

A Tribute to Eugene Rabinowitch"

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SINCE its inception in 1957 Pugwash has convened a large number of meetings, about 260. More than 80 per cent of these have been symposia, workshops and study groups, but we reserved the name Conference for a special type of activity held once a year. For reasons that will become apparent in the course of my talk, we have had 49 of these annual events in the 43 years of our existence. This meeting in Cambridge, now coming to an end, is the 50th in this sequence, and was thus designated as the Jubilee Conference.

It is customary to use an occasion such as a Jubilee to review the past. The organizers of this Conference have assigned this task to me, presumably because of my unique position: I have attended every one of the 50 Conferences, and I am the *only* person to have accomplished this feat.

It is usual to start a historical review from the beginning, and when I think of the First Pugwash Conference in July 1957, my thoughts turn immediately to a person who played a major role in the early days of Pugwash, but who seems to have been forgotten in the Pugwash of today. I am speaking about Eugene Rabinowitch.

There is a special reason for remembering Eugene just now: the centenary of his birth. The official date of his birth is 1901, but there is some doubt about its accuracy. Under the tsarist regime of that period - he was born in what was then, and is again now, St. Petersburg - birth certificates were notorious for being incorrect. So, I am using this large gathering of Pugwashites as the occasion to commemorate his centenary. This lecture is my tribute to a great Pugwashite.

I will be talking about Eugene mainly in the context of his involvement in the Pugwash Movement - indeed, I am blending the tribute with the review of the annual Pugwash Conferences - but I want to start with a brief general sketch of his life, and to begin by quoting what I said about him soon after his death in 1973.

"Eugene Rabinowitch was a man of many facets: a scientist and a teacher; a classics scholar and a modern philosopher; a poet and a man of letters; a journalist and an editor; a sociologist and a politician. But his main characteristic was simply as a human being, with a warm heart, filled with love and tenderness, not only for his family and friends, but for the whole of mankind. This love for humanity, and his profound belief in the potential of science to ensure a happy life for all, were the guidelines throughout his whole life, the philosophy on which all his activities were based."

The field of his academic research work was biophysics, the application of the principles and methods of physics to biological processes. At that time, this was a new scientific discipline, but has since grown amazingly; it is largely responsible for establishing the basic processes of life, such as the double helix structure of DNA, and for the momentous applications in what is now known as genetic engineering. There were then very few established chairs in biophysics, and the first Chair held by Eugene was that of Botany at the University of Illinois in Urbana. It may sound odd for a physicist to be a Professor of Botany, but there was a good reason for this: Eugene's main interests and his greatest academic achievements were in research on photosynthesis, the process by which green plants transform the energy of sunlight into chemical energy, a fundamental reaction that maintains life on Earth. Apart from carrying out basic research on photosynthesis, Eugene established a famous School of Photosynthesis and wrote a 3-volume book 'Photosynthesis and Related Processes', which was for many years *the* reference book on the subject. It is sad that despite his great contributions to science, he has not received the official accolade due to him: election to membership of the National Academy of Sciences. There are reasons to believe that this omission was a snub by the establishment for his involvement in many social and political activities, including Pugwash.

Involvement in the social and political aspects of science was certainly Eugene's main preoccupation since the Second World War. He was one of the first to recognize the urgent need and duty of scientists to be concerned about the social consequences of the tremendous advances in science and technology - the Scientific Revolution, as he used to call it. He believed that this revolution called for a correspondingly radical change in the attitude of Man towards social and political problems, especially towards solving disputes: it was vital to resolve conflicts by non-military means if the human species was not to perish in a nuclear holocaust. Eugene not only held strong personal convictions on these issues; he worked hard to convince and convert other scientists to take up this cause.

Eugene's involvement in the nuclear issue started with the so-called Franck Report, which was submitted to the then Secretary of War, Henry L. Stimson, in June 1945, a month before the first test of the atom bomb in Alamagordo. The Report was prepared by a committee of scientists working in the Chicago branch of the Manhattan Project. Its two leading members were Eugene Rabinowitch and

Leo Szilard: both early opponents of the use of nuclear weapons, but entirely different personalities with different approaches to the problem. The text of the Franck Report - which called for the international control of atomic energy, and appealed to the US government not to use nuclear weapons against civilian populations - was mainly written by Eugene.

When, despite this appeal, the United States used atom bombs to destroy two Japanese cities, a number of scientists on the Manhattan Project decided to do their utmost to ensure that such an act would not be repeated. They set up an organization, now known as the Federation of American Scientists, with the most eminent scientists in the United States among its members. The FAS took explicit stands on a number of political issues and in the early years had considerable success in moulding US policy on matters concerning the utilization of nuclear energy.

I should mention in passing that an organization with similar objectives, but on a much smaller scale, was the Atomic Scientists' Association in Great Britain, in which I was deeply involved.

Eugene Rabinowitch took an active part in the work of the FAS, but his main influence was exerted through the *Bulletin of the Atomic Scientists*, which he co-founded in 1945, and of which he was Editor-in-Chief from the beginning until the end of his life. Despite its relatively small circulation, the *Bulletin* quickly established itself as a prestigious journal with great influence in the scientific community. In the early days the *Bulletin* had to struggle for existence: the first issue was an 8-page mimeographed sheet. It was really Eugene's unbounded energy and enthusiasm, and his almost fanatical belief in the importance of the message which the*Bulletin* had to convey, that ensured its survival. He himself wrote more than 100 leading articles; their clarion call, the rousing nature of these articles were the heartbeat of the *Bulletin*.

Thanks to the solid foundations laid down by Rabinowitch, the *Bulletin* continued after his death, under a succession of editors, which included Bernie Feld - another Pugwash stalwart - and Ruth Adams and Mike Moore, both of whom I am happy to see in the audience. From a mimeographed sheet it grew into a technologically up-to-date publication, dealing with the most pressing problems of the day.

Through both these channels, the FAS and the *Bulletin*, Eugene exerted his influence and conveyed his teaching. His efforts were not confined to the United States: from the beginning he realized that since the problems created by the advances in science and technology affected the whole of mankind, a truly international endeavour was necessary to tackle them. He never missed an opportunity to press for this. Thus, when the first international conference on nuclear physics after the War was convened in Chicago in 1951, be brought together a number of participants and expounded the need to form an international

body of scientists. It was at that meeting that I met him for the first time in the flesh. This started a collaboration which developed into a friendship that lasted until his death.

In the Atomic Scientists' Association in England we too were anxious to establish contact with Soviet scientists, but this was impossible under the Stalin regime. It was only after Stalin's death and the beginning of the Khrushchev era that the prospects of a meeting with scientists on the other side of the iron curtain became realistic, and we began preparations for such an event. During several visits of Eugene Rabinowitch to London in 1954 and 1955, he and I worked out an agenda for the international meeting, which at that time was still a dream. But as it turned out, it was the actual agenda for the First Pugwash Conference.

The history of the start of the Pugwash Movement is probably well known to you, but for the sake of continuity I will recall it very briefly. The initiative came from the British philosopher, Bertrand Russell, who suggested to Albert Einstein that a group of eminent scientists should issue a statement drawing attention to the dangerous situation that had arisen from the development and use of nuclear weapons, and the consequent nuclear arms race, and calling on scientists to meet in a conference to assess the danger and seek means to avert it. Russell drew up the text of the statement and Einstein signed it just before he died in April 1955. After securing the signatures of nine other scientists, nearly all Nobel Laureates, the statement, which became known as the Russell-Einstein Manifesto, was issued to the public in July 1955. An offer to finance the proposed conference was received from Mr. Cyrus Eaton, a US-Canadian industrialist, who requested that it be held in his birthplace, the Nova Scotian village of Pugwash. Thus, in July 1957 we gathered in that village for theFirst Conference.

The historical significance of that meeting is that it brought together - for the first time - eminent scientists from all over the world, to discuss what in essence were political matters. A very small gathering, 22 in number, the scientists came from 10 countries straddling the political divide: the United States and the Soviet Union; the UK and China; France and Poland; Australia and Austria; Canada and Japan. The spread of scientific disciplines was much narrower, with only one of the 22 not being a natural scientist; about three-quarters of the total were physicists. This meant that the majority knew one another professionally if not personally; they had faith in each other's scientific integrity. This was important, considering that the meeting took place at the height of the Cold War, in a climate of fear, mistrust and hostile propaganda. We built on the confidence we had in one another's scientific integrity when discussing non-scientific matters.

The agenda for the meeting, the one which Eugene Rabinowitch and I had worked out earlier, consisted of three items:

1. Nuclear energy hazards in War and Peace;

2. Problems relating to international control of Nuclear Energy;
3. Responsibility of Scientists and International Collaboration.

In a general sense these three items have been the Pugwash agenda throughout its history; and can be described briefly as: technical, political and ethical. Under the first item we used our specialized knowledge to assess the consequences of modern warfare, primarily the effects of nuclear weapons but also of chemical and biological weapons. We are at it still at this 50th Conference, when discussing the likely consequences of the misuse of research on genetic engineering and information technology.

The second topic is the one that has occupied most of our time, in the debates on disarmament and arms control in the nuclear field, or in discussing the terms of conventions banning chemical and biological weapons, as well as a multitude of other issues relating to overcoming war and strife, and securing peace and stability.

The third item refers to Pugwash as a Movement of Scientists. It deals with the social and ethical aspects of science, a problem of increasing importance at a time when the fast advances in some areas of science and technology impinge more and more not only on the material, but also on cultural, moral, and spiritual values of the community. This was the area of special interest to Eugene Rabinowitch.

His main role in Pugwash was to formulate the principles and philosophy of the Movement, and to ensure that they were adapted to changing circumstances. Briefly, his basic philosophy was that the tremendous progress in science and technology has changed the world so much, that the traditional way of life has become obsolete. In particular, the division of the world into a number of sovereign states is outmoded and untenable. Wars have become unthinkable, since they would spell the end of civilization. The survival of mankind, and the advance of its moral and spiritual needs, must be the paramount aim of all people. The aim can be addressed only if we develop a new feeling of community with the whole of mankind. Loyalty to mankind must override all other loyalties. In the creation of the new age, scientists must play a major part, because they understand better the nature of the change; because they are better equipped to educate the general public about the requirements of the new age; and because they can take the first concrete steps towards developing the community of mankind by initiating projects of international collaboration in which scientists from many countries would work together to improve conditions of life.

At the First Conference, Eugene incorporated these ideas in a document, which he drafted and which was adopted by the whole group, under the agenda item on the responsibilities of scientists. The eleven items of common belief include the following:

"With the penetration of science into the world of atomic nuclei, humanity has entered a new epoch.
Scientific and technical progress is irreversible. With humanity basing much of its technological progress on the manipulation of nuclear forces, it is of paramount importance that war be made permanently and universally impossible.
Science develops most effectively when it is free from interference by any dogma imposed from the outside, and permitted to question all postulates, including her own. Without the freedom of scientific thought, and the freedom to exchange information and ideas, full utilization of the constructive possibilities of science will not be possible."

Let me end the account of the First Pugwash Conference by linking it with the theme of the 50th Conference. In the public statement from the 1957 Conference we said:

"The principal objective of all nations must be the abolition of war and the threat of war hanging over mankind. War must be finally eliminated, not merely regulated by limiting the weapons which may be used."

This echoes the famous phrase from the Russell-Einstein Manifesto:

"Shall we put an end to the human race or shall mankind renounce war?"

I hope that our deliberations here in Cambridge will help to ensure that the right answer is given to this rhetorical question.

The First Pugwash Conference ended with the unanimous agreement to continue the effort, by setting up a new organization, 'The Pugwash Conferences on Science and World Affairs', a name that we have kept despite the criticism that it is too comical to be taken seriously. This criticism probably refers to the popular children's cartoon character, Captain Pugwash.

The task of organizing further conferences was entrusted to a Continuing Committee of five persons: three from the UK, Lord Russell, Cecil Powell, and myself, one from the Soviet Union, Dmitri Skobeltzyn, and one from the United States, Eugene Rabinowitch.

No guidelines about future activities were given to the Continuing Committee. Before the first meeting of the Committee, Eugene Rabinowitch and I solicited the opinion of scientists in the United States and in Britain by means of a questionnaire. Three possible types of meetings were proposed:

- Type-A - a large meeting to deal with general problems: it would issue resolutions aimed at the world at large.

- Type-B - a smaller meeting to clarify the thinking of scientists themselves and to study the social implications of scientific progress.
- Type-C - a still smaller meeting to discuss immediate political problems; it would be directed primarily at governments.

Although the sample polled was rather small, the response was quite clear. The great majority were in favour, in about equal numbers, of activities of type-B and C. Only a few respondents were in favour of type-A activities.

This was the main point of discussion at the first meeting of the Continuing Committee, which was held in London in December 1957, chaired by Lord Russell. Leo Szilard was also present, and although not a member of the Committee he made his views unmistakably known, namely, his preference for meetings of type-C. On the other hand, Eugene Rabinowitch favoured meetings of type-B. After two days of heated debate we agreed that both types, B and C, should be pursued, though not at the same time. Type-A activities - large public meetings - were not excluded, but to be convened only rarely.

Having decided on general principles we immediately took action on them; namely, holding two conferences in 1958: one of type-C, in March, in Lac Beauport, Canada; the second, of type-B in September, in Kitzbühel, Austria.

The Lac Beauport meeting was run largely on Szilard's lines. Although we never repeated the format, the substance matter - analysis of specific items on nuclear disarmament and arms control - became the model for later symposia and workshops.

In contrast, the Kitzbühel Conference, with an agenda according to the Rabinowitch formula, dealt with a variety of topics. Apart from technological and political aspects of disarmament, it debated the necessity to end war, international co-operation in science, technology in the service of peace, and the responsibility of scientists. It became the model for, what we called later, the annual Pugwash Conferences.

The significant event of the Kitzbühel Conference was the adoption of the Vienna Declaration, an expanded version of the eleven items of common belief from the First Pugwash Conference. Although largely forgotten nowadays, it became the tenet of the Pugwash Movement. It was endorsed by thousands of the world scientific community in response to another questionnaire sent out soon afterwards.

It is called the Vienna Declaration, because it was issued to the public in Vienna, where the participants travelled to from Kitzbühel. It was also there, in Vienna, where a meeting of type-A was held. A huge assembly in the Wiener Stadthalle, with an audience of about 10,000. Although several public meetings of type-A

were held later, in conjunction with Annual Conferences, we never reached audiences of that size again.

The formula adopted for 1958, to hold two Conferences, one each of type-B and C, in one year, was repeated for several more years. Thus, in 1961, the Seventh and Eighth Conferences were both held in the United States, in the same place, Stowe, Vermont, in immediate succession. The number of participants was almost the same in both, but the actual composition was considerably different.

The first of these was of type-B, *par excellence*, as is evident from its theme: 'International Co-operation in Pure and Applied Science'. It reflected Eugene's strongly held views about the importance of collaboration in science for peace in the world; these were explained extensively in the 14- page document, written by Eugene and endorsed by the whole Conference. Its substantive opening paragraph states:

"Science misused by nations to foster their competitive interests as world powers makes possible the destruction of mankind. Science used co-operatively by all nations for the increase of human knowledge and the improvement of man's productive capacity can give all men on earth a satisfactory and worthwhile life. Scientists bear a responsibility both to foster the constructive use of science and to help in preventing its destructive use."

By contrast, the Eighth Conference, under the theme 'Disarmament and World Security', concluded with a statement of only one page, merely listing the topics of discussion.

A similar procedure was adopted in the following year, 1962, at the Conferences held in England; again two in quick succession, although this time in different locations and in reverse order: the Ninth Conference, here in Cambridge, with its theme 'Problems of Disarmament and World Security' was of the C-type, while the Tenth Conference; held in London, was of the B-type.

The London Conference, under the theme 'Scientists and World Affairs' was of a much larger size, 175 participants, about the same size as the present one. It was the first of the Quinquennial Conferences, which have acquired the role of the general assembly of Pugwash, in the sense that in addition to the usual topics of debate, it also sets the goals of Pugwash for the following five years, and deals with organizational matters, such as the election of a new Pugwash Council, the successor to the Continuing Committee, and officers.

The goals adopted by the London Conference were outlined in the public statement, issued at its conclusion:

"We scientists from 36 countries, assembled at the Tenth Pugwash Conference on Science and World Affairs, are united by an awareness that the scientific revolution has created a radically new situation for humanity, endowing man with an unprecedented capacity for creation and destruction....
Disarmament and a stable peace are essential conditions for making a new society in which poverty could be abolished. The prospect of such a world is no longer Utopian. ...
We reassert our conviction that the goal of full disarmament and permanent peace is realistic and urgent. This work is truly to be seen as a part of a long struggle for the progress of mankind, and it is one in which scientists have a responsible part to play. We call upon scientists everywhere in the world to join us in this task."

The practice of having two conferences in one year, with different emphasis in each, continued for several more years. This explains the discrepancy between the number of Annual Conferences and the number of years of our existence. The practice came to an end at the Second Quinquennial Conference, held in 1967, in Ronneby, Sweden, where it was decided that in the future there would be only one Conference per year. At the same time, a new type of Pugwash activity was initiated: symposia, of a small size, similar to the size of the earlier C-type Conferences. Thus, after ten years of experimenting, we finally settled on a format of activities which we have followed, more or less, up to the present time. The original type-C activities became the symposia, workshops and study groups. The type-B activities are now the Annual Conferences. In my mind they are largely associated with Eugene Rabinowitch.

I have spent a large proportion of my time on the first ten years of the Pugwash history, for two reasons. First, these were the formative years of Pugwash, and laid the foundations for future activities. Second, because these were the years when Eugene Rabinowitch provided so much of our moral and ethical conceptions. His main endeavour was to ensure that Pugwash was not only a forum for informed debate on ongoing political/ technological problems, but that it also had a mission: to serve as the social conscience of scientists, urging the scientific community to be accountable for the problems that have arisen from the advances of science.

Later this was formulated in the document called ‘Principles, Structure and Activities of Pugwash’, which serves as the unofficial bye-laws to the non-existent constitution of Pugwash. With modification, it is restated at each quinquennial Conference. The current version, adopted three years ago, at the last Quinquennial in Lillehammer, states:

"The Pugwash Movement is an expression of the awareness of the social and moral duty of scientists to help to prevent and overcome the actual and potential harmful effects of scientific and technological innovations, and to promote the use of science and technology for the purpose of peace."

In describing Eugene as a staunch advocate of our concern with the social responsibility of scientists, I do not want to create the impression that he was opposed to our involvement in arms control issues. No, he greatly appreciated the importance of the latter, was fully conversant with them, and often made valuable contributions to them, both on the Pugwash forum and in the columns of the *Bulletin*. But he wanted to ensure that *both* aspects figured on our agenda, and that the social responsibility of scientists was not ignored, as the 'arms controllers' are prone to do.

During the two decades after the Ronneby Conference, concern with the social responsibility aspect had to take second place to the urgent need to concentrate on halting the nuclear arms race, and preventing the Cold War turning into a hot war. Problems of arms control were discussed not only in symposia and workshops but also in the Working Groups of the annual conferences. The problem of the social responsibilities of scientists usually came up only at the quinquennial conferences.

With the end of the Cold War Pugwash began a systematic study on the desirability and feasibility of a nuclear-weapon-free world. Initially, this was the subject of special workshops, but after the results of the study were published in 1995 as a Pugwash monograph, this topic appeared on the agenda of successive annual conferences.

We also began looking into the more distant objective, of creating a world not only without nuclear weapons but without any type of weapon. A war-free world was the theme of the 44th Conference in Greece in 1994, and was - directly or indirectly - the topic of working groups in subsequent annual conferences. It culminated in this, the 50th Conference, which was almost entirely devoted to the elimination of the causes of war.

In recent years we have had very little of the B-type activities, on the social responsibility of scientists. We discussed it in early 1998, at a workshop dedicated to the centenary of Leo Szilard, and it was touched upon here, in Cambridge, in Working Group 6, on the misuse of science. However, much greater interest in the subject was taken by the group in which our hope for the future is invested: the young Pugwashites. SPUSA, the American Student Pugwash Group, is engaged in a campaign on the Pledge - a sort of Hippocratic Oath intended to be taken by young scientists at the start of their careers. The subject of the social responsibility of scientists figures frequently on their agenda, and they have even established an Annual Lecture on this theme.

In my opinion, this subject should also figure more prominently on our agenda, because - in addition to the threat from the existence of nuclear weapons - the rapid advances in several areas of technology may lead to profound societal disturbances, which may arise from the changes in the norms of life of the human community as a result of these advances; changes in economic, cultural and

spiritual values, changes that may be abhorrent to some sections of society. There is a real danger that science and scientists will be blamed for the upheavals. It will be difficult to refute such accusations, unless the scientific community wakes up to its social responsibilities. There is a greater need than ever for Pugwash to take a leading role on these issues; there is a real need to pay heed to the teachings of Eugene Rabinowitch.

Let me conclude this talk with a few words about his philosophy, a philosophy much shared by me. Eugene was aware that to many of the so-called hard-nosed realists, his ideas would appear overtly romantic. In his Presidential Address, at the 20th Annual Conference, in 1970, in Fontana, Illinois, he expressed the hope that society would adapt itself to the new technological habitat. He went on to say:

"All this sounds like wishful dreaming - and will be undoubtedly dismissed as such, even by some Pugwash scientists. But yet, it represents the only realistically tenable evaluation of man's existence on Earth in the age of science.
Scientists are accustomed to serve common interests of mankind, whatever their national or ideological commitment may be. Science is truly the first common enterprise of mankind. It is proper for scientists to accept responsibility for weaving this thread into the fabric of human society.
What was once valid for a single society - united we stand, divided we fall - is becoming true of mankind as a whole."

Is all this Utopian, a pipe dream? If it were so then we are surely doomed, for there would be no escaping a nuclear holocaust. I would rather share Eugene's beliefs, a blend of idealism and realism. For he was a giant of a man: his head was often in the clouds, but his feet were firmly planted on the ground.

Despite his inherent optimism, occasionally he would become disheartened with the lack of progress towards a safer world. These misgivings and doubts about his capability to influence events he expressed in poems; he usually wrote in Russian, his mother tongue. But these doubts were only passing moods. His own extremely active life until the very end bears witness to his fighting spirit, to his impatience with compromise and defeatism; to his unswerving determination to tackle the job ahead, notwithstanding the difficulties. If he had one criticism of Pugwash it was the timidity and caution of many participants.

As a poet himself, Eugene was familiar with the poetry of many countries, including Poland, where he spent some time in his younger days. His favourite quotation was from the most famous of Polish poets of the 19th century, Adam Mickiewicz. As it happened, this was also my favourite quotation, and the fact that we had this in common cemented our friendship. I want to quote it in my native language; which at least a few here will understand:

'Mierz sile na zamiary, nie zamiar podlug sil.'

This short verse contains the essence of our life philosophies. An approximate English translation reads:

‘Fashion resources to the aims; not aims to the resources.’

This has been my guiding principle since the days of my youth. It still is, in my twilight. Together with Eugene Rabinowitch, I would like to see it adopted by Pugwashites.

Our aim is to ensure that science is used for the benefit of mankind; that it will help to build an equitable, peaceful world; a world without war. This 50th Pugwash Conference was dedicated to this aim. Many will say that this aim is unrealistic; but what is the alternative? We have to keep our target clearly in our sights, and marshal our resources towards it, not just because it is the only choice, but because it is the right choice.