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P U G W A S H N E W S L E T T E R

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Editor : Dr. M.M. Kaplan
9 Great Russell Mansions
60 Great Russell Street
London WC1B 3BE

C O N T E N T S

Reports of Pugwash Conferences, Symposia and Workshops represent the view of the individuals attending a particular meeting. Occasionally, the Pugwash Council or its Executive Committee issues official statements on behalf of Pugwash.

PUGWASH AND POLITICAL INITIATIVES

The last few months provided several excellent examples of a Pugwash dimension - perhaps its most important one - that is neither well known by the public at large nor fully appreciated by our own members: political initiatives. The usual image of Pugwash consists of periodic gatherings at conferences, symposia and workshops, and temperate but spirited discussions resulting in reports and other publications whose impact is difficult to measure. We proceed in those meetings with the hope that, if not singly then cumulatively, our assessments and recommendations exert some favourable influence on the major issues of our concern: arms control and disarmament, and problems of developing nations. In particular situations in the past, such as the Cuban missile crisis and the USA-Vietnam war, or with certain focal issues of the arms race (e.g. anti-ballistic missile defence, the partial test ban treaty, chemical and biological warfare, the neutron bomb), Pugwash concentrated its efforts on directly influencing decisions at the highest possible political level, while at the same time endeavouring to inform the public of the facts and implications surrounding a particular problem.

Recent examples of political initiatives undertaken by Pugwash are dealt with in this issue of the Newsletter. Perhaps the most important one concerned the question of modernization of theatre nuclear forces in Europe (p. 55). Others, while less dramatic, are also noteworthy: the Pugwash statements on the Non-Proliferation Treaty (p. 57) and the Biological Warfare Convention (p. 60), and Pugwash activities with respect to the United Nations Conference on Science and Technology for Development (p. 63).

The NATO move towards modernization of nuclear weapons in Europe was immediately recognized by our Pugwash colleagues in both eastern and western European countries as an extremely dangerous development which had to be opposed with all the resources we could muster.

The pot began to boil on the European nuclear situation in September when Henry Kissinger in a speech in Brussels brought to the surface a view that had been long debated in military and political circles of the west: a questioning of the validity of the USA nuclear umbrella being invoked at the risk of Soviet retaliation and unacceptable destruction of American cities, which implied the need for NATO forces in Europe to "modernize" their theatre nuclear forces (TNFs) for their own "protection". In October came Leonid Brezhnev's offer for negotiations, with stress on the severely destabilizing effect and potential grave consequences of NATO's projected action, and the withdrawal of part of Soviet forces from the territory of its allies in Europe.

In this heated atmosphere, the reaction of Pugwash groups in many NATO countries was uniform and immediate. All recognized that modernization of TNFs by NATO meant another twist in the spiral of the arms race which has been characterized in the past by an action-reaction syndrome, with the USA triggering a reaction on the part of the USSR through the development and deployment of a new technologically refined weapon. The consensus which quickly emerged in Pugwash groups in western European countries was that the best and most effective way that Pugwash influence could be brought to bear on political decision-makers and the public in their respective countries was to take the stand that both the NATO and Warsaw Pact countries should invoke a moratorium on all further action with respect to modernization of TNFs, notably Pershing IIs and cruise missiles in the west and SS20s and Backfire bombers in the east, and to start negotiations for arms reductions as offered by Brezhnev.

In response to requests from several leading members of Pugwash groups in NATO countries, the Geneva office supplied factual material and sober analyses of the TNF question which could be used for discussing the problem within their respective groups and with political leaders, the media and the public in their countries. Pugwashites were encouraged to contact each other and to take whatever action they deemed best to prevent this new intensification of the arms race. This was done in several of the countries. As everyone who has followed developments will know, parliamentary opposition to the NATO move in Holland and Belgium, and reservations in political circles in Denmark and Norway, broke the solid front for unconditional acceptance of the weapons confidently predicted by leading NATO advocates. When the NATO decision was made on 12 December, Holland refused to have the missiles stationed on its territory for at least two years pending the outcome of negotiations with the Soviet Union, and Belgium stated they would review their acceptance in six months' time with refusal in the offing if negotiations showed progress.

It is impossible to say at this time how much credit is owed to Pugwash action for the turn of events in the countries named above, but from oral reports I have received, such credit due may not be negligible.

On 16 December the Pugwash Executive Committee decided that in view of the situation a Pugwash workshop on "The Current Crisis on Nuclear Forces in Europe" should be convened. The workshop took place in Geneva on 19 and 20 January in which an outstanding group of 33 participants from 19 countries participated (p. 55). This was a remarkable turnout in view of the short notice for the meeting, and reflected the deep concern of the participants and their belief that Pugwash again should and could fulfil its unique function of keeping channels of communication open especially when official exchanges break down. By the time the meeting took place the intervening events in Afghanistan added another dimension to the discussions, which were frank but in the Pugwash spirit of mutual respect for often diametrically opposed opinions and perceptions.

The Executive Committee which met for one day before the workshop and immediately afterwards, apart from deciding on a revised calendar of meetings (back cover) and other matters, approved the convening of a second workshop on the current crisis for 11-13 April. The Committee recognized that with SALT II shelved for ratification in the USA and the steady worsening of international relations, continuing action and initiatives by Pugwash were imperative, especially with regard to TNFs in Europe as a prelude to SALT III. Channels of communication must be kept open and negotiations must go forward - a primary task of Pugwash.

Détente, which has suffered greatly in the past few weeks, still remains the only possible basis in the long term for achieving a stoppage and reversal of the arms race and a neutralization of the other factors propelling mankind towards a nuclear war. It is incumbent on us to keep our sights focussed on the essential issues involved in a cool and rational way befitting of scientists, and not to allow our vision to become blurred by the hot emotionalism which seems to have enveloped large segments of the public, the media and some political leaders.

M. M. Kaplan

PUGWASH WORKSHOP ON THE CURRENT CRISIS ON NUCLEAR FORCES IN EUROPE *

Geneva, Switzerland, 19-20 January 1980

Topic Headings

A. Current Crisis in east-west relations, and the dangers of failure of the world security system:
   a. NATO and WTO nuclear weapon deployments
   b. Breakdown of the SALT process
   c. Crises in other parts of the world - e.g. Middle and Far East.

B. Arms control negotiations in Europe:
   a. Perceptions and realities of security for NATO and Warsaw Pact powers
   b. Destabilizing and balancing factors of nuclear weapons deployments in Europe
   c. Interactions with MFR and SALT
   d. Bases for negotiations aimed at stopping and reversing the race for strategic nuclear weaponry in Europe.

C. Needs, prospects and mechanisms for unofficial communications and actions - role of Pugwash.

List of Participants

Dr. Frank Barnaby, Director, SIPRI, Stockholm, Sweden.
Gen. (ret.) Wolf Graf von Baudissin, formerly NATO forces in FRG, Hamburg, FRG.
Prof. Anders Boserup, adviser to Ministry of Disarmament, Copenhagen, Denmark.
Prof. E. Broda, Institute of Physical Chemistry, University of Vienna, Austria.
Prof. Francesco Calogero, Prof. of Theoretical Physics, University of Rome, Italy.
Prof. Pierre Dabezies, University of Paris, France.
Prof. Marian Dobrosielski, Deputy Minister for Foreign Affairs, and Director, Institute of Foreign Relations, Warsaw, Poland.
Prof. Paul Doty, Director, Center for Science & International Affairs, Harvard University, Cambridge, Mass., USA.
Mr. Valentin Falin, former Soviet Ambassador to FRG, and member of the Central Committee of CPSU, Moscow, USSR.
Prof. B.T. Feld, Professor of Physics, MIT, Cambridge, Mass., USA.
Prof. Jacques Freymond, Chairman, Centre for Applied Studies in International Negotiations, Geneva, Switzerland.
Prof. E.E. Galal, adviser to Minister of Health, Cairo, Egypt.
Dr. Leslie Gelb, Carnegie Endowment for International Peace, former Director, Department of Political and Military Affairs, Department of State, Washington, USA.
Prof. Klaus Gottstein, Max Planck Institute, Starnberg, FRG.
Prof. Dorothy Hodgkin, President of Pugwash, Nobel laureate, UK.
Dr. M.M. Kaplan, Director-General of Pugwash, Geneva, Switzerland.
Dr. C. Kiuranov, Institute of Sociology, Sofia, Bulgaria.
Dr. Jean Klein, Institute of International Relations, Paris, France.
Prof. Peter Klein, Institute for International Politics and Economics, Berlin-Adlershof, GDR.
Dr. R.J.H. Kruisinga, former Minister of Defence, and presently Adviser to Ministry of Foreign Affairs on Health and the Environment, Netherlands.

Col. W. Mark, Federal Military Department, Bern, Switzerland.
Acad. M.A. Markov, Academy of Sciences, Moscow, USSR.
Prof. Jorma Miettinen, University of Helsinki, Finland.
Gen. (ret.) Mikhail Milstein, Professor, Institute of US and Canada Studies of Academy of Sciences, Moscow, USSR.
Prof. M. Nalecz, Academy of Sciences, Warsaw, Poland.
Dr. Uwe Nerlich, Director of Research, Institute of Science and Politics, FRG.
Senator (formerly General) Nino Pasti, Member of Parliament, Rome, Italy.
Dr. Vladimir Pavlichenko, Academy of Sciences, Moscow, USSR.
Prof. J. Rotblat, Emeritus Professor of Physics, University of London, UK.
Dr. A. de Smaele, former Minister of Economic Affairs, Brussels, Belgium.
Prof. Jean-Pierre Stroot, Head of Belgian Research Group in Physics, CERN, Meyrin, Switzerland.
Dr. Nils Morten Udgaard, Foreign Affairs Adviser, and Deputy Foreign Editor of Aftenposten, Oslo, Norway.
Dr. M. Wionczek, Research Associate, El Colegio de Mexico, Mexico City, Mexico.

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* This meeting was arranged with the financial and organizational assistance of the Centre for Applied Studies in International Negotiations, Geneva.

Statement from the Pugwash Executive Committee

Deeply concerned with the current crisis on nuclear forces in Europe, and recent developments in the international situation which have led to a breakdown in negotiations between NATO and the Warsaw Pact powers, the Executive Committee of Pugwash convened a meeting of scientists, as well as political and military experts, in Geneva on 19 and 20 January. Thirty three participants from 19 countries who were invited as individuals, and acting in their personal capacity, discussed a series of issues relevant to the present crisis. The participants emphasized the critical nature of these developments and the increasing dangers of a nuclear confrontation. They urged an early resumption of bilateral and multilateral negotiations, and asked Pugwash to continue its efforts in this direction.

STATEMENT FROM THE PUGWASH COUNCIL ON THE SECOND NPT REVIEW CONFERENCE

(Copies of this statement, issued by the Pugwash Council, were sent to all countries which are members of the United Nations. Pugwashites are urged to call the attention of their governments to this statement.)

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(1) The NPT After 10 Years

By the time of the Second Review Conference, 10 years will have elapsed since the NPT came into force. This period has confirmed the importance of the Treaty in preventing the spread of nuclear weapons, but it also revealed its shortcomings. There is now an urgent need to strengthen the effectiveness of the NPT.

The present situation can be summarized as follows:

(a) about two thirds of all nations have joined the Treaty; but over 50 nations have not yet done so;

(b) there has been no overt violation of the Treaty by any of its members and only one of the non-nuclear-weapon states (a non-signatory of the Treaty) has carried out a test of a nuclear explosive device; but considerable activities aimed at preparation for nuclear weapon production are being carried out in several of the non-nuclear-weapon countries, and it can be assumed that a few of them may already be in possession of nuclear weapons;

(c) nuclear arms control negotiations, as referred to in Article VI of the NPT, have been carried out and some results have been achieved, the most important of them being the SALT agreements; but the nuclear arms race continues, indeed the inventory of nuclear weapons has grown considerably over the last decade and no nuclear disarmament has occurred up to now; this failure represents the most important and regrettable shortcoming in the implementation of the NPT;

(d) while safeguards agreements with the IAEA have been signed by about half of all nations, some non-signatories are being supplied by members of the NPT with nuclear facilities which could help them to produce nuclear weapons, in violation of the spirit of the NPT.

(2) New Initiatives

Concern about the increasing danger of proliferation arising from the above has promoted several international initiatives designed to curb this danger. Among the more important initiatives are the meetings of the Nuclear Supplier's Group and The International Nuclear Fuel Cycle Evaluation; there has also been some national legislation towards this aim. The main merit of these initiatives is to display a more realistic awareness of the danger implicit in nuclear weapon proliferation. However, they may create new problems and increase the probability of conflict. In particular, they may lead to a new type of economic dependence. If, as has been proposed, facilities for enrichment and reprocessing of nuclear fuels will be located in only a few countries, this might give these countries the means of control over the supply of materials essential to the economy of other countries. The division of nations into two groups, the "haves" and "have nots", already inherent in the NPT, would then be aggravated. This risk could be removed if the sensitive parts of the nuclear fuel cycle were operated internationally.

(3) Role of Nuclear Energy

The past decade has also seen a remarkable re-assessment of the scale of nuclear

energy for peaceful purposes. When the NPT came into being there was the expectation of rapid and extensive growth of nuclear power. An increase by a factor of about a thousand was envisaged for the period 1970-2020. For a variety of reasons these forecasts have not come true, and the growth of nuclear energy has been much slower and smaller. Thus, by the middle of 1979 nuclear energy contributed less than 1% of the world energy consumption. Although reactors under construction will increase the nuclear power output by a factor of 3 or 4, little further growth is envisaged, and it is unlikely that nuclear energy will play a significant role by the end of the century. At the same time there has been an increased interest in alternative sources of energy, some of which, in particular solar, may offer a more acceptable option for some countries than nuclear energy. If a large number of nations decide to opt for non-nuclear sources of energy, this will greatly reduce the opportunities for the acquisition of nuclear weapon capabilities, and thus lessen the danger of horizontal proliferation. Each nation must retain its sovereign right to choose the type of energy it wishes to develop, including nuclear energy, but there are indications that some nations - which would otherwise have little interest in nuclear energy - are maintaining such programmes for the main purpose of keeping alive the weapon option; this is a dangerous trend.

(4) Need to Strengthen the NPT

In order to fulfil the purpose of the NPT, as expressed in its Preamble, and to encourage new nations to join it, several further measures seem desirable. The aim of these measures would be to:

(a) create an international climate more conducive to nuclear restraint;
(b) implement Article VI of the NPT;
(c) strengthen the security of non-nuclear states;
(d) provide incentives for adherence to the NPT;
(e) further reduce the risk of misuse of nuclear facilities for military purposes;
(f) reduce the risk of countries becoming dependent on others in the supply of nuclear materials;
(g) avoid discrimination between nations in nuclear matters;
(h) reduce the number of nations that have to rely on nuclear power as their main source of energy.

(5) Recommendations

To achieve these aims the following steps are recommended:

(1) Significant progress should be made in arms control and disarmament in accordance with the final document of the United Nations Special Session on Disarmament; in the General Assembly; in the Committee of Disarmament; at SALT; at the MFR in Europe; further implementation and spread of the nuclear-weapon-free-zone approach, including an extension of the area effectively covered by the Tlatelolco Treaty and the adoption of the Convention for the Renunciation of Nuclear Weapons, as submitted by Pugwash to the UNSSOD; and a graduated and time-bound programme for eliminating nuclear weapons.

(2) A clear commitment be made by nuclear-weapon states to ensure that nuclear weapons will never be used to endanger the security of non-nuclear-weapon states.

(3) There should be recognition of the collective responsibility of all parties to the

NPT to take effective measures to prevent the use, or the threat of use, of nuclear weapons against NPT parties.

(4) There should be no discrimination against any NPT members by suppliers in the provision of exportable nuclear technology, equipment and material. An equitable code of conduct for the transfer of nuclear technology should be agreed between suppliers and recipients.

(5) Nuclear technology, equipment and material should not be transferred to non-NPT members unless these countries are covered by full IAEA safeguards extended to the whole nuclear cycle.

(6) Parties to the NPT should agree, and other states should be urged, to prohibit research and development programmes which might lead to the production of nuclear explosive devices.

(7) The sensitive parts of the nuclear fuel cycle, i.e. enrichment, fuel fabrication and reprocessing plants, should be operated internationally under the safeguards of a United Nations Agency.

(8) The safeguards system of the IAEA be augmented to give it authority to provide physical security for shipments of nuclear materials to and from international centres and individual countries, and in particular to ensure that no clandestine diversion of nuclear materials takes place.

(9) The IAEA be mandated to upgrade the physical security of nuclear materials, including those owned and managed nationally.

(10) There should be established an international repository of spent fuels and a bank of fresh fuels, possibly under IAEA.

(11) Individual countries should enter into agreement with the appropriate international authority about the equitable and non-discriminatory exchange of spent fuels from their reactors for fresh fuels. The supply of such fuels would be guaranteed for nations which undertake not to allow on their territories any of the plants mentioned in (7), except under special licence and international supervision.

(12) The undertakings arising from the above recommendations should apply to nuclear-weapon states and to non-nuclear-weapon states. The United States, the Soviet Union, the U.K., China, and France should agree to stop the testing of all nuclear weapons, to stop the production of all fissile materials for military purposes, and to realize some initial reduction of nuclear weapons in their stockpiles. It is important that such steps be taken within the shortest possible time.

(13) Encouragement, including financial support, should be given to countries which wish to put reliance on non-nuclear sources of energy. This might be best achieved by the setting up of a United Nations Energy Organization to act in conjunction with the IAEA and the World Bank.

(6) Implementation

The implementation of these recommendations does not require formal amendments to the text of the Treaty. It can be brought about by: a determined foreign policy aimed towards nuclear disarmament; setting out the interpretation of the text where ambiguities occur (as in the question of sales of sensitive technology to non-signatories); through separate agreements among the members of the Treaty; and through recommendations to the UN and IAEA about the setting up of any new agency, such as the international energy organization, and about augmenting the role of physical security in safeguards agreements.

(7) Political Background

Human society is organized in nation-states and this kind of international arrangement is not likely to be drastically changed in the near future. In such a framework, the spread of nuclear-weapon capabilities is certain to cause, sooner or later, major catastrophes; these will occur if nuclear weapons continue to be perceived as the basic element of international security. Thus, the hope to avoid disaster hinges on the emergence of a tendency to move away from such exclusive reliance. While complete nuclear disarmament remains the ultimate goal, there is the urgent need for a clear indication of progress in that direction, to be given by the nuclear-weapon countries, primarily by the United States and the Soviet Union. This is a necessary precondition for any antiproliferation policy to be effective.

STATEMENT OF THE PUGWASH EXECUTIVE COMMITTEE PREPARED FOR THE REVIEW CONFERENCE ON THE BIOLOGICAL WEAPONS CONVENTION

1) The Pugwash Movement, since its first meeting on biological and chemical weapons in 1959, has been concerned with the urgent need to outlaw completely both classes of weapons. We have continued to explore technical and political aspects of this problem in a series of workshops and other meetings extending to the present time. We value very highly the 1972 Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction. The first real measure of disarmament to have been negotiated internationally, the BW Convention has in our view made, and continues to make, an important contribution to international security and to the enhancement of mutual trust among nations.

2) We strongly endorse all steps which have been taken by some governments for conversion of production and other facilities for BW agents to peaceful purposes, such as cancer research and vaccine production. The need of developing countries in particular require increased efforts for international cooperation in combatting diseases through collaborative research and development in diagnostic procedures, improved vaccines, and other similar activities. These activities could be coordinated by the World Health Organization.

3) We attach special importance to the conception of the BW Convention facilitating progress towards the prohibition and elimination of all types of weapons of mass destruction and towards general and complete disarmament under strict and effective international control. Reflecting compromises made during the negotiating process, the preamble of the Convention also notes that agreement on BW disarmament represents a possible first step towards a convention prohibiting chemical weapons, and under Article IX States-party are required to continue negotiations in good faith towards the conclusion of a CW Convention.

4) Confidence among nations in the effectiveness of the complete prohibition that would thereby be achieved of chemical and biological warfare weapons would bring universal benefits, not only as a further concrete step towards general and complete disarmament, but also in liberating scientific inquiry in the field of the life sciences from those debilitating constraints imposed by the possibility of warfare applications. The scientific community is now in a period of rapid and accelerating understanding of the basic biochemical and cellular processes of life. As this knowledge expands, so too will the range of its possible applications for good and ill. The creation of an effective CBW disarmament regime would eliminate as grounds for suspicion and self restraint the possibility perceived by many scientists in the field that their future contributions, whether at the level of basic theory or of application to human needs, may come to be abused by military interests. It would allow future scientific inquiry to proceed under those conditions of openness and public scrutiny which would both stimulate progress and ensure that the increasingly profound knowledge of life processes be devoted solely to beneficial purposes. The BW Convention has already demonstrated its value in precisely this respect as regards the development of DNA hybridization technique. But, as we note below, there are other areas now being developed in the life sciences where the BW Convention, in the absence of a CW Convention, is less clear-cut in its application. For this reason we believe that one of the most important tasks before the BW Convention Review Conference is to review progress in the CW negotiations, as specified in Article XII of the Convention, and to assist in whatever ways possible the speedy conclusion of agreement on effective measures for the elimination of chemical weapons, whether by conversion for peaceful purposes or any other means.

5) The entry into force of a comprehensive CW Convention would nullify whatever adverse consequences there could be in certain of the ambiguities that exist in the scope of the BW Convention. In particular, potential CBW agents which might be regarded as 'toxins' under one of the several competing definitions of this term, but not as such under other definitions no less widely used, would indisputably fall within the combined scope of the BW and future CW Conventions. But this, we believe, should not be taken as reason for ignoring the ambiguities in question during the Review Conference. In the first place, the period of time elapsing before the entry into force of a CW Convention may not be short. In the second place, it seems likely that the measures which the CW Convention will contain, whereby States-party may derive and provide reassurance about fulfilment of obligations, will differ substantively from those contained in Articles IV, V and VI of the BW Convention.

6) Under the prevailing state of the relevant technologies, there do not appear to be any CBW agents of a type disputably classifiable as 'toxins', whose military potential may definitely be regarded as superior to that of currently stockpiled CW agents. For the present, therefore, a solution to the toxin problem does not need to be found as a matter of the highest urgency.

Indeed, there may be merit in preserving the present ambiguities. But what is important in our view is that there be full recognition that the relevant technologies are developing very rapidly and that it is not inconceivable that a CBW agent of the foregoing type might soon emerge, by chance if not by design. Particularly relevant here is the likelihood that chemical and allied manufacturing industries will gradually reduce their present relaince on oil and refinery products: the shift away from a petroleum base could well be accompanied, as it is already in a few countries, by greatly increased investment in biotechnology - which is to say that category of process technology which relies on manipulating the behaviour, physiology or structure of living organisms in order to produce substances that are useful to man or otherwise marketable. Fermentation, enzyme catalysis, and biosynthesis all fall within the category, and all seem capable of providing, possibly on a large scale, a range of highly toxic substances of which the full extent can at present only be guessed. In terms of BW/CW Convention scope, these substances would all be located within the grey area that lies between chemical and biological agents.

7) It would be essential, in our view, for the agenda of each successive review conference to include consideration of a report prepared by qualified experts on recent developments in pertinent areas of science and technology, including industrial microbiology and other forms of biotechnology. To be an adequate guide to policy, such a report would need to draw from a wide range of expertise. Familiarity with, for example, biological-warfare defence problems, relevant trends in industrial innovation, and advances in basic theory, should be required of those charged with preparation of the report. These requirements will not be easy to fulfil adequately. The Pugwash Movement stands ready to assist in whatever fashion it can.

8) The dangers inherent in possibilities of this kind, as well as in certain other ambiguities in the scope of the BW Convention, could give rise to suspicion and deterioration of confidence among States-party. We strongly recommend, therefore, that the Review Conference consider establishing both of the following forms of consultative machinery:

a. Recurrent review conferences having the same terms of reference as the present one, to become conterminous, ultimately, with the review conference or conferences required by the future CW Convention.

b. A Standing Consultative Committee of States-party.

Summary

In view of the above we consider that:

1. The BW Convention has made, and continues to make, an important contribution to international security and to the enhancement of mutual trust among nations.

2. The recognized inclusion of DNA hybridization techniques under the BW Convention should not be modified in any way.

3. Every effort should be made to accelerate progress towards a chemical weapons (CW) treaty for the elimination of chemical weapons, including their conversion for peaceful purposes or by any other means, and taking into account certain of the ambiguities that exist in the scope of the BW Convention. In this connection the Review Conference should establish consultative machinery which would be charged with the preparation of recurrent review conferences. The agenda of these conferences should include an assessment by qualified experts of recent developments in pertinent areas of science and technology, e.g., industrial microbiology and other forms of technology.

4. A standing Consultative Committee of States-party should be established to examine problems which arise between consecutive review conferences.

ADDRESS OF THE PUGWASH DIRECTOR-GENERAL TO THE UNITED NATIONS CONFERENCE ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT

Vienna, 28 August 1979

It is an honour and a privilege to speak briefly to this distinguished audience on behalf of the Pugwash Conferences on Science and World Affairs, representing some 1800 eminent scientists throughout the world.

As many of you may be aware, including a number of scientists attending this Conference who are part of our Movement, the Pugwash Conferences were started in 1957 in response to an appeal by Bertrand Russell and Albert Einstein for leading scientists of countries of different - and often opposing - political views to meet and discuss the peril of a nuclear war, and to find ways and means of overcoming the very great danger of a nuclear holocaust which would mean the end of civilization and possibly of mankind itself. Twenty-two years later, we find ourselves facing the same peril, and in many ways a much more complex situation than existed in 1957. That doesn't spell much progress, although nuclear war has not occurred - perhaps more a matter of luck than wisdom.

Since that time Pugwash has held 29 Conferences, most of them annual meetings, and specialized workshops and symposia - over 75 in number - to deal with a variety of subjects relevant to the problems of armed conflict and the achievement of a more equitable and just distribution of the fruits of science and technology, particularly as the latter pertain to problems of the Third World. In my brief presentation I shall deal primarily with our concerns for developing countries because of our profound conviction that not only does social justice require it, but also because we realize that the social instabilities involved provide fertile soil for armed conflict and the attendant danger of escalation to a nuclear conflict.

At the opening of this Conference Secretary-General Kurt Waldheim and President Rudolf Kirschläger made stirring appeals for a stop to the ever-accelerating arms race and for significant steps towards disarmament, both of which have eluded all efforts. They pointed out the tremendous social and economic costs caused by the distorted application of science and technology for military purposes, and the great benefits which could accrue if these resources could be diverted for peaceful purposes, and especially for the benefit of developing countries.

While we in Pugwash agree fully with the views expressed, it would be a gross mistake to consider that benefits of savings from military expenditure would automatically be transferred to assist the developing countries in their struggle to achieve a better quality of life for their peoples. Nothing in recent political history gives any reason for optimism in this respect. Realistically speaking, we must pursue the parallel paths of stopping and reversing the arms race and of establishing the requirements for achieving a new international economic order, knowing that they are interdependent.

Obviously, repeated exhortations for sanity concerning the arms race and disarmament have failed, and we can only hope that a ground-swell of outraged public opinion will develop in time to force governments to take the concrete steps necessary to save mankind from the devastation which awaits us all if nuclear war occurs, and to spare the developing countries the recurrent calamities of conventional wars and attendant suffering they have experienced so frequently since World War II.

With respect to problems of developing countries, Pugwash has drawn on the social consciences and social responsibilities of the leading scientists of over 60 countries - developed and developing - to focus their minds and talents on issues for which Pugwash could make unique contributions. These have not been negligible both on the part of individual Pugwash scientists and their laboratories, and collectively as a Movement. I shall spare you a detailed recital, but I should like to mention two contributions prepared specially for this Conference. They are the Pugwash Guidelines for International Scientific Cooperation for Development, and the statement of the Pugwash Executive Committee on Military Technology, Disarmament and Development (see Pugwash Newsletters, Vol.16 Nos.3 & 4).

The Pugwash Guidelines for International Scientific Cooperation for Development was the product of almost $1\frac{1}{2}$ years' work, including three meetings held respectively in India, Morocco and Bulgaria. Drafts of the Guidelines were subjected to careful scrutiny by over 60 scientists from 35 countries, with additional comments solicited from our membership as a whole. We are pleased to note that the product of this labour has been helpful in formulation by the Group of 77 in their draft Programme of Action. These Guidelines have already received wide notice and favourable comment from various governmental circles, some members of the United Nations system, the academic community, funding agencies, and even some trans-national corporations. We are confident that these Guidelines will serve as a reference source in the future for individuals and groups truly concerned for the rights and interests of developing countries wherever and whenever international scientific cooperation is involved.

Our second contribution to UNCSTD is a statement on Military Technology, Disarmament and Development. We have condensed into a short document the principal considerations underlying this vast subject. The brief analysis made in the statement ends with a few specific recommendations for action which we hope this Conference will take carefully into account. They are pragmatic and not sensational, and perhaps because of this approach their chances for implementation will be increased. Briefly, they include the following:

1. An investigation as to the ways in which the present practices of transfer of arms and military technology can be constrained by international control, for instance, through a code of conduct.

2. A voluntary tax on military expenditure in <u>all</u> countries, which would be pooled centrally and used for development purposes. President de Gaulle failed with a similar proposal for a fight on cancer some 15 years ago, but war is a much more lethal enemy.

3. International conversion projects whereby scientists and engineers, as well as development facilities, are transferred from militarily-oriented programmes in order to solve urgent problems of civilian relevance particularly important for developing countries. These could involve new transport systems on road, rail, or canal; energy conserving equipment or alternative energy systems, based on renewable energy sources; medical systems like sight for the blind using radar; and improving production in agriculture, mining and manufacturing.

In the final analysis, however, these proposals represent at best temporary solutions aimed at buying time. As Pugwash continues to assert, in the long run, unless the arms race is reversed and war is eliminated, mankind faces total disaster. Just as the solution of the economic and social problems of the world requires the eventual establishment of a new international economic order, so does the assurance of peace with justice demand the construction of a new international order in which the resort to force for the solution of conflicts will be eliminated.

M.S. Wionczek

THE MEAGRE RESULTS OF UNCSTD

In spite of nearly three years of world-wide preparations for the United Nations Conference on Science and Technology for Development (UNCSTD), and two weeks of negotiations at Vienna, little substance can be detected in the final text of the UNCSTD Programme of Action, with the exception of an agreement to establish a small special fund, based upon voluntary but regular contributions, initially for the period of two years (1980-1981) and to be administered - upon insistence of the western industrial countries - by the United Nations Development Programme (UNDP). The rest of the 50 pages-long Programme of Action consisted of three major parts: (1) strengthening the scientific and technological capacities of developing countries; (2) restructuring the existing pattern of international scientific and technological relations; and (3) strengthening the role of the United Nations in the field of science and technology and the provision of increased financial resources. This is mere rhetoric.

In fact, no action targets on international, regional and national scale were agreed upon in Vienna; no concrete commitments were made either by developed or developing countries; preparation of an operational plan for carrying out the Programme was left for the future, and the same was decided in respect to science and technology activities and policies within the United Nations system. Thus, while technically the UNCSTD cannot be described as a failure, its contribution to the international mobilization of science and technology for development is close to nil. This judgment may sound harsh, but it reflects much better the reality than the painfully negotiated final agreement known as the Vienna Programme. As an UNCSTD assessment,published in Science a few weeks after the UNCSTD adjournment, put it, "U.N. Technology meeting lacked clear direction and produced few concrete proposals."

The UNCSTD was not a technical failure because no major party participating in the largest and most expensive of the U.N. jamborees of the seventies had interest in a confrontation, in spite of threatening voices of the Group of 77 heard in the successive five meetings of the UNCSTD Preparatory Committee and during the first week of the UNCSTD itself.

The Group of 77 did not want any new confrontation with the industrial countries because of its weakness, division and limited political and technical competence. The Declaration on Science and Technology for Development, adopted at the ministerial meeting of the Group of 77, held at Bucharest on the eve of the UNCSTD, stated:

> "Science and technology must become a fundamental resource for increasing production for the rational and efficient use of raw materials and energy, for preserving and improving the environment, and for enhancing the quality of life, and to achieve these ends the ability to harness modern science and technology is essential."

If the Group of 77 were really serious about these matters its members would have made their case for international funding of science and technology for development at UNCSTD much more convincing. They would have committed themselves firmly to the development of their scientific and technological capacity through their own efforts instead of merely asking for $2,000-4,000 million of external funds, insisting on the creation of a "global information system", and proposing the establishment of an inter-governmental coordinating committee under the U.N. General Assembly. Accepting concrete commitments by the Group of 77 would have involved, however, a lot a painful soul-searching, urgent domestic reforms, and allocating more local resources for science and technology. Such a position would have

involved in turn, however, questioning the validity of the fashionable and "easy" solutions based upon the assumption that money and free access to scientific and technological information can do away with dramatic secular backwardness of science and technology in most of the developing countries (LDCs).

The advanced western countries had reasons of their own not to raise basic issues at UNCSTD, because they are passing through the most painful crisis of the post-industrial era without seeing clearly the way out of it. Moreover, because of the highly politicized nature of North-South relations, and after the ugly confrontation that took place last May at UNCTAD V in Manila, the industrial nations - whether capitalist or socialist - were not in a position at UNCSTD to send the Group of 77 home with empty hands. The political cost of another confrontation in Vienna was perceived by the advanced countries as much higher than with the financial cost of their counter-proposal calling for a UNDP science and technology special fund. Moreover, from the first day of UNCSTD everybody knew, in the corridors of the Vienna Stadthalle where the conference was held, that the Group of 77 would accept any face-saving device as long as it would involve the provision of some new money.

There were other actors present at UNCSTD highly interested in avoiding it becoming a technical failure: hundreds of U.N. system higher-level bureaucrats from all over the world but mainly from New York, Geneva and Paris. While they were divided before the UNCSTD on the issue who should take care of science and technology at the U.N. after Vienna, they were united in Vienna on the issue of giving more power to the U.N. on science and technology independently of the scope and the details of the UNCSTD mandate. Consequently, the U.N. bureaucracy was a natural ally of the Group of 77 in respect of financial and institutional arrangements, contained in its original draft Programme of Action. Since the U.N. bureaucracy shared with the Group of 77 and with advanced countries a wish to avoid a technical failure, a partial satisfaction for all major parties concerned was achieved.

Thus, the conditions assuring the elimination of the danger of a technical failure of the UNCSTD were present at Vienna since the first day of that August jamboree. And if the compromise was not achieved the first day, it was due to the ceremonial nature of the gathering rather than to the existence of conflicts.

By the beginning of the UNCSTD second and final week everybody except a few scientists - the most naive of all souls - was relieved and reasonably satisfied. Representatives of the advanced countries, irrespective of ideology, were talking glowingly about "the seed money" for future science and technology for development, while those on the other end of the negotiating table were complaining "sotto voce" about the cold reality which was forcing them to accept "a few crumbs from the rich men's table".

A question whether the UNCSTD was a success in substantive conceptual and policy terms must unfortunately be answered negatively, although the Paris Le Monde described it as a relative victory for the developing countries. Paradoxically perhaps, the Conference was on the whole much worse than some - albeit not many - parts of the UNCSTD preparations, particularly a series of the UN Advisory Committee on the Application of Science and Technology (ACAST) sponsored international symposia held earlier in 1979.

Nowhere was the intellectual sterility of the UNCSTD exercise seen better than in its treatment of the agenda item 4, Science and Technology for the Future, which presumably was to form a core of the Vienna conference. It became instead a pain in the neck for the UNCSTD secretariat, for a legion of outside consultants, and for a sizable contingent of scientists

present in Vienna. It is no secret that neither the UNCSTD Secretariat nor the official participants in the five successive meetings of the UNCSTD Preparatory Committee had any idea how to handle the subject.

Since two unrelated reports commissioned by the UNCSTD Secretariat and presented at Vienna under the impressive titles of "Dynamism and Development" and "The Critical Point" were not read by the Vienna crowd, and the agenda point was still pending, a working group was improvised to dispose of the matter through the elaboration of some sort of brief instant text to be adopted at one of the final UNCSTD plenary sessions, once the 150 speakers in the general debate had finished their marathon. Towards the end of the UNCSTD a highly disappointing general report emerged from that working group amidst the comments that since it was not adding anything new to the debate, it should be forgotten.

The most superficial treatment offered at Vienna to the issues of science and technology for the future, the frontiers of science and similar important subjects, offers final evidence that UNCSTD was a failure.

NEWS ITEMS

Nobel Prize in Physics to Professor Abdus Salam

Congratulations on behalf of Pugwash were forwarded to Professor Abdus Salam on his designation as a co-recipient of the Nobel Prize in Physics for 1979. Professor Salam has long been active in Pugwash affairs, and cabled in reply "Deeply appreciate your message on behalf of Pugwash colleagues. Am honoured to join your magnificent roll of honour of Pugwash prizewinners."

20th Anniversary of the FRG Vereinigung Deutscher Wissenschaflter (VDW)

The VDW sponsors the FRG Pugwash Group. Its 20th anniversary was celebrated in Bonn on 28 September 1979 and was attended by over 100 leading German scientists, including several government officials. The Pugwash Director-General gave a short address describing Pugwash activities in the light of recent disturbing developments on the problem of nuclear forces in Europe.

ISODARCO. 1980

The 8th Course of the International School on Disarmament and Research on Conflicts (ISODARCO), organized by the Italian Pugwash Group, will be held in Venice August 26 to September 5.

The main topics will be the present situation and future prospects for arms control and disarmament, and regional installations in the eastern Mediterranean (Balkan area).

For further information on scholarships covering participation and full board (but not travel), write to Professor Carlo Schaerf, University of Rome Physics Institute, Piazzale Aldo Moro 2, Rome 00185, Italy.

Lord Zuckerman

THE DETERRENT ILLUSION : A NUCLEAR FACT WORLD LEADERS MUST ACCEPT

(Lord Zuckerman's timely and acutely discerning article on nuclear weapons appeared in The Times (London) 21 January 1980, and is reproduced here with his kind permission. Lord Zuckerman has participated in several Pugwash meetings, the most recent of which was in Toronto in 1978 - Ed.)

The stalemate which bedevils the SALT II agreement is on a par with what has always happened when efforts have been made to curb the nuclear arms race, a race which has helped transform the world into a potentially more perilous place than it has ever been in all human history. It is easy enough to see why the race started; why the Russians, who then did not possess weapons which it was assumed implied overwhelming military power, refused in 1946 to agree to an American proposal to place both military and civil nuclear technology under United Nations control.

It is easy enough to see why a general arms race continues in a world not at peace; why any country would want an armoury at least the equal of that of a potential enemy; why a threatened state should be fearful of being outmanned by a possible aggressor armed with superior tanks or guns or aircraft. Despite the Non-Proliferation Treaty, it is also inevitable that so long as the superpowers go on trying to outbid each other in nuclear weapons technology there will be non-nuclear states which assume that there must be an advantage in becoming nuclear powers.

And after 30 years of the nuclear arms race, it is easy to understand why there is a general indifference to its continuation; why acronyms and numbers make the subject seem too complicated for the ordinary citizen to comprehend.

But as one who was once involved, and who has closely followed its course for more than 20 years, I now find it difficult to understand the logic of the continuation of the technical race between the superpowers. And here my bewilderment is shared by a succession of Chief Science Advisers to American presidents.

We, the top advisers, were active participants in the race. We are not reformed sinners. While I cannot speak for the others, I do not believe that any one of us is so starry-eyed as to believe in unilateral disarmament. But we have none the less failed to convey to those who write theoretical dissertations about the military value of nuclear weapons the irrelevance of the nuclear arms race to the issue of national security.

If I focus here mainly on what has happened in the United States, it is only because much more has been published there by those who were involved at the highest levels of decision than has appeared in print in Britain.

First, it needs to be said that the major technological innovations that have transformed our world have not emerged as a result of clearly thought-out needs. In stimulating change, in promoting the birth of new industries, in devising new agricultural techniques, and in encouraging the launching of vast new technological projects, scientists and engineers have not been acting as servants of politicians and military chiefs who themselves knew that what was being proposed was either technically possible, or socially, economically and politically desirable or necessary.

The scientists and technologists were the ones who initiated the new developments;

who, without any coherent concern for political values or goals, created new demands; who warned the public about new hazards. They were the ones who, at base, were determining the future. The nuclear world, with all its perils, is the scientists' creation; it is certainly not a world that came about in response to any external demand.

So, at root, is the whole of today's environment of ever-rising material expectation. So, because of biomedical advances, is the spectre of over-population. So, some protest, is environmental pollution. So is the world of instant communications. So is the world of missiles. So is the unending arms race by which we are all now threatened.

There is no need to ask why the race started, or to discuss the environment of mutual hostility and suspicion which led to the formation of the NATO and Warsaw Pact alliances. Fears of Russian capabilities and intentions became acute when the first sputnik was launched in 1957. Correspondingly, the Russians became increasingly fearful of the intentions of the West.

Warnings that the Russians were well ahead of the United States in the size of their nuclear missile armoury started to be fostered and became a powerful political card in the run-up to the 1960 Presidential election. A race into space was launched. Throughout this period both sides were testing nuclear warheads in the atmosphere, with Britain participating on its own, but to a lesser extent. Very soon there was world-wide concern about the health hazards associated with radioactive fall-out. Formal diplomatic and technical talks were started to consider an international agreement to stop testing.

The original idea had been a ban on all nuclear tests, a goal for which Harold Macmillan, then Prime Minister, was certainly striving. This was also what President Eisenhower, and then President Kennedy wanted. Obviously there was no direct knowledge, but Mr. Macmillan certainly believed that Krushchev had the same goal in mind.

Unfortunately there was also fierce opposition to any treaty. Regardless of the world-wide and, from the scientific point of view, thoroughly justified concern about fall-out, there were many people in the United States and Britain, including prominent scientists in our weapons laboratories, who were opposed to any ban on atmospheric tests, leave alone an end to the elaboration of new warheads.

Their hawkish views carried considerable weight among the military, in United States Congressional committees, and in some sections of the public, who soon became persuaded that there was something to be gained by continuing the nuclear arms race, and that anyhow the Russians would be bound to cheat, whatever treaty was agreed.

Ergo, if there was to be a treaty, the Russians would have to submit to on-site inspection. Since it soon became apparent that there was no chance that the Senate would ratify a treaty for a total ban on testing unless the Russians accepted this condition - which they had made plain they would not do - President Kennedy then had to settle for one which did not preclude underground testing.

As Herbert York, the first Director of Defence Research and Engineering in the Pentagon, later wrote: "one of the political prices that the President had to pay in order to secure Congressional support for the Partial Test Ban Treaty of 1963 was a promise that the Atomic Energy Commission would embark on a programme of underground tests vigorous enough "to satisfy all our military requirements".

The so-called "missile gap" turned out to have been a myth. Indeed, the Russians

then started pressing hard to close the gap which they had perceived. This added another dimension to the arms race as, for a time, did the notion that foolproof anti-ballistic missile systems (ABMs) could be devised. The discussions leading up to the 1972 SALT I treaty exposed for both sides the futility of this particular dream, but did nothing to stop the growth and further technical sophistication of the opposing nuclear arsenals.

When ABM fever was at its sharpest in 1967, and with strong pressure from many quarters for the continued development and then the deployment of a system of defences against missiles, President Johnson summoned a meeting which was attended not only by Hornig, his Chief Science Adviser, and by the Joint Chiefs of Staff, but also by the three past Presidential Science Advisers, Killian, Kistiakowsky and Wiesner, as well as by the three men who had been in turn Director of Defence Research and Engineering - York, Brown and Foster. The discussion led the President to put the simple question about a defence system against a possible Russian missile attack: "Will it work and should it be deployed?". All present agreed that the answer was no.

By 1972 when Nixon was President, SALT I followed and the main ABM programme was then halted. But research and development on ABMs continued nonetheless. It still continues in spite of the irrefutable logic of the technical argument that no ABM system could ever be devised that would provide a guarantee that either side could escape disaster in a nuclear exchange.

However many incoming missiles might be destroyed in the course of their ballistic path, however many bombers might be brought down, enough would still get through to kill millions, to bring organized life to an end, and to nullify organized resistance - and this regardless of fall-out from such warheads as might be destroyed.

As our own White Paper on Defence put it as long ago as 1957, there were then no means of protecting the population against the consequences of a nuclear war. There are none today, when the scale of attack that could be envisaged may be a hundred times greater than it was in the 1950s.

There is no dispute about this fact. Yet today we read that nuclear deterrence based on "mutually assured destruction" might, nonetheless break down because the accuracy with which nuclear war-heads could now be delivered has improved so much that a so-called counter-force policy is possible, that both the Russians and the Americans either already, or soon, will have it in their power to deliver a "first-strike" in order to destroy military targets such as fixed missile bases.

But it is still inevitable that were military installations rather than cities to become the objectives of nuclear attack, millions, even tens of millions, of civilians would be killed, whatever the proportion of missile sites, airfields, armament plants, ports, and so on that would be destroyed. Statements of the accuracy of missile strikes are given in terms of the acronym, CEP (circular error probable), or the radius of a circle within which 50 per cent of strikes would fall.

Non-technical nuclear theorists are inclined to forget what the other 50 per cent would do. Even if one were to assume that navigational and homing devices worked perfectly, the 50 per cent outside the magic circle would not necessarily be distributed according to standard laws of probability. We also forget that even were it possible to destroy fixed missile sites with accurate "multiple independent re-entry" vehicles (MIRVS) both sides would still deploy fairly invulnerable submarine-launched missiles, as well as aircraft, which would then be

targeted against centres of population, given that one or other side thought it was losing a counter-force exchange.

In 1964, a year after the Partial Test Ban Treaty was signed, Wiesner, then President Kennedy's Chief Science Adviser, and York, who had been associated with both President Eisenhower and President Kennedy at the centre of the debate, published an article in which they argued that in assuring national security further tests of nuclear weapons were unnecessary.

As they saw it, the increase in so-called military power which might follow from further testing and from the elaboration of more nuclear weapons was bound, in both the East and the West, to bring about a decrease in national security. In the considered professional judgment of these two men - and they had all the facts at their disposal,a continuation of the nuclear arms race provided no escape from this curious paradox. This conclusion, which has since been elaborated, is one to which I had also in all logic been driven at the start of my career as scientific adviser to the Ministry of Defence.

Nor was I ever able to see any military reality in what is now referred to as theatre or tactical nuclear warfare; that is to say, of field warfare in which nuclear weapons - however modernized - are used. The analyses and studies which lead to this conclusion have never been controverted. There are no vast deserts in Europe, no endless open plains, on which to turn war-games in which nuclear weapons are used into a reality.

The distances between villages are no greater than the radius of effect of low-yield weapons of a few kilotons; between towns and cities, say a megaton. And a single one-megaton bomb could erase the heart of any great city , say, Birmingham - and kill instantly a third of its citizens. It has been calculated that a one-megaton strike over Washington would lay waste not only to the White House and the Pentagon, but Capitol Hill and almost every Government building.

If the NATO policy of "flexible response" were regarded as a means of waging actual war, then the concept would be equivalent to a game of "chicken" with nuclear weapons. The theatre nuclear weapons about which there is so much talk today - for example, cruise missiles and SS20s - are not the equivalent of the thousands of conventional bombs and shells that were expended against targets of opportunity and in the battles of the second world war and of Vietnam. NATO's armoury of so-called tactical nuclear weapons has been for years authoritatively and publicly stated to number only 7,000, of which it is now said that 1,000 are to be withdrawn. Current discussions of Russian SS20s and American cruise missiles are in terms of a few hundreds - numbers which cannot be related to scenarios of field warfare.

Clearly the major cities of Europe are not going to be threatened for the first time because the Russians are about to deploy a shorter range missile than those which are designated intercontinental. They have always been threatened.

Nor can the gulf between conventional and nuclear weapons be bridged either by so-called neutron weapons or by the Davy Crocketts which were so much in the news 20 years ago - small nuclear weapons which individual soldiers were supposed to carry as they would bazookas. There is a critical difference between nuclear weapons and so-called conventional armaments. Whatever their yield, nuclear weapons are weapons of deterrence.

The declared purpose of SALT II is to establish a measure of nuclear equivalence between the two sides, but at a level which, were the present state of mutual deterrence ever to break down, would be well above the threshold needed to devastate utterly, and without hope of repair, all the cities, even most of the small towns, of both the North American and Eurasiatic

continents, with hundreds of millions killed in a flash, and with vast numbers of those who were not so lucky then dying of the effects of radiation.

These are not extravagant statements. They are spelt out in several recent official American reports which record the results of detached scientific analyses of what would happen at different levels of nuclear exchange. Similar conclusions were drawn from corr-esponding and even more detailed studies that were carried out in Britain about 20 years ago.

No-one doubts that the Russians are as much aware as we are of these grim realities. Khrushchev knew what he was talking about when he grimly joked that the Russians might have exploded a higher yield weapon in their final series of atmospheric tests than the 57-megaton weapon which was tested, had he not feared that it would have broken all the windows in Moscow, more than 1,000 miles away.

Given the existence of nuclear weapons - and no-one supposes that they are going to be swept away - the concept of mutual deterrence, based upon an appreciation of their enormous destructiveness, is valid and inescapable. But as the years pass there is something relevant to the proposition that we are inclined to forget. It is that whatever the number of weapons each side then possessed, a state of mutual deterrence was certainly already in existence by at least the late 1950s and early 1960s.

Even at the worst moments of the Cold War neither side was prepared to risk hostilities which would result in what was euphemistically called "a level of unacceptable damage". Cuba was a prime example of the reality of the concept of nuclear deterrence. There were other occasions when both sides were fearful of approaching the nuclear brink. It is the height of folly to lose sight of such practical demonstrations as we have already had of the reality of nuclear deterrence.

All that has changed in the years since Cuba - a period when the number of nuclear warheads has multiplied on both sides, let us say, 50 times (whatever the exact number does not matter) - is, first, that with every accretion to our respective arsenals, the level of the essentially arbitary and abstract concept of "unacceptable damage" which underlies mutual deterrence has in effect been raised; and second, that we are now encouraged to believe that a theatre nuclear war could be confined.

The process of the nuclear race clearly has no logic. In the early 1970s, when Dr. Henry Kissinger occupied high political office, he declared that no meaning could any longer be attached to the concept of nuclear superiority. In his view, the threshold of nuclear arm-aments for both the Western and Eastern blocs was already well above what was needed to assure a state of mutual deterrence.

More recently, at a meeting in Brussels last September, when talking about the "modernization" of NATO's nuclear armoury, he is reported as having said that the European allies of the United States should not keep asking the United States "to multiply strategic assurances that we cannot possibly mean or if we do mean, we should not want to execute because if we execute we risk the destruction of civilization".

No stronger endorsement than this could ever be sought for the paradox enunciated by York and Wiesner in 1964 - that the continued growth of nuclear arsenals does not increase but decreases national security.

What Dr. Kissinger was also implicitly saying was that while the Russians already have it in their power (even without SS20s) to eliminate at a stroke all the major cities of the NATO

powers, and while the two European states which are nuclear powers already possess nuclear arsenals big enough to bring enormous destructive power to bear on the Soviet Union, it was up to the European partners in NATO to go through a learning process which has already run its course in the United States and the Soviet Union.

For the lesson to which Dr. Kissinger was pointing is that the two major powers know that their political differences are not going to be settled by an exchange of nuclear weapons. They know that if the battle is for the hearts and souls of men, there is no point in "winning" one for the hearts of the dead.

Without invoking any moral principles, it is impossible to see military sense in the scenario of a nuclear holocaust in which tens - perhaps hundreds - of millions on both sides would be sure to die. Nor is this a realistic option that is open to any democratically elected political leader - or one that could be exacted by any dictator - for a failure to win an arms race for which no technical end could ever be envisaged.

The battle which the presidential science advisers have waged with those who participated technically in the race at operational levels below their own seems to have been a lost cause from the start. All the presidential science advisers and the directors of defence research and engineering with whom I have discussed the problem recognize that once the threshhold of mutual nuclear deterrence has been crossed, there is no technical sense in the further elaboration or multiplication of nuclear weapon systems. But for a variety of reasons this point of view has not proved acceptable to those whom the top scientists served.

Here the armaments experts rule, and when it comes to nuclear weapons the military chiefs of both sides - who by convention are the official advisers on national security - usually serve only as a channel through which the men in the laboratories transmit their views, for it is the man in the laboratory - not the soldier or sailor or airman - who at the start proposes that for this or that arcane reason it would be useful to improve an old or to devise a new nuclear warhead. And if a new warhead, then a new missile; and given a new missile, a new system within which it has to fit.

It is he, the technician, not the commander in the field, who is at the heart of the arms race, who starts the process of formulating a so-called military nuclear need. It is he who has succeeded over the years in equating, and so confusing, nuclear destructive power with military strength, as though the former were the single and a sufficient condition of military success. The men in the nuclear weapons laboratories of both sides have succeeded in creating a world with an irrational foundation, on which a new set of political realities has in turn had to be built. They have become the alchemists of our times, working in secret ways which cannot be divulged, casting spells which embrace us all.

Kistiakowsky, the scientist who was responsible for devising the implosion system of the first atom bombs, has published a record of his days as President Eisenhower's Chief Science Adviser, in which he tells how the president's policies were always frustrated by those who consistently exaggerated the Soviet military threat.

Today he does not hesitate to declare that any analysis of the predictions that have been made of the Soviet military threat over the past 20 years will show that they have always been far-fetched. York refers to a steady flow of "phoney intelligence" from a variety of sources, and tells us that "those who had all the facts of the matter and knew there was no real basis for any of these claims (about Russian intentions and capacities) were hamstrung in any attempts

being made to deal with them by the secrecy which always surrounds real intelligence information".

Herbert Scoville, who was in charge of scientific intelligence for the CIA during the 1960s, makes the same point in a small book which was published in 1970 under the title "Missile Madness". So have others who were in the picture.

Why, then, has the testimony on these matters from respected and informed top scientific advisers been set aside? Why, instead, have the nuclear bomb enthusiasts been heeded? "The guilty men and organizations", writes York, a self-declared ex-participant in the arms race, "are to be found at all levels of government and in all segments of society".

And he goes on to say that "the majority of the key individual promoters of the arms race derive a very large part of their self-esteem from their participation in what they believe to be an essential - even a holy - cause. They are inspired by ingenious and clever ideas, challenged by bold statements of real and imaginary military requirements, stimulated to match or exceed technological progress by the other side or even by a rival military service here at home, and victimized by rumours and phoney intelligence."

"Some", he added, "have sought out and even made up problems to fit the solution they have spent much of their lives discovering and developing. A few have used the arms race to achieve other, often hidden objectives". Were there freedom of speech, the same propositions might well have been written by a Russian with York's experience.

Harold Brown, who was York's successor as Director of Defense Research and Engineering in the Pentagon and later Secretary of the Air Force, and who today is Secretary for Defense, has told us that:

"Those who have served as civilian officials in the Department of Defense at the level of presidential appointment... have recognized the severely limited utility of military power, and the great risks of its use, as well as the sad necessity of its possession... (The) higher their position and, hence, their responsibility, the more they have come to the conclusion that we must seek national security through other than strictly military means... and urgently."

That - not the theorizing and imaginings of would-be nuclear strategists - is the issue to which the world's political leaders have to address themselves. Now that the superpowers have reached a state of mutual deterrence, nuclear competition between them has little, if anything, to contribute to the resolution of the political differences between West and East.

If a way out of the political dilemmas we now face is not negotiated, our leaders will certainly learn that there is no technical road to victory in the nuclear arms race. Both sides are bound to lose such a race, a race in which there is no finishing post. Defeat is indivisible in a war of nuclear weapons.

REPORT ON THE FIRST STUDENT PUGWASH CONFERENCE held at the University of California, San Diego, 19-26 June 1979

(presented to the 29th Pugwash Conference, Mexico City, July 1979)

I am honoured to have this opportunity to report on the activities and concerns of the first U.S. Student Pugwash Conference. I pursued organizing such a meeting, which I began to develop over two years ago, because I have always believed that college students should participate, to a greater extent, in the continuing search for solutions to major national and world problems. I do not think it is pretentious to suggest that these students have the insight and intellect to do more than debate - they could be contributing. This resource has been wholly ignored by relegating student activities to academic discussions in individual campuses, in isolation from the policy-making structure. In light of the opportunities available, the educational system has not done an adequate job of sensitizing students to the major issues which they will face as citizens and leaders. It is oriented to specialty training for research and only rarely makes a deliberate effort to integrate disciplines - e.g., scientific and humanistic education.

The interdisciplinary nature of the conference is perhaps its most important characteristic. The format was structured to represent many viewpoints, consciously planned to serve the purposes of a teaching tool.

The seventy-five student participants represented over fifty U.S. institutions, and were trained in more than fifteen academic disciplines. The diversity of faculty participants was equally as salient. Each weeklong workshop was chaired by a senior scientist and humanist. Students prepared and discussed papers in five such workshops: Scientists and Defence Policy; Scientists and Political Activity; Technology and the Needs of Developing Countries; Bio-Medical Research and its Social Implications; Scientific Knowledge and Human Values.

Complementing these intensive seminars were a series of plenary programmes. A few examples suggest the calibre of these discussions: (1) The SALT II Debate, featuring George Kistiakowsky, Pete Scoville, Jeremy Stone, William Van Cleave and Dick Garwin; (2) Scientists and Political Activity, with Joel Primack, Rosemary Chalk and Sanford Lakoff; (3) World Population, with discussion by Jonas Salk, Roger Revelle and James Arnold (to mention only part of the panel); (4) Nuclear weapons debate between Daniel Ellsberg and Harold Agnew and (5) a Bio-Ethics Plenary featuring George Kieffer, Clifford Grobstein and others. Our closing plenary offered workshop reports and resolutions by students, as well as a final guest lecture by Jerry Brown, Governor of California, who presented his first major foreign affairs speech.

While I see the goals of International Pugwash as formulating consensual policy documents to impact governments and reduce critical stresses, my objectives for our conference, and potential movement, were somewhat different.

I think that students must become cognizant of major problems at an early stage of their professional development, to foster earlier, stronger interest in attacking the problems within regional, national and global contexts. Our primary goal was not to attempt to solve these problems - but rather to learn how to go about resolving such dilemmas.

I appeal to you to recognize the seriousness with which these students have undertaken the challenges of Pugwash. I propose that each international group sponsor one student observer at each Annual Pugwash Conference, beginning next year in the Netherlands. The

value of stimulating international cooperation at this level is significant. The twelve foreign students who attended our La Jolla Conference have already begun vigorous efforts to expand student interactions in their respective countries.

In the tradition of citing quotes at Pugwash plenaries, let me read the second of Leo Szilard's ten commandments: "Let your acts be directed toward a worthy goal, but do not ask if they will reach it; they are to be models and examples, not means to an end."

Jeff Leifer
University of California
La Jolla, California.

OBITUARIES

We regret to announce the death of the following Pugwashites:

PROFESSOR E. H. S. BURHOP of London died on the 22nd January 1980 at the age of 68.

Eric Burhop was a physicist whose distinguished work on elementary particles included collaboration with scientists from many countries. This aim of international collaboration was foremost in his mind not only in relation to science but also to other human activities. He was a strong supporter of détente between east and west and devoted much of his enthusiasm and drive towards these objectives. He was one of the most active members of the World Federation of Scientific Workers and for many years its President.

His links with Pugwash go back to the very beginning of the Movement when he was instrumental in the drafting of the Russell/Einstein Manifesto. Together with Powell and Rotblat he helped Bertrand Russell in the preparation of the First Pugwash Conference. He attended the First and Third Conferences, and later participated in several other Pugwash Conferences. He was also an active member of the British Pugwash Group.

SIR ERNST CHAIN of London died on the 12th of August 1979 at the age of 73. Professor Chain was a biochemist famous for his work on penicillin for which he was awarded the Nobel Prize in 1945. He took part in the 17th Pugwash Conference in Ronneby.

PROFESSOR OTTO ROBERT FRISCH of Cambridge died on 22nd September 1979 at the age of 74. He was a brilliant physicist who - together with his aunt Lise Meitner - discovered the fission process and thus laid the foundation for the practical release of nuclear energy in war and peace.

He participated in four of the earlier Pugwash Conferences, but he maintained an interest in the aims and work of the Pugwash Movement until the end.

PROFESSOR PAWEL JAN NOWACKI of Poland died on the 22nd May 1979 at the age of 72. He was Professor of Electrical Engineering and Nuclear Technology at the Polytechnic of Warsaw, and Director of the Institute for Nuclear Research at Swierk. He took part in the First and Fourth Pugwash Symposia in London and in the 21st Pugwash Conference.

CALENDAR OF FUTURE MEETINGS

(please note revised dates)

1980	We regret that the Symposium on the Nuclear Situation in the South Pacific, which was to be held in Auckland, New Zealand, 27-31 January, has had to be cancelled for the time being.
11 - 13 April	2nd Pugwash Symposium on The Current Crisis on Nuclear Forces in Europe, Geneva.
14 - 18 April	Symposium on an International Agency for the Use of Satellite Observation Data for Security Purposes, Avignon, France.
28 May - 1 June	8th Pugwash Workshop on Chemical Warfare, Bad Saarow, Near Berlin, G.D.R. (tentative).
26 - 29 June	Symposium on New Directions in Disarmament, Wingspread, Wisconsin, U.S.A. (see agenda below).
20 - 25 August	30th Pugwash Conference, Breukelen, Netherlands.
Sept/Oct.	Pugwash Workshop of Scientists and Media Representatives on the Increasing Danger of a Nuclear Confrontation, Austria, Autumn 1980 (tentative)
11 - 13 December	Symposium on New Weapons Systems and Criteria for Evaluating their Dangers, London, U.K.
1981	
26 - 31 August	31st Pugwash Conference, Banff, Canada.
1982	
August	32nd Pugwash Conference, Warsaw, Poland.

Joint American-Canadian Symposium on New Directions in Disarmament

Agenda

A. Negotiating Agreements
   1. The UN Machinery
   2. The Problem of New Technologies and Weapon Systems
   3. Improving the SALT Process
   4. Role of the Non-Nuclear Weapon States in Nuclear Disarmament
   5. Confidence Building Measures.

B. Unilateral Initiatives
   1. The Limitations of Negotiated Bilateral and Multilateral Agreements
   2. The Possibilities of Unilateral Initiatives
   3. Promoting the Non-use of Nuclear Weapons

C. New Approaches to the Reduction of Military Expenditure
   1. Comparability of Military Budgets
   2. Means of Verification of Military Expenditures and Reductions

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CENTRAL OFFICE

9 Great Russell Mansions
60 Great Russell Street
London WC1B 3BE
Telephone: (01) 405 6661
Telegraph: PUGWASH LONDON

EXECUTIVE OFFICE

11A Avenue de la Paix
1202 Geneva, Switzerland
Telephone: (022) 33 11 80
Telex : PEACE 28 167 CH
Telegraph: PUGWASH GENEVA

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