

October 1990

Volume 28

No. 2

# *Pugwash Newsletter*



issued quarterly by the Council of the Pugwash Conferences on  
Science and World Affairs

# PUGWASH NEWSLETTER

Volume 28 No. 2 October 1990

Editor : Francesco Calogero

---

## TABLE OF CONTENTS

	Page
Editorial : "Egham"	97
Statement on the Middle East Crisis by the Pugwash Executive Committee	98
Statement of the Pugwash Council for the Third Review Conference of the Biological Weapons Convention of 1972	99
<i>Pugwash Meeting No. 174</i>	
<b>40th Pugwash Conference: "Towards a Secure World in the 21st Century"</b> , Egham, UK, 15-20 September 1990	
Statement of the Pugwash Council	102
Secretary-General's Report 1990	107
Annex to the Secretary-General's Report 1990	112
Closing Address by the President of Pugwash Programme	113
Working Group Topics and Subtopics	117
Reports on Working Groups	120
Report on Working Group 1	121
Report on Working Group 2	124
Report on Working Group 3	127
Report on Working Group 4	131
Report on Working Group 5	137
Report on Working Group 6	142
Report on Working Group 7	145
Report on Working Group 8	149
List of Papers	153
List of Participants	158
<b>"A Vision of a Post-Cold War World"</b> by Robert S. McNamara	161
<b>A Pugwash Monograph:</b> <b>VERIFICATION--monitoring disarmament</b>	170
<b>ISODARCO Winter Course 1991: Announcement</b>	174
<b>Book Review</b>	175
<b>Obituaries</b>	176
<b>Calendar of Future Meetings</b>	back cover

---

## Editorial

### Egham

This issue of the *Pugwash Newsletter* is almost entirely devoted to our 1990 Annual Conference. It also carries two Statements, issued by the Pugwash Executive Committee and Council.

The Statement of the Pugwash Executive Committee on the (still current) Middle-East crisis has been agreed by telephone and fax; its issuance was motivated by a perceived need to let our voice be heard at a critical time, when decisions were being made about international actions in response to the military annexation of Kuwait by Iraq. Our stand is clearly expressed by the text printed below. Although this statement only commits the Pugwash Executive Committee, who is solely responsible for its formulation and issuance, I am sure it reflects concerns and views which are widely shared by Pugwashites; this was confirmed by the discussions on this topic held in the Pugwash Council and throughout our Annual Conference in Egham.

The Statement by the Pugwash Council for the Third Review Conference (to be held in 1991) of the Biological Weapons Convention of 1972 is a carefully prepared, and quite substantive, text (see below), which reflects the Pugwash care for, and expertise on, these matters.

I beg all of you readers to study carefully these Pugwash Statements and, to the extent that you agree with their thrust, to act in whichever way you can (both internationally and in your domestic environment), to help to implement them and/or to ensure that they are distributed most widely and appropriately.

The 40th Pugwash Annual Conference was quite a large gathering, held in a most congenial setting (back to school!). It was masterfully organized by a most dedicated British team, under the ubiquitous watch of our President, Joseph Rotblat. For carrying the main brunt, a special word of thanks to Bas Pease, Max Bruce, Roderick Braithwaite, and

to that amazing duo, Tim Walker and Tom Milne, who managed to remain cheerful and efficient while carrying out simultaneously a multitude of crucial tasks--although many others also deserve our thanks for the wonderful job they did, including the British and international staff, their counterparts in Royal Holloway and Bedford New College of the University of London, and of course the participants in the Conference as well, including in particular those having special tasks as rapporteurs, convenors, and speakers in plenary sessions.

Much discussion at the Conference focussed on the future of Pugwash. My own views on this are laid out in the Secretary-General's report I read at the Opening Session of the Conference; and since this text is reprinted below, I need not add anything here, except perhaps to underline the difficulties we are likely to face in the near future to fund our activities, which are in fact expanding to cope with the growing need and opportunity for Pugwash action, while some of our prospective funders are instead questioning our continuing usefulness, on the basis of the (partially correct) notion that peace has now broken out, and the (totally incorrect) inference that nothing much else need be done hitherto, neither to avert the risk of use of mass destruction weapons, nor to alleviate the looming global dangers to the environment which require concerted international action, nor to redress the widespread, perhaps increasing, dangerous and unethical inequities in the distribution of wealth and misery around the world (is the "end of history" paradigm becoming fashionable?).

The Pugwash Executive Committee and Council also met at Egham. As usual, much time was devoted to the usual tasks of reviewing our financial situation, organizational structure and (past and future) activities. An important decision has committed us to undertake two research projects, one on the concrete planning for the eventual establishment of a viable Nuclear-Weapon-Free World, the other on Conversion,

---

with particular attention to the high-tech component of this question, and specifically the roles of the laboratories (in the nuclear-weapon countries) which have been hitherto concentrating on nuclear-weapon R&D.

We hope these projects will turn out to be as successful as our recently completed exercise, namely the production of the book *VERIFICATION-monitoring disarmament*. More information on this Pugwash Monograph is printed below. Here I would like to emphasize once more the record-setting

feature of this book, to have all its chapters *co-authored* by (high-caliber!) American and Soviet (and, in some cases, European) authors.

I do hope all readers of this *Newsletter* will buy a copy of this book (which they can do at a discount--see below), and/or will make sure that a copy is acquired by the library of the institution with which they are associated.

*Francesco Calogero*

---

### **Statement on the Middle East Crisis by the Pugwash Executive Committee**

The Pugwash Executive Committee expresses its profound concern over the current situation in the Middle East. We fully support the UN Security Council resolutions condemning the military occupation and annexation of Kuwait by Iraq.

We appeal to the members of the Security Council, especially the five permanent members, to ensure that all necessary military operations are under the aegis of the United Nations, and to act without delay to restore the situation that existed before the military intervention by Iraq in Kuwait. At the same time we urge them to do everything possible to avert the danger of a war among individual nations.

The time has now come for the United Nations--with the broadest international support--to show its capability to intervene with full efficacy, as mandated by the UN Charter, in support of any of its members who has suffered military aggression, and thereby to demonstrate that no nation can hope to achieve any gain by military action in violation of the rule of international law.

[Approved per capsulam and issued on 24 August 1990.]

---

The camera-ready copy of this issue of the Newsletter has been produced in the Pugwash Office in Rome by *Paolo Branchesi*, as part of his activity performed, in alternative to military service, as "conscientious objector".

---

**Statement of the Pugwash Council  
for the Third Review Conference of the Biological Weapons  
Convention of 1972**

0. *Summary*

All nations have a profound interest in ensuring the success of the Biological Weapons Convention (BWC). This derives from the potential of biological weapons for indiscriminate mass destruction and from the ease with which such weapons could proliferate. The unilateral renunciation of biological and toxin weapons by the United States in 1969-70, followed by the BWC in 1972, and subsequent agreements at the BWC Review Conferences and at the United Nations constitute a sound framework for biological disarmament. Especially noteworthy is the system of data reporting agreed upon at the Second Review Conference and the authority unanimously given by the General Assembly to the Secretary General to conduct on-site investigations of allegations of chemical or biological attack. Additional progress is expected to result from the Third BWC Review Conference in 1991. Measures for further strengthening the biological disarmament regime, outlined in this statement, include: (1) efforts to achieve universal membership in the BWC; (2) improvements in the system of data reporting; (3) procedures for on-site verification of compliance, including challenge inspection; (4) agreement on non-secrecy of work at declared facilities; and (5) resolution of past compliance disputes and provision for technical consultations to avert or resolve possible future disputes. Measures to strengthen the biological disarmament regime must also include greater efforts toward elimination and prohibition of all other weapons of mass destruction--most importantly chemical and nuclear weapons--both regionally and globally. Such weapons are no less indiscriminate and abhorrent than biological ones. The continued existence, in national arsenals, of weapons of mass destruction of any kind inevitably will reduce the appeal and effectiveness of prohibitions against the other kinds.

The measures we outline in what follows represent our view of what may be particularly useful and achievable at the Third Review Conference of the Biological Weapons Convention (BWC) of 1972.

1. *Universal adherence*

A serious threat to the BWC exists in certain areas of the world where nations involved in bitter regional conflicts have refrained from joining the Convention. In the Middle East, for example, Jordan, Lebanon, and Saudi Arabia are parties to the BWC while Egypt, Iraq, and Syria have signed but not ratified it, and Israel has done neither. The USA, the Soviet Union, and other parties to the Convention have made little diplomatic effort to encourage non-parties to join the treaty. The need is now urgent to remedy the situation, through bilateral diplomatic representations, and also in the context of multilateral regional peace efforts. Parties to the BWC should make every effort to draw the attention of non-parties to the desirability of joining in time to attend the Third BWC Review Conference as full members of the Convention. Although even non-signatories may attend as observers, only full members of the Convention may take part in decisions of the BWC Review Conferences. Consideration might also be given to elevating diplomatic representation at the Third Review Conference to the Ministerial level, as a means of increasing the priority given to the matter by national governments, and for motivating those that have not yet seriously reviewed the case for becoming parties to do so.

2. *Declarations of research centres and laboratories*

The system of data-reporting agreed upon at the Second BWC Review Conference has now passed through three annual cycles. At this stage it would be useful to have informal consultations among the parties regarding the functioning of the reporting system and its

---

possible improvement. Subjects for discussion include completeness and ambiguities of the information provided in the declarations, additional information the inclusion of which would effectively advance the objectives of the BWC, and procedures for States Parties having nothing to declare to give explicit annual notice to that effect.

In the category of additional information, it would be a useful confidence-building measure to list all publications in the declared research centre or laboratory. While the Second BWC Review Conference agreed that "results of biological research directly related to the Convention" should be published in generally available scientific journals, there is no requirement to list such publications in the annual exchanges of information. By giving a concrete picture of work being done at each declared establishment, the provision of such reference lists could enhance confidence in the operation of the Convention.

Another important area for consideration at the Third BWC Review Conference is the further specification of research centres and laboratories to be declared. At present, declarations are required only for those with BL4 containment facilities or with BL3 facilities if they also specialize in biological defence work. This fails to include certain sites that are unquestionably of interest in connection with the BWC. Examples are the US Army Dugway Proving Ground in Utah and the Division of Military Epidemiology in Sverdlovsk. Although permitted work on biological defence or military epidemiology is said to be done at these sites, they apparently have no BL4 containment units nor do they have BL3 units and specialize in BW defence work. The latter installation is included in the annual Soviet declarations even though, according to its description, it need not be. Nevertheless, a less restrictive definition of installations to be declared is clearly desirable. Such a broadened definition might include: all research centres and laboratories that have containment units and conduct biological defence work, whether or not they "specialize" in it.

### 3. *Verification at declared sites*

Following the precedent established by recent conventional and nuclear arms-control agreements and the draft Chemical Weapons Convention, agreement might be reached on a system for on-site verification at declared research centres and laboratories conducting work relevant to the BWC. This could be done in a number of ways, ranging from bilateral and multilateral inspection tours to working visits and exchanges of individual scientists and others.

Particularly valuable and also consistent with the generally open practice in biological and medical science would be longer-term exchanges of working scientists, accompanied by their families when appropriate. Such exchanges could enhance confidence in the openness of the participating facilities and could also lead to scientifically beneficial collaboration and joint efforts in medicine and public health.

A type of exchange not previously considered would be that of scientific administrators and biological safety officers. If genuinely integrated into the operation of a research centre or laboratory, individuals with such duties would acquire a particularly broad understanding of its activities and might also make useful contributions both at the host institution and, upon return, at their home establishments.

### 4. *Challenge inspections*

The Chemical Weapons Convention being negotiated in Geneva is expected to provide for a special system of inspections that could be conducted anywhere at any time on short notice by a team of inspectors designated by the Technical Secretariat of the Convention. Such inspections on challenge could be requested by any party to the Convention, with no right of refusal by the requested party. Since toxin weapons will be covered by the chemical treaty, its provisions for challenge inspection will automatically extend into an area also covered by the BWC. A system of challenge inspection could also be considered for verification of those

---

prohibitions of the BWC that are not included in the chemical treaty. It would probably be impractical and distracting, however, to seek additional agreements on challenge inspection for biological disarmament until the challenge provisions of the Chemical Weapons Convention are agreed.

#### 5. *Non-secrecy of work at declared facilities*

Verification of compliance with the BWC can be simplified if it is accepted as a basic principle that there should be no secret work at declared installations. This simplification results from two factors. First, if there is no secret work, the practical impediments to verification activities on-site are greatly reduced, both for the inspectors and for the managers of an installation. Second, non-secrecy is in itself an indicator of compliance, and the task of defining and verifying it may often be simpler than that of defining and verifying more technical indicators of compliance. To take an example, the presence of unrestricted international researchers or safety officers at an installation, by demonstrating non-secrecy, may by itself provide adequate confidence in its compliance with the BWC, without the need for formal inspections.

Acceptance of the principle of non-secrecy at declared facilities hinges on the proposition that any benefit of secrecy in permitted biological defence programmes is outweighed over time by the effectiveness of openness in reducing the biological threat and enhancing confidence in the Convention.

Non-secrecy at declared facilities could be embodied as a basic principle in the international political agreement expected to emerge from the Third BWC Review Conference, or in a more formal protocol or treaty dealing with BW verification. If that cannot be accomplished at this time, individual states wishing to do so might declare non-secrecy unilaterally in their

annual declaration.

The specific scope to be encompassed in affirmation of non-secrecy deserves careful consideration. For example, while secret laboratory research in BW defence should be renounced, the commitment to non-secrecy should not be so broad as to preclude confidentiality in legitimate national means for verification of the BWC.

#### 6. *Dealing with compliance issues*

With general improvement in international relations, we may hope that hasty or mischievous allegations by governments of non-compliance with the BWC will not occur. Nevertheless, reliable procedures are needed to deal with honest suspicions that might arise and to curb any temptation to make political capital of ill-founded allegations. The system of declarations established by the second BWC Review Conference and the new authority of the UN Secretary General to investigate allegations of use are important steps in this direction. In addition, it would be useful to consider institutionalized mechanisms that could address BWC compliance issues at a technical rather than a political level. In some cases, this could be accomplished pursuant to a request by a State Party for a consultative meeting of experts, as agreed at the First BWC Review Conference. In order to facilitate the procedure, the Third Review Conference might consider establishing a standing panel of experts, along with suitable mechanisms for its activation and financial support.

If compliance questions that may arise in the future are to be addressed responsibly, it is important that the US and the Soviet Union make every effort to resolve the outstanding compliance issues between them before the Third BWC Review Conference takes place. Failure to make sincere efforts in this direction sets a poor example for other States Parties and imperils the successful operation of the Convention.

[Approved by the Pugwash Council on Friday, 14 September 1990]

**40th Pugwash Conference, Egham, UK, 15-20 September 1990  
TOWARDS A SECURE WORLD IN THE 21ST CENTURY**

**STATEMENT OF THE PUGWASH COUNCIL**

The 40th Pugwash Conference on Science and World Affairs met in Egham, Surrey, United Kingdom, from 15 to 20 September 1990 under the theme "Towards a Secure World in the 21st Century". The meeting was attended by 189 scientists, other scholars, and public figures designated as regular participants, 29 members of Student/Young Pugwash groups from around the world, plus a number of additional invited speakers, observers from national and international organizations, and guests.

The participants came from 46 countries and included 2 Nobel Laureates, 6 current and former ambassadors, 7 active and retired generals and admirals, 10 members of national parliaments, and numerous past and present heads of universities, research institutes, and government agencies. As always in Pugwash meetings, the participants took part as individuals, not as representatives of their governments or institutions.

The Conference took place at the Royal Holloway and Bedford New College of London University. It was organized by the British Pugwash Committee, under the chairmanship of Dr. Sebastian Pease, in cooperation with the international Pugwash organization's London office, headed by the President of Pugwash Professor Joseph Rotblat. Sponsors for the meeting included a variety of organizations and individuals inside and outside the United Kingdom. To the hosts, organizers, and sponsors, the Pugwash Council expresses its gratitude.

The opening address to the Conference was given by Lord Flowers, who called for an international Convention to ban the taking of hostages, reductions of battlefield nuclear weapons in Europe, and increased efforts against the proliferation of weapons of mass destruction. Messages of greetings to the

participants were read from Her Royal Highness the Princess Royal, Prime Minister Margaret Thatcher, Soviet President Mikhail Gorbachev, the Archbishop of York, and Royal Society President Sir George Porter.

President Gorbachev noted in his message that "Pugwash has contributed in a unique way to averting the military danger, has helped to stop the Cold War and to achieve profound positive changes in the development of the world." Letters of greetings were also received from the President of the US National Academy of Sciences, the President of the Soviet Academy of Sciences, the President of the American Academy of Arts and Sciences, and the President of Sokka Gakai International. The Council is grateful to all those who sent messages of greetings to the Conference.

The calibre of the participants in this 40th Pugwash Conference and the vigour and quality of their discussions demonstrated that, after 33 years of such meetings, the Pugwash idea of promoting in-depth interaction among prominent scholars and public figures from many countries about the problems of arms reduction and security building has lost none of its vitality or relevance. And the state of the world in which we live makes clear the continuing need for such activity.

The core goal of reducing armaments and the likelihood of major conflict has been brought considerably closer by the past year's remarkable positive transformation in East-West relations, but much remains to be done: the Strategic Arms Reductions Talks (START) still have produced no treaty, nor does there yet exist a Comprehensive Test Ban Treaty (CTBT) outlawing nuclear explosive testing, or a treaty banning production and possession of chemical weapons, or an agreement on reducing and restructuring

---

conventional forces in Europe. Meanwhile, weapons development and the weapons trade proceed apace.

The evaporation of the political underpinnings of the bipolar East-West confrontation, while unquestionably a great step forward, leaves behind a considerable residue of conflict potential along North-South and South-South lines--as underlined by the appalling crisis in the Persian Gulf. Failure of the major powers in the North to renounce their reliance on nuclear weapons, coupled with the aspirations and insecurities of many states in the South and the wrong impression that possession of nuclear weapons would help, weakens the nuclear nonproliferation regime. The need for new thinking in shaping more effective regional and global security structures--from Europe to the Middle East to Africa, Latin America, and Asia--could hardly be clearer.

At the same time, it is increasingly apparent that the military and political dimensions of international security cannot be disentangled from its economic and environmental elements. There can be no real security without sustainable well-being for all, but the world has been moving away from this goal rather than toward it: the staggering rich-poor gaps in economic well-being within and between nations have been widening rather than narrowing; patterns of resource use that are highly inequitable are being supported by technologies that are environmentally unsustainable; and environmental disruption, while it reduces the well-being of every person on the planet, reduces it most painfully for the poor.

Science and technology have played a role in generating all of these problems, and science and technology must play a role in gaining control over them. But the problems have economic, political, philosophical, and cultural components as well. Improved understanding--and solutions--will come only from approaches that treat the problems as interdisciplinary, interconnected, and international in character. All this underlines the appropriateness of Pugwash--which combines these same characteristics with a

core focus and competence in science and technology--as a forum for addressing these crucial problems in the 1990s and beyond.

Much of the work of addressing them at the Egham Conference was organized under eight working groups that met in repeated parallel sessions during the week: (1) changing concepts of security, (2) desirability and feasibility of a nuclear-weapon-free world, (3) Europe in the 21st century, (4) regional conflicts, (5) conversion of military-oriented activities to peaceful applications, (6) interactions of environmental degradation and economic development, (7) dealing with forces of divergence and convergence in the world of the next century, and (8) ethical problems facing scientists.

Plenary sessions treated the emerging political situation and its opportunities, the state of arms control and disarmament, global cooperation for safeguarding the environment, tackling global debt problems, and the Gulf crisis. A public meeting, organized by the British Pugwash Group, took place immediately following the closing session of the Conference and focused on the Conference's overall theme of building a secure world in the 21st century; it was chaired by Lord Zuckerman and addressed by Mr. Robert McNamara, Sir Ralf Dahrendorf, Prof. Alexey Yablokov, and Prof. Abdus Salam. (Prof. Salam's speech was read to the meeting, and then elaborated upon by Prof. Bhalchandra Udgaonkar, after an injury prevented Salam's attendance.)

The present statement on the issues addressed at the Conference draws on the working-group and plenary-session discussions, but its formulation is the responsibility of the Pugwash Council alone. We have not attempted to be comprehensive--many important points discussed at the Conference are not mentioned here--and our statement has not been reviewed or endorsed by the other participants. Summaries of the discussions in the Working Groups have been prepared by the Rapporteurs in consultation with the Convenors of these Groups and will become part of the published Proceedings of the Conference, along with the texts of the

---

major speeches from the plenary sessions.

The past year's political transformations in Eastern Europe and the Soviet Union have deprived the East-West confrontation of its ideological foundation and drastically reduced the danger of East-West military conflict. The resulting opportunities for reducing the tremendous nuclear, conventional, and chemical-weapon stockpiles on the two sides now must be vigorously pursued by all parties. Continuing concerted effort will be required to ensure the early attainment of agreements to drastically shrink these arsenals and to divert to the improvement of human well-being the resource flows that have been sustaining them.

The Strategic Arms Reductions Talks between the United States and the Soviet Union have dragged on for more than five years without producing a treaty. The remaining points of detail still being negotiated could be solved virtually at once if the leaders on the two sides insisted upon it. We urge them to do so. START has been criticized as offering too little because the reductions in the total numbers of US and Soviet strategic warheads will be considerably less than the 50 percent initially mentioned and because extensive modernization of strategic nuclear forces will still be allowed; but these shortcomings are greatly outweighed by the advantages of beginning, at last, the process of actual reductions in strategic arsenals. Getting on with it could produce a dramatic change in the arms-control climate, giving good prospects for further agreements delivering much deeper cuts and blocking off many modernization possibilities.

Concerning military forces in Europe, the last shreds of plausibility have been stripped from the rationales once offered for the huge arsenals maintained on that continent. The complete removal and verified absence of nuclear and chemical weapons from Europe should now be an early goal of all the governments involved. As a next step in that direction, the removal of all such weapons from a central-European area including the territories of Poland, Czechoslovakia, Hungary, Romania, and Bulgaria, as well as

that of the reunited Germany, should be agreed as soon as possible.

Reducing and restructuring conventional forces along defensive lines are inherently more complex undertakings than eliminating nuclear and chemical weapons. It now seems likely and most welcome, however, that the new political circumstances in Europe will be exploited to sweep aside many of the old obstacles and reach early agreement on a conventional forces treaty. We reiterate our continuing concern that this agreement should provide for the destruction of the excess weapons or their irreversible conversion to civilian functions, explicitly precluding their transfer to other countries.

The positive political changes in Europe need to be reinforced now by development of pan-European security structures to promote interdependence and a sense of partnership among states, stimulate further reductions in military forces, and respond to the major social and economic needs of the continent. Despite the near-term economic and social dislocations in Eastern Europe and the Soviet Union as these countries continue the profound economic and political transformations on which they have embarked, we are optimistic about the ability of the Conference on Security and Cooperation in Europe (CSCE), the European Community (EC), and other organizations to play key roles in strengthening the relationships among the European states and between Europe and her global partners.

While the potential for East-West armed conflict has been shrinking reassuringly, the danger of conflict along North-South and South-South lines remains substantially unabated and in some respects and regions may well be growing. In this connection, the crisis in the Persian Gulf illustrates (among other things) the folly of the huge arms transfers to this region over the past decade, the potential for conflict inherent in economic disparities and in the uneven geographic distribution of the world's most profitable energy resources, and the need for more effective regional and global security structures.

---

We believe in the peaceful resolution of conflicts and deplore the aggression of Iraq against Kuwait. We continue to hope, and strongly urge, that the Gulf crisis can be resolved nonviolently through the good offices of the United Nations and the relevant regional organizations, such as the Arab League. In the unfortunate event that it cannot and military action is taken against Iraq, such action should be entirely under United Nations auspices. It is time to establish decisively the principle that such crises can and must be resolved by multilateral rather than unilateral mechanisms, based on the interests of the community of nations rather than on individual national interests. The United Nations Charter provides adequate basis for accomplishing this, not only in the Gulf crisis but more generally; if the actual apparatus in place in the United Nations for these functions is not adequate, modifications should be made to make it so. Consideration should be given, in this connection, to reactivating or restructuring the UN's Military Staff Committee.

The situation in the Gulf ought to stimulate, more generally, a reconsideration by states and publics of the need for stronger and more reliable regional and global security structures, including mechanisms for avoidance and nonviolent resolution of crises, as well as the need for attitudes and mechanisms that will provide for consistent responses to aggression as a matter of principle rather than as a function of the aggression's particular connection to the interests of the world's dominant powers. It is essential, more generally, to find ways to increase the authority of and respect for international law and the institutions that dispense it--the United Nations, the International Court of Justice at the Hague, the European Court of Justice on Human Rights, and so on. The rule of law cannot prevail if powerful states invoke it only when it suits their immediate interests and ignore it when it does not.

The Gulf crisis also underlines the dangers of further proliferation of weapons of mass destruction--nuclear, chemical, and biological. The world is a more dangerous

place simply because the knowledge of how to make such weapons exists at all, and more dangerous still because weapons in the first two categories are actually produced and stockpiled by a number of nations. It should be obvious that the danger that such weapons will actually be used in any particular crisis or conflict increases further as the number of states possessing them grows--that is, the danger increases with proliferation. But somehow it seems to be less obvious, or at least less easy for some governments to admit, that there will be temptations toward proliferation as long as weapons of mass destruction of any kind exist in the arsenal of any state. As we have stated before, there is no logical basis for allocating a "right" to possess such weapons to some states while denying it to others.

That is the basis for trying to achieve, as we strongly support, a comprehensive ban on production, stockpiling, and use of chemical weapons; and the same logic should lead one to pursue the possibility of a nuclear-weapon-free world (NFWF). A working group at this 40th Pugwash Conference was devoted entirely to formulating a set of questions relating to the technical and political feasibility of a NFWF, and these questions will now be addressed in a special Pugwash study group modeled after the recently concluded Pugwash Verification Project (which yielded the first book we know of in which all of the chapters were jointly written by US, Soviet, and in some cases European authors--*VERIFICATION: monitoring disarmament*, F. Calogero, M. Goldberger, and S. Kapitza, editors (English version, Westview Press, Boulder, 1990 ; Russian version, Mir, 1991).

The path toward a NFWF will not be a short or easy one in any case, but getting there at all will be less likely if the Non-Proliferation Treaty (NPT) falls apart because of discontent with its asymmetries and the failure of the nuclear-weapons states to begin to live up to their part of the bargain. In this connection, we regret that the 1990 NPT Review Conference, which just concluded, failed to achieve agreement on a Final Declaration because the parties could not agree on the immediate start of negotiations to

---

achieve a Comprehensive Test Ban (CTB) proscribing all nuclear explosive tests. Achieving a CTB and starting actually to reduce strategic nuclear arsenals are the two most effective actions that the current nuclear-weapons powers could take to meet their own obligations under Article VI of the NPT and reduce the temptations for others to ignore, abrogate, or fail to renew that Treaty. The Conference to Amend the Partial Test Ban Treaty, which will convene in New York in January, will provide the next opportunity to make real progress toward the achievement of a CTB.

Irrespective of the details of arsenals and treaties, there can be no real security for the world as long as important root causes of political instability and international tension go unaddressed. Increasingly prominent among such factors are the staggering economic disparities between rich and poor within and between nations (lately aggravated by a crushing debt burden), other forms of abuse of human rights, and regional and global environmental problems--air and water pollution, ozone holes, climate change, soil erosion, loss of biodiversity--that are undermining human well-being in industrialized and less-developed countries alike. In effect, the problems of environment, development, and international security are becoming ever more tightly entangled (as we pointed out in the Dagomys Declaration following the 1988 Pugwash Conference in the Soviet Union and again in our statement following the 1989 Conference in the United States).

Problems of energy supply and population growth play key roles in the world's difficulties with the environment/economy interaction. Environmental damages are the product of population size times economic product per person times the environmental damage generated per unit of economic product; and energy supply is both an indispensable ingredient of economic activity and the dominant contributor to many of the most serious local, regional, and global environmental problems. The chances of providing economic well-being for all the world's people without a degree of

environmental damage likely to cause the collapse of that prosperity will depend on civilization's success in the decades immediately ahead in improving energy efficiency (the ratio of economic output to energy input), shifting to energy technologies much less disruptive of the environment than those most heavily relied upon today, and stabilizing world population.

The progress likely to be needed in all three of these dimensions will require a firm political decision and an unprecedented degree of international cooperation in science and technology, medicine and health, economic development and finance, environmental protection, population limitation, and more. Neither the countries of the East nor those of the South have sufficient economic, technological, and managerial resources to solve their economic, energy, and environmental problems without help, and because of the global nature of all of these problems the West cannot solve them for itself unless they are also solved everywhere else.

The only plausible source of the extra economic resources and scientific and technological capabilities needed for this joint effort is to divert them from the military sector. The problem, then, is not simply to dismantle much of the world's bloated military enterprise but also to harness its resources to the task of fashioning a sustainable prosperity for everyone. Pugwash is initiating this year a second cooperative project (besides the one on a nuclear-weapon-free world) to deal with this conversion problem; it will engage participants from East, West, and South, and will focus initially on the research and development sector where the experience of Pugwash participants is especially germane.

Many other needs identified by the working groups in this year's Pugwash Conference are relevant to this task of building a more prosperous, more equitable, and therefore more secure world. We wish to call attention, especially, to two such needs in the hope that they will be addressed by government agencies, national Pugwash Groups, scientific societies, and others who

---

may see this report. The first is the need to better integrate scientists and technologists from the South and the East into the networks of meetings, electronic communications, and printed information that are so critical to rapid and efficient progress in the global scientific and technological enterprise. The second need is for more systematic efforts to introduce scientific concepts and analytical thinking at all educational levels, but especially in preschool and elementary education, in less-developed and industrial countries alike; only in this way will our citizens attain the level of understanding of contemporary problems in which science and technology play such crucial roles needed for them to participate in the selection and implementation of the

appropriate public policy responses.

All of the topics we have discussed here --and all of the topics treated by Pugwash-- relate in one way or another to the social and ethical responsibilities of scientists. The working group on this general subject at this year's Conference made a number of useful recommendations, but we call attention here to one in particular: that scientists and technologists who speak out to inform the public on politically or corporately sensitive subjects related to the public interest ("whistleblowers") deserve more protection and support from scientific societies, university communities, and perhaps even national legislation.

---

## SECRETARY-GENERAL'S REPORT 1990

0. This Report, read at the opening session of our Annual Conference, provides an opportunity for the Secretary General to comment on the current situation in Pugwash and the rest of the world. A *factual* report on Pugwash activities and on the status of our organization is presented in the Annex to this Report that has already been distributed to all of you, and I therefore need not take your time now to dwell on it--except for complementing it with some additional information that was not yet available two weeks ago, when I wrote the Annex. But you are of course welcome, in the discussion from the floor that will follow my presentation, to ask questions or make remarks relevant to the contents of the Annex, as well as in response to what I am going to say now. You may, however, also wish to keep in mind that organizational questions should perhaps more appropriately be reserved for the informal meeting with Contact Persons from the National Pugwash Groups and with Members of Council that will take place tonight--and which, incidentally, every Conference participant is also welcome to attend. In any case I plan to be brief, so as to allow more time

for the discussion from the floor.

1. The only item of additional factual information I would like to convey to you is that, during their pre-Conference meeting, the Pugwash Council has approved a "Statement for the 3rd Review Conference of the Biological Weapons Convention". Let me remind you that the Biological Weapons Convention of 1972 has been the first truly universal measure of disarmament, which has foreclosed an entire field of potential weapon development. The Third Review Conference will take place in Geneva next year, and we in Pugwash usually like--and succeed--to present on such occasions a statement, sufficiently in advance so as to maximize our chance to influence the position of governments, at the stage when they are still preparing for the Conference, so that their positions are not yet set. (We did, incidentally, do the same for the 4th Review Conference of the Nuclear Non-Proliferation Treaty, which has taken place just now in Geneva--from August 20 to September 14--and where I understand our position paper has been much heeded). The text of the "Statement of the Pugwash

---

Council for the 3rd Review Conference of the Biological Weapons Convention" will now be distributed to you, as well as to governments throughout the world, and it will of course be printed in the next issue of the Pugwash Newsletter. Let me just mention here that it is based in part on the relevant chapter of the Pugwash Monograph *VERIFICATION -- monitoring disarmament*, the book that constitutes the outcome of our joint American-European-Soviet project, about which you find relevant information in the Annex to this Report; a project of whose success we are so proud that I could not resist the temptation to take advantage of this opportunity to call it specifically to your attention. [ I do not know whether it will make it into the Guinness Book of Records; but there is little doubt in my mind that it would deserve such a distinction, since it is indeed, to the best of our knowledge, the *first* monograph on an important and sensitive international security issue to have all its chapters actually *co-authored* by American and Soviet (and, in some instance, European) authors--thereby signifying the beginning of a new era ].

2. Let me now introduce some remarks on the role, and future, of Pugwash.

The origin of Pugwash, and its main *raison d' être*, have hinged on the involvement of the world scientific community, to provide a channel of communication that has helped nations to overcome their confrontational stands. Our main focus, from the very beginning, has been on the catastrophic dangers for human civilization due to the availability of weapons of mass destruction, which have arisen out of scientific discoveries and have such enormous destructive capabilities to defy the imagination of public opinions and decision makers. As a consequence, arsenals of such weapons have been accumulated whose outlandish size can only be characterized as "obscene and crazy" --a demonstration of collective human folly that has justified serious concerns about the capability of humankind to survive.

A main role of Pugwash has been to maintain open a rational dialogue on these

issues, among nations locked into confrontational postures--and to involve in such a dialogue the intellectual communities from all sides, in the expectation that thereby some rationality would be injected into decision-making processes, and moreover that such open dialogue, conducted in the manner best suited to promote its efficacy, would contribute to bring about the changes needed to overcome the root causes of the confrontation.

Recent developments in the Soviet Union and in Eastern Europe--to whose emergence has certainly contributed our constant advocacy, going back to Einstein and Russell, of the need to adopt a "new way of thinking" (although we must recognize that our efforts could hardly have sufficed, without the path-breaking leadership of President Gorbachev, as well as the contributions of many others, both in the Soviet Union and in Europe, who have been and are now also playing important roles)--recent developments have greatly improved the situation; so much so, that most barriers to East-West contacts have now vanished and many a development whose advocacy was discarded as unrealistically utopian only a short while ago, appear now feasible if not already achieved.

What is then, in this new context, the role of Pugwash? For the immediate future--say, for the next few years--I submit that our task is quite clear: we must work to consolidate the recent achievements, and in particular make sure that the process of disarmament gets really on its way. Let us not forget that, so far, no sizable reduction has occurred in the nuclear weapon arsenals, that the risks of nuclear weapon proliferation remain extremely serious, especially in certain conflictual regional contexts, that the elimination of chemical weapons is still a distant goal, and that even a Treaty to consolidate and sanction the long overdue reduction and restructuring of conventional forces in Europe is not yet in place. Under these circumstances, it would be folly for us to abandon our commitment to foster progress in this area, which remains crucial for the very survival of our civilization. Why should we

---

give up working for our main goals just now when their achievement has been made feasible by a much improved political environment ?

What we should rather ask is whether the *methodology* of our approach requires significant changes, given the changes in the political circumstances. My view is that the required changes are for the moment minor; and that we have indeed already moved in the right direction with some of our activities, which have involved more in-depth studies on specific topics --such as our recent projects, which have yielded high-quality technical inputs on such issues as the verification of arms control agreements. Indeed the Pugwash Council two days ago has endorsed the idea to undertake two more *projects*--one on Conversion (with particular emphasis on Science and High Tech, perhaps focussing on the Weapons Labs) and one on the achievement of a viable Nuclear-Weapon-Free World. These projects will entail commissioned in-depth research (including meetings to promote and evaluate it), and should yield substantive results--both in the form of publications, and of advice appropriately channeled to decision makers in ways likely to improve its impact. Initial steps to map out these activities will begin at this very Conference, where two Working Groups are devoted precisely to these issues.

What may stand in the way of a more extended Pugwash activity of this kind--namely, in-depth sustained studies--is the difficulty to raise adequate resources, a perennial problem for Pugwash, and a permanent headache for your Secretary General, who moreover admits at his being rather inept in this respect, and who must therefore appeal for your help. Indeed many of the institutions who might support us seem now to believe--unfortunately, quite wrongly --that the problems of arms control and disarmament are already essentially solved; and therefore they seem to prefer to direct their support to other causes, which are now more in fashion. Some of these issues--such as the degradation of the environment and the poverty and underdevelopment affecting many nations--certainly also fall within our

remit and must certainly be pursued by us, because we have both a firm commitment and a clear capability to intervene usefully in these fields; and indeed we have been and our doing our best to act in these areas (we have, for instance, initiated a new series of Workshops, devoted precisely to "Non-Military Dimensions of Global Security"). But I reiterate that it would be most unwise for us at this time--when some of our main goals appear finally realizable, including the paramount one to eliminate the threat of total destruction of our civilization implied by the existence of absurdly vast arsenals of weapons of mass destruction--to decrease our commitment to the cause of disarmament, an area where we are capable of summoning a substantial, universally recognized expertise, to an extent which remains perhaps unique, at least in the universality of its scope, as has been once more demonstrated by the recent, record-setting, achievement mentioned above.

3. I have talked so far about the role of Pugwash in the immediate future, the next few years. Let me now introduce some remarks relevant to a longer time perspective, extending perhaps to the next millennium, which is, anyway, only a decade away.

In such a perspective, the issue of whether Pugwash should continue, or instead be disbanded, shall have to be considered. Indeed, our very flexible organizational structure, and the lack of any official who might have a vested interest in the preservation of the Pugwash Organization as a bureaucratic niche, makes it possible for us to debate such a possibility with complete equanimity. (Indeed, in my case, I must admit to an opposite bias, since I am now working practically full time for Pugwash, while I would prefer to devote more time to my scientific research interests--although this is a personal problem that will not necessitate the disbanding of Pugwash to be solved, but merely the eventual recruitment of a new Secretary General.)

Thus, everybody surely agrees that Pugwash ought indeed to be disbanded as soon as it appears that its usefulness has vanished. Clearly, this is not the case today. In

---

speculating about a more distant future, I suggest that the real issue that can be usefully debated now is not so much the specific question of the viability of Pugwash, as rather the more basic problem of the role that the *international scientific community* is to play in world affairs. And I submit that it is both likely and desirable that such a role will grow in the future, mainly for two reasons.

In the first place, it is clear to the point of being trivial that the nature and direction of "scientific and technical progress" are of paramount importance for the future of the world. Some of these developments have created great dangers, and this pattern will undoubtedly continue to occur; yet the only way to avoid the catastrophes threatened by such developments, as well as other disasters naturally implicit in the contemporary conduct of human affairs, will be through a rational effort to control and to exploit for the betterment of the human condition the enormous potentialities entailed by "scientific and technological progress". This process need not be fully controlled by scientists and technicians; indeed, those of us who believe in representative democracy as the best viable form of government, must advocate that decision making be ultimately the responsibility of elected representatives, namely of politicians--unpalatable as this term may sound, at least in certain geopolitical contexts. But clearly it is and it will be desirable that decision makers, and public opinions, base their deliberations on a rational evaluation of the available options. This requires sound and competent advice; hence it will inevitably call for an enhanced role to be played by the *interface* between science and world affairs.

In the second place, the universality of science constitutes a paradigm for overcoming the divisive elements in world affairs that are the root cause of many conflicts. This universality may be traced to the universal acceptance of *scientific truths*--a fact which may be considered obvious and trivial, but whose importance is nonetheless paramount--and also to the universal characteristics of the *scientific method* which is instrumental in arriving at such universally

recognized truths. Moreover, and more pragmatically, a striking character of universality is now featured by the actual day-to-day development of many scientific fields, including most of those which are at the cutting edge of "scientific progress". Indeed research is now *de facto* conducted as a *common endeavour* on a world scale, bypassing national, ideological, religious and ethnic barriers.

This model points to a desirable future evolution of world affairs towards an integration on a global scale that should help us to face cooperatively the global problems that lie ahead and that should help us to manage those divisions--national, ideological, religious, ethnic--whose negative relevance as a source of conflict one hopes will eventually become obsolete, while they may well retain a positive relevance in countering flat conformism and enriching human culture.

If this vision has any validity, then there ought to be in the future an increasing role, more important and more positive, to be played in world affairs by science--and, more generally, by the entire intellectual community. This role will be undoubtedly implemented via many diverse institutional arrangements, operating both locally and globally, and including of course institutions where scientists and other scholars contribute in their professional capacities. But it is unlikely that Pugwash will not continue to be needed--with its unique mix of eminent professionalism and generous commitment and amateurish flair, interdisciplinary and international participation, flexibility and informality and high competence, emphasis on personal contacts and individual responsibility rather than faceless bureaucratic exchanges, openness to every intellectual intercourse yet careful attention to avoid the pitfalls of propagandistic fluff.

4. Finally, let me say a few words on our immediate predicament. As you will have seen from the documents attached to the Annex to this Report, the Pugwash Executive Committee has taken a public stand on the present crisis in the Middle East, by supporting and advocating the intervention of

---

the United Nations, to reestablish the international rule of law, and thereby to discourage any present and future temptation to solve international problems by unilateral military action. It is my view that, to the extent that these principles prevail, a major step will have been achieved in affirming the prevalence of the rule of law in international affairs on a global scale--and thereby strengthening the United Nations as the viable world institution that has the capability to uphold such principles. This might--and, I hope, it will--mark a watershed in world affairs.

I talk here--as we always do in Pugwash -- in my personal capacity; and I will end by outlining my present feelings. For many years I was pessimistic about the future prospects of humankind. Nuclear arsenals were growing as a malignant cancer; decisions were taken (such as the introduction of Multiple Independently-Targeted Re-entry Vehicles, to mention just one example) whose dangerous stupidity was evident to anybody who had any brains and intellectual honesty; lunatic ideas such as Star Wars were taken seriously by key decision makers; the world appeared locked into an East-West confrontation that impeded any move towards the establishment of a world order that might prevent the outbreak of murderous conflicts; indeed the polarization of the world into opposing camps fed into local conflicts and led to ruinous wars, in Vietnam, in Afganistan, in Africa, in Latin America; Europe had been turned into a powder keg of weapons, just a fraction of which would have sufficed to obliterate its civilization; East Europe and the Soviet Union were dominated by stultifying regimes which had destroyed their economies, their physical environments, their cultures, their viability as humanistic societies, while amassing a huge military potential, with an enormous capability for destruction; and a growing portion of a growing world population appeared destined to live in miserable poverty, while the affluent part of the world was squandering enormous resources in the development and procurement of weaponry. The trend towards the ultimate catastrophe--a

conflict, or a series of conflicts, waged using the modern instruments of mass destruction , nuclear, chemical, whatever--seemed inevitable, with the end of the road not even too far away in time.

The changes that have occurred in the world over the last few years have turned me into an optimist. So much has been achieved so rapidly and so successfully ! So drastically have circumstances changed, so feasible a total reversal of trend now appears ! I will not review these developments, because I have already taken too much of your time. Of course, even changes for the best involve unsettling aspects; many dangers still loom ahead; and how can I reconcile my optimism--you might well ask--with our present predicament, with the possibility of a major war breaking out any day, any hour ?

But the present crisis demonstrates precisely that we are now living in a new world. A new world which is, admittedly, only beginning to shape up, a new world in which it will be clear that going to war is no more a profitable option. I am not suggesting that all military conflicts are hereafter excluded; it takes time for a new paradigm to prevail in international relations, to be universally accepted. But--perhaps for the first time in human history--such a new world appears now realizable, indeed even close: a world where the dictum that "war is a continuation of policy, by other means", will become as obsolete as the statement that the Earth is flat. Indeed, the obsolescence of that dictum with respect to nuclear war had been already proclaimed, most solemnly, some time ago, and was indeed well-recognized by most people [ with the possible exception of a few NUTs ("Nuclear Utilization Theorists"); as indeed there are still a few individuals who firmly believe that the Earth is flat ]. Now we see the prospect of a new situation developing in the world, in which starting a war--any war --will clearly not pay. Is this not ground enough for optimism ?

*Francesco Calogero*

---

## Annex to the Secretary General's Report 1990

0. In this Annex factual information on Pugwash activities since the previous Annual Conference are summarized.

1. *Organization.* The 3 Pugwash Offices (London/Geneva/Rome) have now reasonably efficient computer and communication equipment. Linkage of the offices via e-mail is in the process of being achieved. The division of labor among the 3 Offices has been organized according to the following guidelines. *London:* organization of the Annual Conference (also the 1991 one), backup for the President of Pugwash, supervision of most publications (including the Proceedings of the Annual Conferences, the Annals of Pugwash and some Monographs, excluding the Pugwash Newsletter). *Geneva:* organization of all meetings (except the Annual Conference), liaison with the arms control community in Geneva, preparation of Council and Executive Committee Meetings. *Rome:* backup for the Secretary General, production of the Pugwash Newsletter (camera-ready copy), fund raising. Special projects may involve in a special way one of the 3 offices: for instance the camera-ready copy for the book *VERIFICATION -- monitoring disarmament* (a joint American-European-Soviet project--see below) has been produced in the Rome Office.

2. *Meetings.* A list of meetings held since the beginning of 1989, with brief descriptions of each of them, is enclosed as Appendix 1. We also enclose, as Appendix 2, the list of future meetings that appeared in the last (July 1990) issue of the Pugwash Newsletter and that gets updated on every new issue of the Newsletter.

3. *Verification Book Project.* We are happy to announce the successful completion of this important project. To the best of our knowledge, this is the *first* book ever produced, which deals with an important international security issue and whose chapters are all *co-authored* by American and Soviet (and, in some instances, European)

authors. Copies of the first few pages of the English version of this book (which shall be on sale by the end of this year) are enclosed as Appendix 3.

4. *Thiodiglycol Project.* The preparatory work on this joint Pugwash/SIPRI project is now completed. This study has focussed on a chemical compound ("Thiodiglycol": TDG), whose life cycle and worldwide pattern of production and distribution are highly relevant to understanding questions associated with the *verification* of a universal Convention banning the production of chemical weapons (TDG is a precursor of mustard gas, but also has civilian uses). A monograph reporting these findings will be published by SIPRI at the beginning of next year.

5. *Publications.* Several monographs, arising out of Pugwash activities, have been published; a list is enclosed, as Appendix 4. In addition we have of course continued to issue quarterly our *Pugwash Newsletter*.

6. *Public Statements.* Last but not least, two public Statements have been issued by the Pugwash Executive Committee (in addition, of course, to the Statement issued, as usual, by the Pugwash Council after the last Annual Conference.

The first of these Statements was issued in Suraj-Kund, near New Delhi, India, where the Pugwash Executive Committee met on the occasion of the 1st Pugwash Workshop on Non-Military Dimensions of Global Security, 21-24 November 1989. Its title is: "An Agenda for Presidents Bush and Gorbachev". The text of this Statement (enclosed as Appendix 5) was printed as Op-Ed (under the signature of John Holdren, who is the Chairman of the Pugwash Executive Committee and who acted as main drafter of this text) in the *International Herald Tribune* on Friday December 1, 1989--the day before the beginning of the Bush-Gorbachev Summit

---

Meeting.

A Statement on the Middle East Crisis was sent to the Secretary General of the United Nations and to the Governments of the five Permanent Members of the UN Security

Council, and issued to the media, on Friday, August 24th, 1990. Its text is enclosed as Appendix 6.

F. C.

[The Appendices are not reprinted here, since this material has already appeared--or appears--in the *Pugwash Newsletter*.]

-----

**Closing Address**  
**by**  
**J. Rotblat, President of Pugwash**

The discussion this morning made it clear that while new directions, new points of emphasis, and a somewhat different structure are in order, the basic role of Pugwash, its *raison d'être*, has not changed. The general justification for our continued existence goes back to the concept of Pugwash as a Movement of Scientists concerned about the impact of science on society. This was the issue discussed at the very first Conference held in Nova Scotia 33 years ago. We said then:

“Men of science are now well aware that the fruits of their labour are of paramount importance for the future of mankind, and they are thus compelled to consider the political implications of their work... A gathering of men of science can discuss with special competence only the scientific and technical implications. Such discussion, however, can be fruitful only if it takes into account the political problems, which are the background to international negotiations”.

A year later--at the Kitzbühel Conference when we formulated the Vienna Declaration, the credo of the Pugwash Movement--we elaborated on this:

“We believe it to be the responsibility of scientists in all countries to contribute to the education of the peoples by spreading among them a wide understanding of the dangers and potentialities offered by the unprecedented growth of science... Scientists are, because of their special knowledge, well equipped for early awareness of the danger and the promise arising from scientific discoveries. Hence, they have a special competence and a special responsibility in relation to the most pressing problems of our time.”

Nothing that has happened during the past three decades has made these pronouncements invalid or out-of-date. Indeed, new issues of concern to scientists have since been identified, such as the ecological threat. In the Dagomys Declaration, two years ago, we said:

“... in the spirit of the Russell-Einstein Manifesto, we call on all scientists to expand our concerns to a broader set of international dangers; destruction of the environment on a global scale and denial of basic needs for a growing majority of humankind.”

It may be argued that the identification of these problems is not by itself a sufficient reason for the continued existence of Pugwash. Many organizations are concerned with these problems. Moreover, the main factor that has made Pugwash unique and indispensable in the earlier years, the provision of a channel of communication between East and West, has lost its importance with the dissolution of the East-West divide. But, I suggest, the characteristics of Pugwash that have made possible the establishment of that channel in the early years and its maintenance throughout the whole period of the Cold War, these characteristics are still valid, they are still a compelling motive for Pugwash to continue. They need to be brought to our attention time and time again: we are an association of scientists from all over the world; we attend our meetings as individuals and not as representatives of this or that body; and because we are scientists we can conduct our

---

debates in the scientific spirit of objective inquiry, unencumbered by vested interests. The adherence to these principles over the years have gained for us the respect, the high reputation, in many strata of society, as evidenced, for example, in the messages of greetings received at the opening session.

But these characteristics not only justify our continued existence; they enable us to extend our activities, to reach towards objectives which only now, with the end of the Cold War, have become more sensible.

One of these is the goal called for in the Russell-Einstein Manifesto, to bring all wars to an end. This goal, which we did not dare to spell out before, because it was too utopian, can now be brought to the fore.

The current situation in the Middle East, tragic and dangerous as it is, has established a fact of tremendous importance, that the nations of the world can agree to act collectively against aggression, under the banner of the United Nations. For the first time, the United Nations Organization has asserted itself in the role which it should have had from the beginning. It is still a long way from being an effective instrument for the prevention of all war and aggression, but the first step having been taken it is now more realistic to move towards the stage when peace in the world will be based not on the military might of the superpowers, or even the five states with a veto power in the Security Council, but on the will and consent of the overwhelming majority of nations.

To achieve this, people everywhere will have to learn the meaning of "one world", they will have to realize that we are all members of a species, whose continued existence is now in doubt, and that its preservation demands an effort from each of us. In the closing address at the last Pugwash Conference in Cambridge, I said:

"There is a growing recognition that if mankind is to survive--economically, environmentally, even physically--we have got to develop in each of us a sense of belonging to mankind, the feeling of loyalty to the human race. This would be an extension of the historical loyalties to our family, to our village, to our

city, to our nation".

The events of the past 14 months have not only put emphasis on this necessity, but have also made it more realizable. A determined effort is now called for, and I submit that scientists are particularly suited for this task. Science has always been cosmopolitan in nature, its method and ethics transcending geographical frontiers and ideological boundaries. Scientists have felt themselves to be citizens of the world perhaps more than any other group in society. It is therefore incumbent on scientists to foster and nurture in the public the sense of loyalty to mankind.

This is the educational effort called for in the Vienna Declaration. It requires a very large number of scientists, many more than come to Pugwash, and our task should be to educate the educators.

In the past we have not done much in this respect. Most of us in Pugwash prefer to deal with specific, even if very difficult, issues: how to detect the clandestine retention of a small amount of plutonium; how to ensure a supply of energy to the poor countries without endangering the environment. This sort of task attracts us more than the vague notion of awakening the social conscience of scientists. But it seems to me that the reason why the notion is vague is because we have not made a sufficient effort to clarify it, to concretize it. I believe that this is an area to which Pugwash should pay more attention.

Let me now turn to two specific projects which we have already decided to pursue, and in which I happen to be specially interested.

One is a study of how to eliminate nuclear weapons. This is a goal which was set by the United Nations in its very first resolution in 1946, and was subsequently enshrined in various international treaties. However, over the years, the conviction grew --particularly among the nuclear-weapon states--that the retention of these weapons is needed for national and world security. At the basis of this conviction is the fact that there has not been a war in Europe since 1945, coupled

---

with the assumption that this fact was the result of the existence of nuclear weapons. A deduction based on a negative observation, that something did not happen, cannot of course be proven; nevertheless it is accepted by many in leading positions as the gospel truth. It reminds me of a story current in my childhood days, at the time when radio communication just came into being. Two old-timers were arguing with each other about the ancientness of technology in their respective countries. One said, 'I have proof that we had high technology in ancient times: we carried out excavations, dug very deep and found a wire, which goes to show that already in those days we used the telegraph'. The other sneered at this: 'We also carried out excavations, we dug much deeper than you, and found nothing; clear evidence that we had wireless communication!'.

Anyhow, the argument that nuclear weapons are needed to ensure security for a state is basically flawed, because its logical sequel is that all states should have nuclear weapons. A policy based on the premise that nuclear weapons possessed by some countries guarantee peace, but their possession by other countries would be a danger for peace, is not acceptable in a moral, equitable society. It is important for Pugwash to eradicate the pernicious notion that nuclear weapons are needed to ensure immunity from any type of attack. All the same, one cannot dismiss the genuine concern of many people that in a world which has been rendered nuclear-weapon-free by international treaties, some states may cheat and retain a few weapons clandestinely, or may produce them later, to blackmail other states into submission. The way to avoid this danger is seen in the retention of small nuclear arsenals, the minimum deterrent. However, the question of who should be entitled to possess the minimum deterrent has to be answered, if permanent discrimination between nations is to be avoided. There is also the fear that further advances in technology may make the minimum deterrent vulnerable, and that a new nuclear arms race will ensue.

It is a challenge for us scientists to investigate the ways to overcome this obstacle.

We should not accept the facile dictum, that nuclear weapons cannot be disinvented, as a reason for their retention. We have to engage in a proper study of technological and societal means of verification of treaties banning nuclear weapons. The same argument applies of course to other weapons of mass destruction, chemical and biological, but the study of nuclear weapons must have priority because of their enormously greater destructive potential. The nuclear issue has always been the prime concern of Pugwash, and now that the political climate is so much more favourable, we should certainly make a sustained effort to find a solution to it.

The second specific issue which Pugwash needs to look into in the present political climate is conversion, the change-over from military to peaceful applications.

Notwithstanding the hiccup caused by the Gulf crisis, the general tendency is nowadays towards reduced armaments, fewer military personnel and back-up resources, and lower military budgets. Everybody is talking hopefully of peace dividends, how to spend the money thus released for peaceful, humanitarian and ecological purposes.

The conversion of swords into ploughshares is not something like transformation of matter, which can be achieved using the potions of the alchemists, or the accelerators of high-energy physicists. It is also not a problem for scientists alone; it is a most complex problem to the solution of which many skills and specialized knowledge --particularly from economists--would be necessary. Nevertheless, this is an area in which Pugwash has to be deeply involved.

We have to be interested in conversion, because we are interested in disarmament, disarmament of all types of weapons, nuclear, chemical, biological and conventional. We want to ensure that this disarmament will not be a cosmetic measure, getting rid of obsolete weapons, disposing of useless equipment; that it consists of radical cuts and involves a change in posture, in strategy, in accordance with our ideas about common security, about non-offensive defence, about non-military

---

solutions of conflicts. A major obstacle to such measures is bound to be the economic upheaval they will entail; the strong opposition to major changes, be it from industrial companies with vested interest, or the genuine worry of workers whose jobs will be threatened, or the legitimate concern of the military personnel who will become redundant. All these are problems that can be solved in time, but naturally we would like to make that time as short as possible, and the process of conversion smooth and efficient.

In this field too, there are many organizations working on the problem at national and international levels. Pugwash, as a Movement of Scientists, can make a unique contribution by concentrating on the military research establishments, such as Livermore, Los Alamos, Chelabinsk or Aldermaston. These are the real dens of iniquity, the procreators of weapon systems, the prime movers of the arms race. In a disarmed world the existence of such centres would not only be unnecessary but downright dangerous. Yet, their abrupt closure would bring hardship and frustration, as well as be a waste of resources in terms of specialized knowledge and equipment. The thousands of scientists employed there have a better understanding of the working of various types of weapons than anybody else, and this knowledge could be made use of for the dismantling of these weapons. In this sense, this problem links with the project mentioned before, the creation of a nuclear-weapon-free world. A treaty binding all nations to abolish nuclear weapons is unlikely to be attained, unless it included a verification regime tight enough to ensure that no party has concealed a few bombs, and sensitive enough for early detection of

attempts to start a new nuclear arsenal. Who better to design such a regime than those who designed the weapons in the first instance? As the saying goes: "An old poacher makes the best keeper."

The actual, physical destruction of nuclear weapons is a difficult, lengthy and very expensive process, even entailing environmental dangers, unless an adequate research effort is put into it. This could be one aspect of the Pugwash input into the conversion problem.

I have mentioned the environmental hazard of the disarmament process, and this leads me to another important aspect of the Pugwash contribution to conversion. As has been said frequently, the manifest danger to the environment is to a large extent the result of scientific and technological advances and their applications. The way to deal with this danger and to ameliorate it, should therefore also entail scientific research. Here too, the existing military research establishments could be utilized, and this should be another aspect of the Pugwash effort on conversion.

In this address I managed to touch on only a few of the topics which were discussed at this Conference. All of the topics were concerned with the contributions that we scientists can make towards the creation of a secure world in the 21st century. The next millenium is nearly upon us, there is not much time left and so much still to do. We cannot afford to relax, to slacken in our endeavours. I call on you to put in an even greater effort towards the shaping of a really new millenium, to the preparation of the grounds for a safe, stable and peaceful world.

---

*Pugwash Meeting # 174*  
**40th Pugwash Conference, Egham, UK, 15-20 September 1990**  
**TOWARDS A SECURE WORLD IN THE 21ST CENTURY**

**PROGRAMME**

[All meetings at the Royal Holloway and Bedford New College of London University]

**Saturday, 15 September 1990**

09.00-19.00 Registration  
19.00 Reception and buffet dinner

**Sunday, 16 September 1990**

07.15-08.15 Breakfast

Opening Plenary Session

09.00-10.30 Part A: open session  
Chairman: **Dr. Sebastian Pease**  
Opening Address: **Lord Flowers**  
Messages of Greetings  
Response: **Prof. Joseph Rotblat**

Review: "The Emerging Political Situation and its Opportunities"

Speakers: **Acad. Mihaly Simai**  
**Adm. Elmar Schmähling**  
**Amb. Olu Adeniji\***

10.30-11.00 coffee break

11.00-12.30 Part B: closed session  
Chairman: **Acad. Maciej Nalecz**  
Tributes to deceased Pugwashites: **Dr. Martin Kaplan**  
Report of the Secretary-General: **Prof. Francesco Calogero**  
Discussion on the Report

12.30-13.30 Lunch

14.00-17.30 Meetings of Working Groups  
(15.30-16.00 tea break)

18.30-19.45 Dinner

20.00-21.30 Meeting of Council members with Contact Persons from the National  
Groups  
Chairman: **Prof. Francesco Calogero**

21.30-22.30 Meeting of Council members with Young/Student Participants  
Chairman: **Dr. Martin Kaplan**

[For those not attending the above two meetings, there was a concert in  
the Picture Gallery, starting at 20.00]

**Monday, 17 September 1990**

07.15-08.15 Breakfast

---

09.00-12.30 Meetings of Working Groups  
(10.30-11.00 coffee break)

12.30-13.30 Lunch

14.00-17.30 Meetings of Working Groups  
(15.30-16.00 tea break)

18.30-19.45 Dinner

20.00-22.00 Plenary Session (open)  
Chairman: **Prof. John P. Holdren**

“State of Arms Control and Disarmament”  
**Prof. Mikhail Milstein** “START and Other Reductions in Nuclear Weapons”  
**Dr. William Epstein** “CTB and NPT”  
**Mr. Julian Perry-Robinson** “Banning Chemical Weapons”  
**Prof. Catherine Kelleher** “Reducing and Restructuring Conventional Weapons”

**Tuesday, 18 September 1990**

07.15-08.15 Breakfast

09.00-12.30 Meeting of Working Groups  
(10.30-11.00 coffee break)

12.30-13.30 Lunch

14.00-22.30 Afternoon and Evening: Excursion by bus to Windsor Castle and dinner on  
the River Thames

**Wednesday, 19 September 1990**

07.15-08.15 Breakfast

09.00-10.30 Plenary Session (open)  
Chairman: **Acad. Vitalii Goldanskii**

“Global Cooperation for Safeguarding the Environment”  
Speakers: **Prof. Peter H. Gleick**  
**Prof. Yasushi Kitano**

10.30-11.00 coffee break

11.00-12.30 Plenary Session (open)  
Chairman: **Prof. Essam Galal**

“Tackling Global Debt Problems”  
Speakers: **Prof. Witold Trzeciakowski**  
**Dr. Eduardo Ferrero Costa**

12.30-13.30 Lunch

14.00-16.15 Plenary Session (closed)  
Chairman: **Prof. Bhalchandra Udgaonkar**

---

Reports on Working Groups  
(16.15-16.45 tea break)

16.45-19.00 Plenary Session (closed-continuation)  
Chairman: **Prof. Bernard Feld**

19.45 Reception

20.30 Banquet

**Thursday, 20 September 1990**

07.15-08.15 Breakfast

09.00-10.00 Plenary Session (closed-continuation)  
Chairman: **Prof. Joseph Rotblat**  
(10.00-10.30 coffee break)

10.30-12.30 Final Plenary Session (open)  
Chairman: **Prof. Joseph Rotblat**

“Pugwash - the Tasks Ahead”

Speakers: **Prof. Serguei Kapitza**  
**Prof. Virginia Gamba-Stonehouse**

Discussion

Closing Address by **Prof. Joseph Rotblat**, President of Pugwash

End of the Conference

12.30-13.30 Lunch

14.30-18.30 Public Meeting  
Chairman: **Lord Zuckerman**

“Towards a Secure World in the 21st Century”

**Mr. Robert S. McNamara** “A Vision of a Post-Cold War World”

**Sir Ralf Dahrendorf** “A United Europe: Economic Problems”

**Prof. Alexey Yablokov** “Global Effort Needed to Overcome Ecological Problems”

**Prof. Abdus Salam\*\*** “Thoughts on Peace, Disarmament, and Science and Technology  
for the South”

(16.45-17.15 tea break)

Discussion

18.30 Reception

---

\* Since Ambassador **Adeniji** was delayed due to a late flight arrival, his speech was read by Lt.Gen. **Emmanuel A. Erskine**.

\*\* Since Professor **Salam** could not attend (due to illness), his speech was presented, and elaborated upon, by Professor **Bhalchandra Udgaonkar**.

---

**40th Pugwash Conference, Egham, UK, 15-20 September 1990**  
**TOWARDS A SECURE WORLD IN THE 21ST CENTURY**

**WORKING GROUP TOPICS AND SUBTOPICS**

- WG1: Global security versus national security: a change in basic approach**
- 1.1 National security in the absence of a military threat
  - 1.2 Practical implementation of the concept of common security
  - 1.3 Restructuring of military forces and doctrines
- WG2: A nuclear-weapon-free world: is it desirable, is it feasible?**
- 2.1 Technological problems: ensuring detection of non-compliance with treaties
  - 2.2 Legal problems: convention to outlaw nuclear weapons and its enforcement
  - 2.3 Political problems: creation of a global climate of trust
- WG3: Europe in the 21st century**
- 3.1 Making Europe nuclear-weapon free
  - 3.2 Ensuring political stability in a climate of reduced confrontation between East and West
  - 3.3 Economic integration of Europe and its relations with the rest of the world
- WG4: Regional conflicts and global security**
- 4.1 Extraregional factors and regional conflict--general issues
  - 4.2 Southern Africa
  - 4.3 Latin America
- WG5: Conversion of military-oriented activities to peaceful applications**
- 5.1 Developing a political commitment to conversion
  - 5.2 Reorientation of military R&D for peaceful purposes: environment and energy
  - 5.3 Problems of changing military industries to civilian production
- WG6: Environmental degradation and economic development: conflicting interests?**
- 6.1 Conflict between provision of basic needs, demands of the consumer society, and preserving the environment
  - 6.2 Economic measures to protect the environment
  - 6.3 Scientific collaboration and technology transfer for the amelioration of environmental problems
- WG7: Three worlds or one world in the 21st century?**
- 7.1 Economic integration versus continued marginalisation
  - 7.2 Towards an equitable global security regime
  - 7.3 Cooperation in science and technology for development
- WG8: Ethical problems facing scientists**
- 8.1 The conflict between pursuing a career and satisfying one's conscience
  - 8.2 Is there a need for a code of conduct (a Hippocratic Oath) especially in the transfer from military to civilian activities?
  - 8.3 Creation of greater awareness among scientists of their social responsibility; spreading "Pugwash thinking"

---

*Pugwash Meeting # 174*  
**40th Pugwash Conference, Egham, UK, 15-20 September 1990**  
**TOWARDS A SECURE WORLD IN THE 21ST CENTURY**

**REPORTS ON WORKING GROUPS**

**Report on Working Group 1**  
**Global Security vs. National Security: A Change in Basic Approach**

**Rapporteur: Richard L. Garwin**

*Context*

We began with the clear evolution from "national security" to a brief emphasis on "common security," to the present emphasis on "collective security." Even though there are many components other than military to "national security," among them health and economic security, we concentrated on protecting a nation against armed attack from the outside, because that remains a fundamental threat (in perception even if not in reality) though one may not be able to identify in advance the origin of the threat. Nevertheless, it is a threat that should be countered reliably at the least cost possible; to over-prepare at any given time means to under-prepare in the distant future, because near-term overprotection would come at the cost of economic investment or advancement. Our recommended course aims to provide protection for states and for the human rights of individuals, but it is frankly based on the nation-state system for the foreseeable future.

Common security involves the recognition that national security cannot be achieved at the expense of the "other side," a prescription still valid. The revolution of 1989 certified the end of the East-West bloc-to-bloc confrontation in Europe, eliminating any WTO threat to Western Europe, whether or not it ever existed, and the economic and political liberalization in Eastern Europe spelled the early demise of the WTO itself. Participants from Eastern Europe pointed out that this is a period of great promise, but also of uneasiness and even loneliness, lacking modern law and current custom to maintain internal order, and awaiting new arrangements to replace the military security guarantee

provided by the WTO, even in view of the WTO military actions against Hungary and Czechoslovakia, against attack by one of the smaller WTO nations on another.

At the same time, negotiations among European nations in the CFE and the CSCE laid the basis for new security organizations in Europe and elsewhere, and provided the background for our discussions.

Primary attention was paid to examples of a "security community" in Europe, an area reasonably well defined, with nations with a long history of shared values, even though they have diverged for the last few decades. Two such examples are the European Community and the Scandinavian group. In either, the use of force or the threat of force between members is an option beyond consideration.

A primary characteristic of such a security community is a shared set of values and mechanisms, including a democratic system of government and the rule of law imposed by the people. Nations in these groups do have military forces, but the interstate relations have been demilitarized. Viable mechanisms exist for resolving disputes between states, such as the International Court of Justice at the Hague, or for human rights matters, the European Commission on Human Rights or the European Court of Justice on Human Rights. In the interest of common security, it is necessary that all states (including the largest) agree to abide by the rule of law.

Finally, there are many links--people, investment, trade--between countries in the security community. With few exceptions, it

---

is no longer possible for the people of one nation to regard those of another as "the enemy."

Within these security communities there is no mutual military threat. Military forces maintained by one nation against a potential external threat to its security alliance (not identical to the security community--Norway and Denmark are NATO members, while Sweden and Finland are not) do not call for a balancing force in its community neighbors. One of the group proposed an approach to international security problems that focussed on actors and issues rather than the more usual states and areas in creating a security community; discussion suggested that a flexible approach might be useful. In any case, there must be added to the collective security approach the insistence that security be maintained at the lowest and at a rapidly decreasing level of armaments.

Thinking anew about security arrangements among nations, one is brought back to review what has already been embodied in the charter of the United Nations, if not always in the conduct of the U.N. In fact, Articles 43-50 of the United Nations provide a substantial basis for reliance upon the U.N. in future security measures. Note, for instance:

Article 43. "All Members of the United Nations, in order to contribute to the maintenance of international peace and security, undertake to make available to the Security Council, on its call and in accordance with a special agreement or agreements, armed forces, assistance and facilities..." and

Article 45. "In order to enable the United Nations to take urgent military measures, Members shall hold immediately available national air force contingents for combined international enforcement action..."

One may want to implement local or regional security arrangements under the aegis of the United Nations, rather than to involve the Security Council in small, regional matters, and there is provision for this in Article 53. It is a matter of some urgency to review these 45-year-old articles in the light of

modern technology and world structure. In particular, the Military Staff Committee might be activated or restructured, as a high-level review might indicate. The Security Council itself should take measures to ensure that it can handle simultaneous urgent tasks, including the guidance of UN military actions, where necessary.

The ability of the United Nations to act in the case of the Iraq aggression against Kuwait (although the future is anything but clear) shows that there is some vitality in this organization.

There was much discussion of individual Eastern European countries joining the WEU or NATO, but there emerged the view that significant associations for economic matters would be with the EC, and for security matters with the CSCE. If CSCE is eventually to replace NATO as the mechanism of collective security (to be sure, in a world of vastly reduced perceived threat), it will need not only a secretariat but a headquarters and command structure. It is nevertheless urgent that at least a transition security affiliation be available to the newly independent Eastern states.

There was general acceptance that a security treaty should at least guarantee the inviolability of borders, and might involve an initial registry of borders. Not surprisingly, the vanishing of the "enemy" in Europe changes the requirements on the nature of military forces. With the creation of a single Germany, it makes no sense to implement a high-tech "defensive defense" system along the inner German border. Nor can the remaining elements of potential conflict between NATO and the Soviet Union be handled by defensive installations created on both sides of the western border of the Soviet Union.

The meeting in Vienna in January and February 1990 of the military chiefs of staff of the 35 nations of the CSCE for a top-level policy seminar was taken by our Group both as indication of progress toward a less threatening world and as a base for a future mechanism of some significance.

---

It was proposed that such a planning review be institutionalized, with the chief of military staff of each of the nations of Europe (including USSR, Canada, and the US) meeting annually for a review of the status of forces in his or her country, the planned future forces, and a justification to peers of the stated plans. "Zero-based planning" would involve the disappearance of forces (to the benefit of the economy) unless they could be justified to the knowledgeable and skeptical peers. The collective Defense Policy Review need not await the acceptance of zero-based planning; it could adopt guidelines of a specified annual percentage reduction of expenditures by each nation, with the burden on that nation to show how the agreed cut was being fulfilled or, if the target was not met, why there was necessity not to meet it. It was argued that a 3 per cent annual growth target had been useful in NATO under different circumstances, even if not always achieved, so why not a 3 per cent or 7 per cent annual cut as a guideline in the Defense Policy Review process?

There was substantial approval of a more open process of defense planning and justification, as practiced in Germany and the United States, with the involvement of independent and competing analytical organizations, in contrast with the more closed and secretive planning as practised in the UK. A more open process was regarded as yielding better security at lower cost and with the opportunity to minimize the offensive nature of the force. Just such openness would be maximized in the proposed annual Defense Policy Review, in which not only the military chiefs but also high-level foreign office representation would be involved in the process of explication and challenge.

It was noted that a good secretariat for the Policy Review process would provide continuity and objectivity, and some dynamism. These benefits might be augmented by the presence of NGOs in the planning review.

Competitive arms sales to the third world were discussed as a contributor to an over-armed world, with the more advanced nations then building their own forces so that

they remain quantitatively and qualitatively superior to those of the nations they have just armed. In order to rationalize arms sales, means should be sought to reduce the competitive incentive for such sales outside the community, taking into account the degree to which each sale would increase or reduce security. There was discussion of a community-wide registry of arms sales, and of an appropriate export tax or other regulation of incentive to reflect "externalities". If effective measures can be taken earlier in the United Nations to reduce and limit arms sales, so much the better. Some nations sell no arms at all, yet maintain enviable economic growth.

The suggestion was made of a common market in the security community, so that any nation within the community would be obliged to offer for sale to other members of the community any military equipment it produced, thus preventing any member nation from achieving technological superiority in its arsenal, and removing the incentive for each member nation to try to achieve such superiority by providing national subsidies to military research and to the development of new weapons.

Although most of the participants in Group 1 were European or North American, the Group considered other regions of the world, to the extent time permitted, and had the benefit of a relevant paper from India, as well as of two participants from China. Recognizing that many sources of tension have very particular aspects which must be understood before undertaking to resolve or defuse a crisis, or to employ military intervention to prevent a great irreversible harm, there seems much of general applicability in the above discussion of future military security in Europe. Of course, the proposed "CSCE Defense Policy Review" should be supplemented by other regional Defense Policy Reviews or by a suitable UN mechanism. More generally, the end of East-West confrontation and the new willingness to build and to use the UN mechanism, provides both hope and urgency to address the North-South problems as well as South-South conflicts. A new look at what is possible in this regard, accepting a greater role for the rule of

---

law among states, would seem promising.

There is one general exception, and that is a leader who is willing to expend (not just to risk) the nation for the conquest or the destruction of another nation or group. Even a nominally democratic society with a view to spiritual redemption through death in a battle to eliminate the enemy is a threat that cannot be deterred. The nations of the world should be willing to direct large efforts in education, communication, and persuasion to avoid war. But in such cases when all efforts to prevent war have failed, military action may be inevitable.

Another difficult challenge for collective security is a religious or territorial dispute entirely within the borders of an existing country; in this case, outside military intervention is unlikely to lead to a peaceful settlement. Instead, collective security expertise may be helpful in an early and continued fact-finding role, in providing recorded television surveillance to identify

those who might perpetrate war crimes, and in educating those involved to better understand their situation and options.

### *Concluding Remarks*

That national security is to be obtained through common security is now well accepted, and collective security is increasingly advocated as the mechanism. The end of the cold war has clearly permitted, almost for the first time, to use the United Nations as the basis for collective security, with military forces and support contributed by members, to obtain security for all, insofar as possible. Increasing openness in planning for and building national military capabilities, such as a proposed annual CSCE or UN Defense Policy Review, provides the opportunity for nations to direct the evolution of their military to more effective and less threatening forms, and to reduce the likelihood of a spiral of action-reaction military acquisitions.

---

## **Report on Working Group 2: A Nuclear-Weapon-Free World: Is It Desirable, Is It Feasible?**

**Rapporteur: Marco De Andreis**

Achieving deep reductions of the current arsenals of nuclear weapons has always been one of the major goals of Pugwash. The end of the cold war and the present climate of increasing trust among the major world powers have made it possible to devote serious thinking to an even more ambitious goal: the worldwide elimination of nuclear weapons.

The Pugwash Council decided to set up an *ad hoc* study group to investigate the issue of nuclear weapon elimination and its implications. The study group will engage in a research effort, whose result will eventually be published. With this in mind, our working group focused on raising as many questions as

appeared to be pertinent to the feasibility and desirability of a Nuclear-Weapon-Free-World (NWFW), knowing that the answers to these questions require a great deal of further study. The issue of a NWFW, however, is now clearly on the table, witness, among other things, a number of statements recently made by world leaders such as Rajiv Gandhi, Mikhail S. Gorbachev and Ronald Reagan.

For the sake of clarity, this report attempts to summarize our discussion according to broad categories of problems, namely technical problems and political problems. It must be clear, however, that this distinction is often blurred. Moreover, there are also legal aspects to which the group was

---

able to give only a very cursory review: They certainly deserve detailed studies on the part of scholars of international law.

*Technical Problems.* If agreement existed, one participant argued, it would be possible to destroy all the existing nuclear warheads in less than five years. It would take much less, perhaps a matter of months, to incapacitate them--that is, making it impossible to detonate the warheads. Of course, the problem is more complex when it comes to nuclear weapons' delivery means and platforms. Also an experimental, demonstrative dismantling of 1 or 2 warheads was advocated as a step that could be taken immediately.

The issue of the relationship between nuclear weapon elimination and nuclear energy was raised. While some participants agreed that halting altogether the use of fissionable material as an energy source would make nearly fool-proof verification conceivable in a NFWF, others noted that such a phasing-out would raise extremely difficult issues in light of a variety of problems, ranging from greenhouse effect to projected Third World energy needs. It was clear to all, however, that the questions raised by the role of plutonium in the nuclear fuel cycle are formidable on a planet that currently operates more than 400 nuclear reactors.

To deal with the risks caused by the large amounts of plutonium produced by nuclear power plants, other proposals were put forward, including one that advocated a "Fort Knox" solution: spent fuel elements from reactors all over the world would be transported under guard to a handful of isolated and heavily guarded storage sites, operated and controlled under international auspices. Reprocessing could then take place only in such sites and any transportation of new fuel elements back to the reactors would again occur under heavy guard. But even such procedure was considered not fool-proof by some.

These are the main technical questions that emerged from our discussion:

-When is a set of components to be considered a nuclear weapon? How to define it best?

-Would there be other means of retaliation in a NFWF?

-What role for strategic defenses in a NFWF?

-How to dispose of weapon-grade fissionable material in a NFWF?

-Is a cut-off in the production of weapon-grade fissionable material verifiable?

-What kind of verification would be needed in a NFWF?

-What would be the break-out possibilities in a NFWF? and how to detect an impending violation?

*Political Problems.* The group was mindful of the fact that the precondition for serious movement toward a NFWF is further improvement in the political relations on a worldwide basis.

An obvious political obstacle that has to be overcome in order to proceed to a NFWF is the widespread belief that nuclear weapons preserve peace and stability by deterring the outbreak of any war, nuclear and conventional as well. It was also felt within the group that such perception, if taken literally, is likely to fuel the horizontal proliferation of nuclear weapons, since it is a legitimate interest of any state to preserve peace and stability. Thus, advocacy of nuclear weapon elimination goes hand in hand with reinforcing the existing non-proliferation regime.

Another recurrent argument against a NFWF is that nuclear weapons cannot be disinventured and therefore the world will never be able to escape their shadow. It was noted, though, that Chemical Weapons (CW) and Bacteriological Weapons (BW) cannot be disinventured either, a fact that does not seem to have weighed much in past and current efforts to outlaw them--although it is also true that the amount of damage a single nuclear weapon can do is of an entirely different magnitude from that likely to result from the use of a single CW or BW ammunition.

As for how realistic it is in today's world to strive for nuclear weapon elimination, one participant noted that this question should be turned upside down: We should ask instead whether it is realistic to go on with the present state of affairs, including the continuing threat

---

of horizontal proliferation, and how long the massive numbers of nuclear weapons of the current arsenals will continue to go unused.

A third group of political questions that were debated had to do with the transition from the current state to a NFWF. Some participants advocated a process with several stages: from the bilateral START talks currently underway, to further START negotiations dealing with cuts deeper than those now agreed upon, further on to a multilateral forum capable of involving all the present nuclear powers. Others emphasized instead that the world could immediately move to an "almost zero" solution, bearing in mind that even 1 percent of the current nuclear weapon arsenals would provide more than enough to accommodate what is normally implied by the words "minimum deterrent".

Although the word "consensus" should be avoided in reporting on a Pugwash meeting, this rapporteur ventures to say that there was indeed consensus on the fact that moving from whatever quantity of nuclear weapons, no matter how small, down to zero, truly represents a quantum leap and poses the most fundamental problems of a political, technical, psychological, and legal nature.

Other participants pointed to the Non-Proliferation Treaty (NPT), to a Comprehensive Test Ban (CTB), to a progressive enlargement of Nuclear Weapon Free Zones, to the general adoption of a No-First Use policy or to the adoption of an even more encompassing pledge not to use nuclear weapons under any circumstances--all measures seen as interim steps toward a NFWF.

Another proposal dealing with the transitional phase from now to the elimination of nuclear weapons supported the creation of an international repository of nuclear weapons in the hands of an international authority, possibly the UN. It was recognized, however, that this suggestion raises a fundamental contradiction: if the concept of nuclear deterrence is to be overcome, how can we rely on nuclear weapons in a NFWF?

As to the world order needed to make a NFWF work, many participants believed that a strong effort should be made to de-emphasize the notion of nation-state and to foster the creation of a supranational authority, i.e. a world government. Others were convinced, however, that a NFWF is a workable proposition even without a major restructuring of world affairs: while it appears to be difficult to reconcile the sovereignty of nation-states with the enforcement power of a supranational authority, there would still be the advantage of having delayed the acquisition of nuclear weapons; furthermore, since any violation could be readily reciprocated, a deterrent against break-outs would be in place in any case.

Other participants noted that, given the role of great equalizers played by nuclear weapons, there will always remain a strong appeal to acquire them even in a NFWF. Potentially, this factor would threaten the stability of a NFWF. Thus, the question arose whether, as part of a NFWF, it would be necessary to create a world that is free of the threat of war.

The need to address the obstacles likely to be posed by the vested interests in nuclear weaponry was also recalled during the discussion. Huge and powerful nuclear weapon R&D establishments operate in the countries having, or aspiring to have, nuclear weapons. These, along with the sizeable bureaucracies associated with the Defense departments, have undue influence on political decision-makers. At least a strong tension exists between the elected officials in charge of defense policies and those vast bureaucracies; this problem should be recognized and faced.

Finally, one participant argued that citizen reporting is a viable method of reinforcing a NFWF verification regime. To this goal, governments should spread information on the content of the arms control treaties they adhere to and devise some means to guarantee the rights and the integrity of the potential whistleblowers.

Following are the main political

---

questions raised in our discussion.

- What would replace the psychological function of nuclear deterrence in a NFWW?
- What sort of sanctions against violators would be needed? and how to enforce them against big powers?
- How to convince leaders to consider seriously a NFWW?
- How realistic is to think about a NFWW now?
- Does the mere threat of nuclear weapon acquisition act as an effective deterrent in a NFWW?
- What are the political conditions and the best first steps to move toward a NFWW?
- What is the connection between the requirements of a NFWW and allowable conventional forces and weapons?
- What kind of political structure could sustain and maintain a stable NFWW?
- What would be the role of the UN in a NFWW?
- Can a NFWW be effective and can states still be sovereign?

-What would be the degree of openness required to make a NFWW work?

-What kind of societal verification is needed for a NFWW? is it feasible?

-Should there be an international repository of nuclear weapons, and if so, how big should it be? Who would guard the guardians of the international repository?

-What margin of error in verification is affordable in a NFWW? How significant would be the possession of a single nuclear weapon in a NFWW?

-What is the meaning of minimum nuclear deterrent? Who should have a minimum nuclear deterrent?

-Should a NFWW be achieved in connection with a ban on other weapons of mass destruction? or in the context of General and Complete Disarmament?

-How soon can a NFWW be achieved?

As said at the beginning, answers to these questions will hopefully come through further studies sponsored by Pugwash.

---

### **Report on Working Group 3 Europe in the 21st Century**

**Rapporteur: Jeffrey Boutwell**

#### *Introduction*

With the end of the post-war European order, there are unprecedented opportunities for shaping new European security frameworks. The acceleration of change occurring in Europe in 1989 and 1990 calls for, indeed demands, the elaboration of imaginative and comprehensive structures and policies that will promote interdependence and a sense of partnership among states, stimulate further reductions in military forces, and respond to the major social and economic needs of the continent.

#### *1. A Nuclear-Weapon-Free Europe?*

The Group considered the feasibility of

eliminating nuclear weapons from Europe, given the dismantling of the NATO-WTO military confrontation, the planned withdrawal of Soviet forces from Central Europe, and the unification of Germany. Participants applauded recent unilateral moves by the USSR and US to reduce (and constrain the modernization of) nuclear-capable artillery and short-range missiles from Europe, and to begin SNF negotiations.

At the same time, however, France is continuing with its Hades modernization program and the US, France, and Britain are proceeding with the TASM (tactical air-to-surface missile) program. Many participants were concerned that these developments, and the continued existence of British and French

---

nuclear forces, will complicate the SNF negotiations and possibly encourage proliferation in Europe, especially in a Germany that at some point may no longer be anchored in NATO.

For the moment, of course, Germany remains strongly committed to the NPT and the 1954 prohibitions on nuclear, chemical, and biological weapons. And the point was made that any future German acquisition of nuclear weapons would rightly be seen as militarily irrelevant and politically counter-productive.

In light of the failure of either politicians or analysts to predict the 1989 revolutions, however, participants cautioned about our ability to confidently predict how this issue will play out over time. Given that any proliferation of nuclear weapons in Europe would be an exceedingly dangerous development, the Group urged Pugwash to analyze alternative security structures with the aim of reducing any incentive that Germany or other countries may have for acquiring nuclear weapons.

The Group did explore various options for reducing reliance on nuclear deterrence, with an eye to eventual abolition of nuclear weapons. One proposal advocated the denuclearization of France and Britain and a reliance by the international community on the minimum nuclear arsenals of the US, USSR, and China.

Other participants argued in favor of a continued European nuclear role, whether based on the national forces of Britain and France, a European multi-national nuclear force under the auspices of the Western European Union (WEU), or arrangements within the CSCE.

A third proposal called for the five major nuclear weapons states to use their roles as the permanent members of the UN Security Council to work for reductions and international controls consistent with a regime of minimum deterrence. In this context, it was noted that there are various proposals for expanding the permanent members to include

some combination of the EC, Japan, Germany and India on the Security Council.

Whatever the longer term future of national nuclear forces and nuclear deterrence, *the Group stressed the need for Pugwash to continue to focus on how the SNF talks can quickly be brought to a successful conclusion so that the thousands of American and Soviet nuclear weapons in Europe can be eliminated.* There could still be difficulties in the transition to substantially reducing the military forces stationed in Europe, where the expertise and channels developed by Pugwash can be usefully employed.

## 2. *Military and Political Stability*

There was much discussion of the institutional structures and mechanisms that will be necessary to promote both external and domestic stability in Europe. Unlike the military and ideological tensions between blocs that characterized the Yalta system, stability in the new Europe will depend far more on reducing domestic sources of tension in Eastern Europe and the Soviet Union. Accordingly, new institutional frameworks must address the thoroughgoing transformations of the political, social and economic systems in these countries.

At the moment, it is unclear how existing European institutions (the CSCE, EC, EFTA, WEU, NATO, the WTO) will evolve to provide an overall European security framework. There is much talk of a "common European house," yet much uncertainty as well on how to construct it.

### 2.a *The CSCE*

The Group agreed that the CSCE represents the best overall framework for creating pan-European security and confidence-building mechanisms. Current plans for strengthening the CSCE process include annual meetings of Heads of State, more frequent meetings of Foreign Ministers, and the creation of a small secretariat. Also mentioned were the creation of CSCE conflict prevention and arms control verification centers (possibly based in Berlin). In addition,

---

several participants forcibly argued for the fusion of the Stockholm CSBM negotiations and the follow-on Vienna CFE talks by the time of the 1992 CSCE conference in Helsinki.

More problematic is the CSCE decision-making process itself. How will such an organization take difficult decisions to defuse crises and resolve conflicts? By majority or two-third votes of the 35 members, or through a UN-type Security Council of the major CSCE countries? Similar problems exist with proposals for creating CSCE peacekeeping forces that could be deployed within Europe to reduce the risk of heightened tensions breaking out into open conflict. In particular, how would decisions be made to raise, command, and deploy such forces? To this end, the Group felt that Pugwash should study the operational issues involved in creating CSCE peacekeeping forces, as well as the conflict resolution mechanisms necessary to stop fighting once it has started.

Given that the CSCE might not be able to meet the high expectations invested in it, some participants felt that sub-regional organizations and bilateral initiatives (the so-called "mosaic" approach) could do much to promote stability in Europe. An example of the former is the Pentagonal Initiative, where the countries involved (Italy, Yugoslavia, Hungary, Austria, Czechoslovakia) have discussed not only economic cooperation but measures on ensuring minority rights, on environmental pollution of the Adriatic, and various confidence-building measures. An interesting aspect of the Pentagonal Initiative is that these discussions involve local and regional entities as well as the national governments. Among the many bilateral initiatives taking place are talks between Bulgaria and Turkey on economic cooperation and the treatment of ethnic minorities.

## *2.b NATO and the WTO*

The Group noted the new spirit of cooperative dialogue between NATO and WTO countries and positive changes in their military doctrines, especially in regard to the diminishing rationale for any policy of first use of nuclear weapons.

Over the near term, the Group felt the two alliances (and especially NATO) can continue to play useful roles in successfully implementing arms reductions (CFE I), enhancing confidence-building measures, and promoting greater military transparency. There was less support, however, and even outright skepticism, for seeking any long-term role for NATO in coordinating and planning out-of-area operations.

The Group discussed at length the relationship over time of a unified Germany and NATO. Some participants expressed the concern that, in the continued absence of any military threat from the East, many Germans may feel that NATO's only relevance is to contain a united Germany. Such perceptions could hasten Germany's departure from NATO and a premature dissolution of the alliance.

Regarding the longer term, some participants did feel strongly that NATO should continue to provide a core military capability, and a US military presence in Europe, as a hedge against an uncertain future. Whether US domestic politics and economic concerns will support a continued US presence in the absence of any threat remains to be seen.

All in all, the Group felt that NATO especially has a useful role to play in the transition to a new European security framework, but that both alliances should ultimately be superseded by new pan-European security organizations.

## *2.c The Western European Union*

The role of the WEU in this regard could be especially important. The WEU has been revitalized in the 1980s with the addition of Spain and Portugal and with the WEU's coordinating role during the Iran-Iraq war and the current Persian Gulf crisis. The WEU has also been promoting a European space surveillance and arms control verification capability that offers further opportunities for European-wide defense cooperation.

More problematic is whether the WEU

---

can or should evolve into a more operational military organization for integrating the defense forces of Western Europe, with formal treaty links to the US and Soviet Union. Suggestions were also made for going further and creating a European Union that would include the WTO countries as well.

In sum, given the overlapping security responsibilities of the CSCE, NATO, the IEPG, WTO, and WEU, plus the calls from some countries for a growing security role for the EC, *the Group felt it important that Pugwash continue its work in analyzing how an effective pan-European security framework can develop that meets the needs of the 35 members of the Helsinki process.*

### *3. Economic and Social Dimensions of European Security*

The Group discussed the importance of economic stability and interdependence as a key component of European security, especially in the context of the newly emerging market economies of Eastern Europe and the Soviet Union. Several participants pointed to the European Community (EC) and how economic integration among the 12 has promoted stability between the EC members. Some participants thought that EFTA-type arrangements for Eastern Europe and the Soviet Union, or eventual participation in the EC, could likewise reduce the potential for conflict. Other participants were not so sanguine, however, that economic cooperation would mitigate the potential for instability arising from border disputes, ethnic unrest, etc., or that the East European and Soviet economies will develop rapidly enough to act as a corrective to societal instability.

It was noted that, although prospects for structured cooperation between the European countries are now greater than ever, these will be mitigated by the great disparities in economic standards between West and East Europe (where per capita GDP levels are roughly one-third those of the EC countries). There may also be a shift in the priorities of the major EC states due to German unification and

the 1992 single market program that will work against an expansion of the EC to the East.

Accordingly, an unintentional "golden curtain" could replace the "iron curtain," relegating the East European countries to a peripheral status in European economic affairs, with disturbing implications for security in Eastern Europe. Over the short term, a combination of energy shortages, sharp increases in unemployment, and widespread social dislocation will greatly test the durability of emerging democratic regimes. To ameliorate these shocks, which have been exacerbated by the Persian Gulf crisis, participants urged that western policies address the serious debt problem in these countries. Also, participants noted indigenous initiatives, such as the creation of a Central European Payments Union, that could foster regional trade despite the scarcity of hard currency.

The influence of COCOM restrictions was mentioned as a factor inhibiting East European and Soviet economic growth, and the Group agreed that COCOM restrictions should be greatly reduced. Concerns were raised, however, that complete abolition of COCOM restrictions might facilitate western exports of sophisticated weapons systems, with destabilizing effects, by undermining current efforts such as the Nuclear Suppliers Group, the Ballistic Missile Technology Regime, and the informal Australia Group efforts on chemical weapons technologies. Participants did feel that, especially in light of the Persian Gulf crisis, a further re-examination is necessary of what restrictions are needed on the export of militarily relevant high technologies. Although Pugwash was mentioned in this regard, it was noted that SIPRI is expanding its continuing work on arms trade issues, particularly in regard to national laws regulating military technology exports.

Participants emphasized the difficult transition period that East European scientific institutes and research personnel are experiencing. *Recommendations were made for using the Pugwash network to help strengthen these institutes through this*

---

*difficult period* and to help stem what one participant called the “tragic” process of a “brain drain” from East to West. It was noted that a Pugwash workshop along these lines is being planned, and *the Group went further in advocating Pugwash help in facilitating joint ventures between East European institutes and western research firms and institutes, possibly under the auspices of programs like EUREKA and EUCLID.*

The Group also discussed the need to go beyond free market concepts and analyze alternative economic models that are not based on perceiving the environment as an infinite reservoir for material and energy resources. In the same way that security among nations is coming to be seen as a synergistic partnership rather than a zero-sum game, so society’s relationship with the natural environment must be seen as an organic partnership rather than an exploitative one. The formulation of new economic principles focusing on values like the sustainability of the earth’s ecosystem, admittedly more difficult to quantify than

profit margins or GDP, could help lead to “new rules of the game” that in turn would reduce the potential for conflict that is often a result of gross economic disparities.

A concrete example of the above was the suggestion that energy prices be tripled so as to reduce current inefficiencies in the way goods are produced and marketed. Prevailing assumptions about the renewability of energy sources would be altered by factoring in the value of sustaining the earth’s ecosystem, with the result that economic decentralization and regional economic self-sufficiency could become viable goals. Such concepts in turn could lead to new ways of ordering society that would minimize traditional sources of conflict.

While such concepts are admittedly speculative and novel, they do reflect the need for “new ways of thinking” about enhancing security in the short term, and ensuring survival over the long term, that are a hallmark of the Pugwash Conferences.

---

#### **Report on Working Group 4: Regional Conflicts and Global Security**

**Rapporteur: Kevin Clements**

When this working group was organised it was assumed that the major areas of regional conflict would be Southern Africa and Latin America. No one predicted that there would be an Iraqi invasion of Kuwait, that the United States, Western Allies and most Arab states would array themselves against the Iraqi government, and that this particular crisis would pose the gravest challenge to world peace since the Vietnam war.

The Gulf crisis, therefore, (for both Pugwashites and the wider world community) has been a salutary reminder that the end of the Cold War has not ushered in a totally new world order, enhanced respect for international law, or resulted in stable peace

between all nations.

The Gulf Crisis, however, represents both danger and opportunity. There is a danger of major military conflict with highly unpredictable outcomes, but also a major opportunity for the world community to rethink the nature and significance of world order, world law and appropriate ways of dealing with aggression in the post Cold War era.

Because of the new *detente* between the Soviet Union and the United States, the Gulf Crisis challenges the superpowers and their allies to deal with a major regional crisis in a way that may enhance global security and

---

generate a new respect for international law. Whether or not there is a willingness to move in this direction rests on whether the world community and the specific parties to this conflict believe in multilateralism, the United Nations and the force of world law--with appropriate sanctions--or whether they believe in peace through strength and the rule of force, and are cynically utilising multilateral institutions to legitimate national rather than global interests. Saddam Hussein notwithstanding, the Gulf Crisis is, to some extent, a consequence of the transition from a bipolar to a multipolar world. In this transition, regional powers that desire to be regionally dominant will assert themselves economically, militarily and politically. If they are reckless, they will flout international conventions and world law until they are checked by other states acting alone or under the auspices of regional institutions or the United Nations.

In fact, this possibility was addressed by the last two Pugwash conferences as participants contemplated international relations in a post *detente* world. There has always been a recognition that moving from the old ideas of central balance to a more multipolar situation would require new ground rules, new ways of behaving and new imagination. This does not mean that a bipolar world with old-style tensions between East and West was a safer more predictable world. It simply means that when these tensions are reduced, local and regional disputes have an opportunity for manifesting themselves without the risk of becoming new focii of superpower contention.

This transitional process will arouse different sorts of anxiety as the world community witnesses ancient social, political, ethnic, and military rivalries activating in response to specific catalytic circumstances and progressing up the escalatory ladder from contention to violent conflict. The major problem for Pugwashites must be the determination of ways in which these real conflicts of interest may be addressed (by the protagonists themselves in the first instance, by regional and multilateral organisations in the second) and resolved non-violently. If this

proves impossible the second concern must be for ways in which coercive sanctions can be implemented under the auspices of legitimate regional or United Nations authorities. Our task, like that of the world community, is to ensure that these inevitable regional disputes are dealt with in ways that result in the formation of a new and binding normative system for a new world order. The primary responsibility for this rests--as it always does--on the major strategic players but it will also require the active involvement of small and medium powers as well.

Pugwash has already focussed much attention on ways in which a new system of international order may be constructed under the auspices of the United Nations, but if this current window of opportunity is to result in the creation of new ways of responding to international crises, it is imperative that urgent attention be directed to the ways in which regional and multilateral institutions can be enhanced and empowered to act in concert with states to counter instability and promote lasting peace and security.

In the first place there is an urgent need to elaborate the concepts of common/global security to take account of changed international conditions. The Palme Commission, for example, assumed the persistence of East-West and North-South rivalries. These dichotomies now seem overly simplistic and are proving inadequate guides for dealing with multipolar realities. The fact is that all nations are vulnerable to attack by ballistic missiles, all nations lose by some nations being locked into roles of perpetual enmity and constant military preparedness, and, because of modern communications, there are few possibilities for any conflict remaining purely local or regional. This new interdependence of the globe is demanding new responsibilities and new awareness of why some conflicts get globalised and others remain local. The Gulf Crisis, for example, is a useful reminder that the globalisation of conflicts is more a consequence of the perceived national/international interests at stake rather than a primarily principled response to an act of aggression. There are numerous other conflicts, for example, which

---

because they do not impinge on vital natural, economic or political interests, remain ignored by the world community, i.e., the conflict in Liberia, the continuing disputes in the Horn of Africa, Lebanon, Central America. These do not arouse the same international response as the Gulf because they are deemed marginal to the central interests of the world's dominant powers. Thus any new formulations of peace and security need to harness principle to national interest in ways which ensure that there is an equal response to all challenges to international peace and security. All aggression, all infringement of borders, all violations of human rights, all unequal and unjust development, pose equal problems to the creation of a new world order, and new conceptions of security need to acknowledge this fact.

Second, the Gulf Crisis also reminds us of the urgent necessity to realise that global security cannot be imposed on regions but must flow from them. Thus the second principle which emerged from our discussions is that new collective security arrangements must be imbedded in regional realities. There are areas of the world which can be classified as areas of "stable peace", where the likelihood of international aggression is almost zero, i.e. Australasia and the South Pacific, North America, Europe (possibly including the former socialist countries of Eastern Europe). It is not coincidental that much of the thinking for a new world order flows out of these areas of stable peace since scholars and policy makers in these areas are able to demonstrate that functional integration, cooperation and the relative permeability of boundaries make the likelihood of war highly remote. This is not the case for the Middle East, Africa, South Asia and Latin America. In these regions there is an urgent need to begin focussing on ways in which internal processes leading towards functional integration, mechanisms for the peaceful resolution of dispute, and confidence between states can be promoted and encouraged. In the first instance this will require a willingness to subordinate some national interests to broader regional interests, but in all regions it will also require sensitive intervention and assistance from those states

and multilateral institutions with experience of enhancing these processes in other parts of the world. The old aphorism of "Thinking globally, acting locally" should be extended to "Thinking globally, acting locally and regionally". For the first time since the Cold War paralysed the effective operation of the United Nations, it looks as though the time is ripe for the inclusion of a revitalised United Nations in the promotion of regional processes. Here again, the end of the Cold War has generated possibilities that did not exist five years ago. The *detente* between the superpowers and the new spirit of cooperation between the other three permanent members of the Security Council (precipitated by the Gulf Crisis) should be built upon to stimulate the rapid realisation of regional collective security arrangements. This is not to say that movement in this direction will be easy or immediate, but the logic of the new situation suggests that unless there is some progress towards regional collective security arrangements, there is little likelihood of other global security aspirations being achieved, and hopes for a new world order will give way to a reassertion of the old order under the dominant influence of the West with the Soviet Union as a passive or active partner.

There was considerable concern in this working group that we not be paralysed by the immediate crisis in the Gulf but rather utilise this situation to set in place both pre-emptive and reactive procedures to mitigate the possibility of such crises occurring in the future and, if they do, more effective and immediate regional and multilateral responses.

The Gulf Crisis would not have occurred had Iraq not been so well-supplied in arms and military equipment by most of the countries now arrayed against it. The third area covered by this working group, therefore, concerned the responsibilities of internal and external powers in relation to the regional arms trade. While weapons transfers do not of themselves generate armed, violent conflicts, their presence undoubtedly makes the non-violent resolution of dispute more difficult. The irresponsibility of arms suppliers and those who transfer the technology and resources for

---

the manufacture of weapons of mass destruction, has exacerbated the current crisis in the Gulf and makes the resort to violence more likely in other parts of the world as well. Regional and global collective security arrangements, therefore, have to address the question of effective means for monitoring and controlling the arms trade so that producers propelled by profit and political influence, and consumers propelled by fear and national aggrandisement, do not wittingly or unwittingly generate unnecessarily explosive situations. In particular there was a concern that we should direct more energy towards ensuring the integrity of the Non-Proliferation Regime in relation to nuclear weapons and that there be concerted effort to get regional agreements outlawing all other weapons of mass destruction.

### *Specific Regional Conflicts*

As expected, most of the discussion in this group revolved around the Gulf Crisis. But we also focussed attention on the North-South Korean conflict, Central and South America and Southern Africa. Procedurally, we expressed the hope that future Pugwash Conferences might be able to allow some flexibility in organisation and budget to ensure the participation of people from regions in conflict although we appreciate the particular constraints this would impose on the organisers.

### *Iraqi Invasion of Kuwait*

Despite the absence of informed locals to our discussions we were assisted by colleagues with considerable general knowledge about each area of dispute. In the discussion on the Iraqi invasion of Kuwait we traversed some of the possible explanations for the conflict--the proactive, permissive and catalytic factors, the particular role of leadership and personality and the diverse historical reasons for it. It was clear that in this conflict as in all the others there are multiple causes, both internal and external, and a variety of historic reasons for the dispute. Iraq's actions, like those of other past aggressors, is in clear contravention of international law and because of the salience of oil it has generated an

unprecedented international reaction. Our group expressed considerable concern about the possibility of unilateral pre-emptive military action on the part of the United States and expressed the strong hope that any military action would be very firmly under the auspices of the United Nations in fulfillment of Security Council recommendation. There was also an animated discussion about the swiftness of Western reaction to Iraqi aggression while there was relative Western quiescence in the 20-year-old Israeli occupation of the West Bank, Gaza and the Golan heights.

There was strong support for internationalising the military action against Iraq by placing the various components of the multinational force under the command of the United Nations. This would require a new resolution of the Security Council and the reactivation, or the formation, of a new UN military Staff Committee to provide military control of the dispute. This would give concrete and specific expression to the desire of the group that the resolution of the Gulf Crisis provide a positive example to the world community of how to deal with a variety of other crises. It might also allay Arab fears about continued and sustained Western military involvement in the region, and provide a more principled justification for resisting Iraqi aggression than the implicit objective of protecting Western oil interests.

In line with the desire that the Gulf Crisis be resolved along multilateral rather than national interest lines, there was a strong concern to allow economic sanctions to take effect before launching military action, although there was also appreciation of the difficulties of leaving large armies confronting each other in adverse conditions. There was some concern about the possible leakiness of Jordan and Iran, but a general feeling that sanctions were proving effective. The naval blockade could be enhanced by an aerial blockade as well, and this would provide another means of placing additional pressure on Iraq. (We note that the Security Council has implemented steps in this direction already.)

The group was in favour of increasing

---

non-violent sanctions and negotiating a settlement of the dispute. This would certainly involve a withdrawal of Iraqi forces from Kuwait and subsequent negotiations of outstanding disputes between Iraq and Kuwait. There should also be broader discussions about non-aggression treaties and a regional collective security arrangement. Iraq's invasion of Kuwait forces Arab states to confront the necessity of thinking beyond the immediate crisis and contemplating Arab collective security arrangements that will contain Iraq or any power that wishes to assert dominant influence in a region where principles of partnership and equality make more sense.

There was considerable support for a well-prepared international conference on the Middle East which would have regional collective security arrangements as one of its agenda items, and within which the specific question of a separate state for Palestinians and effective security guarantees for Israel could be discussed and negotiated.

There was consensus in favour of developing more effective international monitoring systems under the auspices of the United Nations and enhancing the power and ability of the Secretary General to respond to crises, wars and potential wars--with early warning systems, mediation efforts and so forth. Throughout our discussions we were aware of the necessity to think beyond the immediacy of the crisis to the long-term implications of it for a global order based on international law, upheld by effective United Nations and regional security systems. In relation to the Gulf and other regions of conflict, we were reminded of the central importance of the United States, Western Europe and Japan in the determination of the new order. It is vital that those of us who are citizens of these countries ensure that our leaders use their economic and military influence in pursuit of a new global order rather than the promotion of national self-interest, assertion of power and coercive diplomacy. Whether the World moves in the direction of a new global order or nations continue to pursue unilateral measures that perpetuate an outmoded order, is a crucial

short- and medium-term problem which Pugwash and other concerned organisations need to engage in immediately.

### *North and South Korea*

On North and South Korea, we were reminded of the difficulty that both countries face trying to transcend the cold war in the Asia-Pacific region. The border between both North and South Korea is one of the most impenetrable in the world. This has resulted in the formation of different modes of thinking and orientations to economics and politics which contradict some of the commonality of language and kinship. The current efforts to stimulate high-level political contact are fragile but seem potentially fruitful. There is a need for Koreans on both sides of the border to devise opportunities for functional cooperation, open up cultural, sporting and social linkages, and sensitively address the sources of division and the possibilities provided by reunification. The fact that Korea is a focus of attention for the big powers of the Soviet Union, China, Japan and the United States means that there is a need for equally sensitive external support for these tentative internal moves towards reunification. The presence of United States nuclear weapons (1,000+) in South Korea is a spur to nuclear proliferation in the North and a major diversion from the reunification process.

### *Latin America*

In relation to Latin America, we focussed on the military and non-military dimensions of security and of the awesome nature of the economic and social problems confronting both Central and South America. There is a strong anxiety that Latin America--like Africa--will be marginalised in the creation of a new economic and political world order, making the economic crisis worse and resulting in social and military upheaval. South and Central America have both been afflicted by economic problems becoming social, political and finally military problems. We need to address the issues of consolidating democracy, containing the drug traffic and changing the role of the military in all Latin American countries. There are strong

---

indications that this can best be done through multilateral approaches and with the strong and active involvement of the United Nations. The region's relationship with North America, the United States in particular, demands the negotiation of a new security relationship which must be re-thought in equitable terms. The group expressed its unhappiness and condemnation of repeated instances of US unilateral military intervention in the region, and reiterated support for the principle of non-intervention.

We focussed some attention on the particular pressures facing Cuba but felt that these would resolve themselves eventually when the exclusionary practices of the United States ended.

### *Southern Africa*

On Southern Africa, the group's conclusions were generally optimistic. There was a consensus that apartheid is doomed and that internal reform processes in Southern Africa were going to result in an as-yet-unimagined political system that would do justice to all. We were not utopic about this being a smooth process and recent events demonstrate that internal change in Southern Africa has violent as well as non-violent dimensions. In particular, the internal ethnic conflicts seem to be as important now as the actual dismantling of apartheid itself. There is a real danger that this will stand in the way of a negotiated settlement ending apartheid.

Similarly, there are a range of other problems afflicting the sub-region which need to be addressed rather swiftly by a reformed South Africa (as the dominant economic power) and by the wider world community. It is clear that the judicious application of external pressure in the form of boycotts, sanctions and support for different movements in favour of change, etc., coupled

with the elevation of De Klerk as President and the release of Nelson Mandela, have had an important impact on speeding up the pace of change.

Here again it was hoped that the United Nations, in collaboration with appropriate regional groups, might continue working with the various parties to the internal disputes and ensure that regional tensions did not erupt into corrosive violent international conflicts.

Given a reasonable solution to South Africa's internal problems, we are hopeful that South Africa's role in the region will be a positive one both in economic and military terms. A critical question hanging over any revised international role, however, is the possible existence of nuclear weapons. The international community should exert sustained pressure on South Africa to subscribe to the Non-Proliferation Treaty and to exercise a positive role in relation to future progress in Angola and Mozambique.

### *Recommendations from Working Group 4*

We have one general recommendation. Pugwash must direct its attention towards precise ways in which regional institutions, under the auspices of the United Nations, can enhance their collective security and peaceful roles. Pugwash can do this by initiating specific discussions on the various means of achieving international security, i.e., the negotiation of non-aggression pacts, regional and multilateral arms control agreements, regional confidence-building processes, and all other processes which will guarantee the independence and integrity of each state within the global system. The Gulf Crisis has prompted urgency on the question of devising new ways of thinking about regional issues and working out how these relate to a new global order.

---

**Report on Working Group 5  
Conversion of Military-Oriented Activities to Peaceful Applications**

**Rapporteur: Venance Journé**

The discussion of the group developed at several levels which were not contradictory. One part of the discussion assumed the existence of economic constraints as in the actual framework of market economies, and focused on the possibilities of profit-led conversion programs.

Another level of the discussion dealt with the distinction between needs and demands, and even considered extending the bounds of the present economic system. Later we discussed the need for far-reaching cultural changes and what we called the "conversion of minds".

The process of conversion can be defined in different ways. We concentrated on the transfer of production and R & D capabilities from the military sector to the civilian sector. These constitute the seeds of what exists and are of importance for the control of the arms race.

We discussed also other aspects related to conversion such as diversification which is the production of civilian goods without stopping the military production itself. We mentioned also the diversion of military personnel, research workers, and military equipment. But conversion is not using military equipment or military personnel for other tasks as, for example, the use of military satellites for environment monitoring or troops fighting the drug war.

Conversion is essential for many reasons. There are sound economic reasons to believe that the transformation process from the military to the civilian sector will help domestic and international economy. The political will required to sustain a demilitarized society will be strengthened by the process of conversion. It is also recognized by the scientists concerned that there is no strong

obstacle against technological requirements for conversion.

The process of conversion embraces many different aspects, economic, scientific, technical, social, cultural and strategic. It has no universal solution, and depends on the political and social system of a country, on the importance of its military industry, and on the strength of its economy. Questions to be answered involve the inter-relation between technical feasibility, political will, and economic opportunity.

In the last years, we have witnessed tremendous political changes, which led to the elimination of the East-West confrontation. Finally, the Cold War is over. The piling up of military equipment has taken substantial resources and generated economic problems, and a slow shift of priorities towards social and ecological necessities among others, have induced domestic pressures for a reduction of military expenditures. As a result, conversion has become an objective necessity. There was unanimous agreement on this in the group.

Several remarks were made on the need to be realistic and not ignore the current views of the military, and think in the context of existing doctrines. The irreversibility of the process has to be assured.

At the overall macro level, conversion requires political will from the highest decision-makers, including the tacit acceptance of the military. This will result in deep spending cuts, the setting up of a conversion policy (dependent on the economic system), and the belief that the transfer of resources is optimal. At the specific micro level, the conversion really takes place, and unemployment effects, social costs, and regional difficulties have to be tackled.

---

If one may expect substantial financial benefits, the so-called peace dividend, in the long run, there is an intermediate period of several years, when there is in fact a peace penalty. Money has to be injected into industries to construct new buildings, make new equipment dedicated to civilian production. There is also the case when equipment or personnel are transferred to the civilian sector.

To give some numbers, the world total military expenditures amounts to 950 billion dollars, including 467 billion devoted only to the European security requirements. This should be compared to the total amount spent by the major European countries on all environmental measures (including pollution control) on the order of 30 billion dollars.

The cases of the Soviet Union and the United States are of prime importance for consideration as they spend a far larger fraction of the world military expenditures than any other country. However, other countries also have a crucial role to play in the global process of conversion.

In the United States, with its free market system, conversion requires less direction from the government than in a planned economy. Although military spending has come up against financial constraints, and the budget deficit is high, United States economy may still be able to produce both "guns and butter". However the United States Department of Defense announced significant defense contracts cuts in 1990, and since then, thousands of workers have been made redundant. Although some large defense contractors deliberately refuse to embrace conversion in public, most of them are looking ahead and are exploring alternative civilian sources of income. Meanwhile, although the term "industrial policy" is not in favour, many of its goals are being taken up by a United States Senate Committee under the objective of making the economy more competitive. It was noted that re-orientation of resources from the military to civilian sectors will help the United States economy to regain competitiveness against major economic powers such as Japan and Germany.

On the other hand, the Soviet Union is still under the regime of a planned economy and encounters huge economic difficulties. It is a shortage economy where vast demands have to be met. There the conversion process itself, integral to *perestroika*, has started in an economic system which is now shifting at unknown speed towards a market economy. It is a top-down process, initiated in 1987, with all the support from President Gorbachev. He has stated recently that the military expenditures in the Soviet Union amount to 18% of the national income. Although this figure may be controversial, the real number is surely not too far off. This is surely a very heavy burden on its national economy.

The conversion will involve 420 defense industries, 100 civilian industries involved in military production, and more than 200 leading research institutes. One can expect also a further expansion of the process of conversion as treaties (START, CFE) are signed.

Up to now conversion has been implemented by diversifying the production into civilian goods. It would be better to transfer the producing capabilities to civilian industries, as this would have the effect of demonopolizing the production which is now concentrated in a few enterprises.

The conversion process, in the Soviet Union, is not going smoothly. There is no unanimity in all the layers of the society. Although nobody speaks openly against conversion, there are mixed feelings about the reform. To illustrate some of the difficulties and contradictions of the process in the Soviet Union, there was a report on a visit to a very technologically advanced factory, with good productivity and good cohesion, of which the workers were very proud. But they were very frustrated by the conversion orders that they had received. Instead of being able to develop their own technologically advanced project, in which they would have used all their skill, they had to produce milk pumps. In such cases there is also the risk of losing the know-how. But on the other hand, they would not want to enter in the market economy, as they are not used to commercial competitiveness.

---

This process of conversion will need substantial financial input, and until 1995, this has been estimated to be around 9 billion rubles, plus one billion for social expenditures in this area. One obvious way by which the West could strengthen the process of conversion in the Soviet Union would be to help to provide the necessary resources, in the framework of mutually beneficial international cooperation. That would also be the best guarantee for peace for the future.

In the Third World, several countries have sizeable defense industries, such as China, Brazil, India, Egypt, Israel and South Africa. The conversion of their industries will depend on general security conditions and would certainly be slowed or even stopped by the proliferation of weapons and technological know-how. Conversion is linked to the arms trade. In this context, it was also noted that a significant portion of the foreign debt of the Third World was due to arms imports.

Total military R & D spent by governments across the world amounts currently to 90 to 100 billion dollars per year. If private company expenditures are added the sum could be even more. This is 10% of the world military expenditures. The sum is also highly concentrated with over 80% being spent by the two superpowers, the United States and the Soviet Union. This concentration ratio is higher than that in total military spending or for weapons procurement expenditures.

The conversion of military R & D is absolutely central to the whole conversion process. This is partly due to the fact that substantial numbers of high quality researchers, scientists and technologists are involved in defense related R & D, and their productivity and inventiveness would contribute significantly to socially required research, particularly in the field of environment and energy. Equally important, military R & D has a pull effect whereby successful research effort leads to demand for testing evaluation and procurement, and therefore keeps alive the potential for the arms dynamics. Conversion of the military R & D

towards civilian needs would stop the possibility of a de-conversion whereby the existence of critical mass of military research can fuel future expansion of the military sector.

During the 1980s, military R & D increased significantly all over the world. Between 1980 and 1987, almost all OECD countries, as well as the Soviet Union, increased the share of defence research as a proportion of total central government R & D funding. More ominously, the current peace process has had little impact on military R & D allocations. Rather this part of the defence budget exhibits resilience. Even when all other components of military expenditures decline, military R & D refuses to fall so that its share in the military budget goes up.

The re-orientation of military R & D to civilian uses, particularly in the field of energy and environment will come up against some problems. The efficiency of military research in terms of input measures such as monetary costs, use of sophisticated equipment or skilled manpower, is sometimes questioned. The non-economic norms pursued by military R & D may cause obstacles to market-oriented conversion. Research on dual purpose of multifunctional technology, usually helpful to the rapid process of conversion, may not be as widely pursued as commonly believed. Lack of commercial consciousness, insulation from the civilian economy, and a penchant for grandiose projects, all may hinder the process of conversion.

Yet there are great opportunities and prospects for utilizing the scientific and financial resources in the military R & D sector, particularly for research in the fields of energy and environment. Discussion centered on ways to improve the efficiency of the whole process of conversion of military R & D: the use of specific goals, re-direction of basic science research, utilisation of the military R & D to first clean up the environmental impact of the arms race itself, provision of suitable incentives to companies conducting R & D, protection of the civilian research which has the largest impact on renewable energy technology or is related to the conservation of

---

fossil energy, technical cooperation between countries at similar levels of technology, provision for alternative large-scale projects in the civilian sector of R & D, efficient re-training of scientific personnel.

There was some discussion on the re-organisation of scientific teams involved in military R & D. Some believed that it might be advisable to break up such teams. Even though they are efficient in working together for defence-related activities, forming alternative groups might prevent the possibility of de-conversion. On the other hand, since organisational and cooperative efficiency is central to high quality research and much has been invested to create such teams, it was argued that it may be preferable to maintain such teams and re-orient or re-train them towards socially desirable goals.

The problems that have grown in importance on the international agenda include health security, food security, and population movements, which are all long-term security issues. They should be regarded in the developed world as problems in which all of us, or at least our children, have a stake. Not to forget the ecological challenges, the depletion of fossil fuel energy resources and degradation of the environment, part of it having been caused by the disposal of retired weapons and the production of plutonium. Obviously here there are vast needs for money, technology, some of it really high-tech, and skilled manpower.

Conversion can help to shift resources, although there is little chance that they would first be used to solve the above-mentioned problems or diverted to the developing countries. The demands in the developed world are still high. Most surely these funds will be translated in the reduction of budget deficits, as countries have spent beyond their means for military equipment and R & D. This will have positive consequences for the Third World if the economic situation of the Northern countries is better, provided that the conversion process is not accompanied by a recession.

One of the unwanted consequences of

conversion might be that because of socio-economic reasons (unemployment, lower wages), some scientists might be tempted to go to developing countries where they would be offered high salaries to make weapons. In the Middle East, for example, the technologically advanced weapons have been acquired with foreign support: One way to prevent that would be to set up an industrial policy and inject money into useful projects to maintain employment.

Creating the political will is a mechanism which is going in two opposite directions: top-down and bottom-up. What was already mentioned about the general political trends, and economic benefits, is an illustration of the incentives that generate the top-down process, as in the case of the Soviet Union. The bottom-up movement is as essential, since conversion and practical ideas for successful reforms will best be thought out by the people who are vitally involved in it. The strong commitment of those who carry out the activities is essential.

In this context there have been reports on recent projects conducted by Trade Unions in England, sometimes in collaboration with colleagues from other European countries. The outcome was a series of proposals for 150 alternative products and services which would use the skills and facilities in their own company and in the defence industry in general.

In a form of technological "agit-prop" to convince policy makers, prototypes were developed and demonstrated in public. One of them, an integrated ecologically desirable transport system, involves a vehicle capable of running on both road and rails. Another is a new form of permanent magnet motor which dramatically reduces energy consumption. A significant application is that it could provide power units for a new generation of low energy green motor cars. The Metal Worker Union in Germany, together with workers in parts of the armament industry, have proposed advanced forms of offshore vertical wind turbines as alternative energy resources. Their proposals also include different energy-efficient forms of power units for boats and transport systems.

---

This opens up the possibility of exciting challenges for those working in the military industries rather than the fear of structural unemployment and degradation.

An important point which was often made, is that conversion requires first the conversion of people's minds to what science and technology should be about. In the laboratories and the industries, one has to get technicians and scientists excited about conversion: They want challenging tasks. Those can be found not only in the military projects. One should get rid of the idea that peace is boring. Conversion should not be seen as imposed but beneficial, and not only in economic terms.

At the other end of the chain, the consumer has to be made aware of the new products by education, including the use of mass media. There is a social excitement in channeling the new products to the people who need them. The discrepancies between the needs and buying possibilities of the people who most need those socially and environmentally useful products was also mentioned.

### *Conclusion*

The Group believes that military spending should be drastically reduced, that conversion is both desirable and inevitable, and that it can be done. The process must also be irreversible. There is no universal recipe as needs and production capabilities are different in different parts of the world. The conversion process must include the active participation

of people at the regional and local levels.

As conversion could be linked to arms trade, every measure has to be taken to prevent the diffusion into the Third World of cancelled military orders, of second-hand military equipment, as well as the spread of military technology.

We also emphasized the fact that conversion requires deep cultural changes: the "conversion of the minds" and changes in values and priorities, by education and the use of the media.

We acknowledged the fact that conversion has already started through major economic reforms in the socialist countries, and that discussions at the highest level developing now between the Soviet Union and the United States are productive. It is also very important that the United Nations continue to be intimately involved in discussions on conversion. We propose also to strengthen other forms of international cooperation in this area, including the Helsinki process.

Pugwash could have here a specific and useful role to play. We recommend that Pugwash set up a workshop on institutional ways to encourage local community projects, for example directed towards research and production of environmental protection devices, and linked with conversion. The participants should include engineers, scientists, industrialists, experts from the appropriate international institutions (UN, EEC, OECD), both from the developed world and from the developing countries.

---

**Report on Working Group 6:  
Environmental Degradation and Economic Development:  
Conflicting Interests ?**

**Rapporteur: Anne H. Ehrlich**

As the threat of a global nuclear holocaust recedes and a new political world order begins to emerge, so too a new concept is emerging of global security, based on a far broader range of elements than military preparedness and arsenals of deadly weapons. No longer is national security paramount; the recognition is growing that, in an increasingly interdependent world, true security depends on the stability of the global economic and political system. That system in turn depends on the natural environment in which it is embedded and on the well-being of the people in each society. Seen this way, security becomes an exceedingly complex matter, one concerning everyone and affecting virtually every aspect of the human enterprise.

Today, the global economic system is quite unstable, in part because its environmental underpinnings are seriously threatened and deteriorating, and in part because of extreme and widening differences in wealth and well-being among regions and nations. As the human population continues to grow rapidly, possibly to double once more in a half-century or so, pressure on resources and the ecosphere also escalates.

The human enterprise is now undeniably a global force. Consequently, environmental changes on a global scale are already occurring or are entrained that will further undermine the human resource base and threaten its capacity to support the human population in decades ahead, especially one that is substantially larger than today's. The changes include global climate change, acidification in many regions, slow degradation of agricultural lands, and a decimation of biomass and biodiversity.

This situation is complicated and exacerbated by the huge difference between

rich and poor peoples in access to resources and technology to better their lives as well as to protect the ecosystems on which they ultimately depend. The world economic system largely creates and perpetuates these inequities. Most of the responsibility for environmental degradation lies with the wealthy minority; the consequences often are more heavily borne by the poor, but all of humanity is impoverished by it. Clearly, environmental deterioration is connected to economic development: sometimes to a lack of sufficient development; more often to too much development of the wrong kind.

A society's environmental impacts are the product of the number of people multiplied by the amount of resources each one consumes, and by the damaging effects of the technology used to produce each unit of consumption. Thus a substantial increase in the human population alone will cause a great increase in global environmental damage in coming decades, unless major efforts are made to reduce the other factors. And human expansion faces significant limitations through intolerable environmental damage, as the example of global warming (described in the Report of Working Group 7, Development, Environment, and Security, Pugwash Annual Meeting 1989) most clearly shows.

What are the most important issues in this nexus of interrelated problems? Obviously, population growth is a matter requiring the world community's urgent attention and action. Some members of Working Group 6 were reluctant to recommend action because of political concerns, based on some ill-advised programs in the past. This concern might be defused by depicting population growth in the rich countries as a larger threat to world security

---

than the more rapid (and thus more difficult to reverse) growth in developing nations, because individuals in rich countries consume many times more resources per person and contribute far more to global environmental damage. It would be entirely appropriate to advocate establishment of policies in developed nations (which mostly lack population policies) of population reduction toward a more sustainable population size.

A sustainable population size (one that can persist indefinitely without degrading its resource base and environment; i.e., remains within its carrying capacity) has not been determined for any nation. It would be a very complex exercise, since sustainable size would be dependent on factors such as levels of consumption, prevailing lifestyle, and the technologies used to support the population. In addition, since no society is entirely self-sufficient or economically or environmentally isolated, the population sizes, consumption, and technologies of other societies must be taken into account. Working out ways to determine sustainable population sizes might be a project of interest to Pugwash in the future.

Given that the population will continue growing for the foreseeable future, and that a large fraction of it lives in poverty and underdevelopment, expansion of the human enterprise for several decades more is virtually inevitable, despite the increasing threats to security from the resulting environmental damage. Consequently, efforts are also urgently needed to address the problems of development and environmental protection directly. Many Pugwash scientists wish to participate in this effort and seek ways for Pugwash to do so effectively.

In view of the central role of energy use in generating environmental damage, including global warming, one possibility that was given some consideration was to propose and perhaps participate in developing a Global Energy Convention: a world agreement on limiting per-capita energy use. (This idea was sparked by John Holdren's "response".) The convention would include arrangements for sharing technologies for

efficiency and alternative energy sources, and mechanisms to provide assistance to poor countries (where per-capita energy use needs to be increased, but as efficiently and environmentally benignly as possible). Some mechanism for controlling the environmental consequences of worldwide energy use will clearly be necessary, but it should be done fairly and without causing undue hardship. Indeed, such a compact might offer opportunities for reducing the economic and well-being gaps between nations of the North and South through carbon taxes and tradeable credits that could be exchanged for financial debts or used to preserve or restore biodiversity. Such a compact obviously would also be a venue for transferring a variety of technologies.

A new economic order is both needed and expected to evolve, given both the political changes that have occurred in the world and the failure of traditional economics 1) to prevent or remedy environmental degradation with political intervention, and 2) to prevent or remedy the gross economic inequities that now exist between societies. The inability of central planning systems to meet basic needs or to protect the environment is manifest; however, doubt was expressed that the currently popular free market system is ideal either. It appears to be the best available option, but much modification and manipulation will be required to prevent intolerable environmental consequences. This is another problem that Pugwash's multidisciplinary approach might usefully address.

Another issue that Pugwash is suited to address (and has in the past) is that of technology transfer. While acknowledging complexities such as the need for patent protection and that technologies are not free, Working Group 6 nonetheless felt that finding mechanisms to increase transfers from the developed North to the developing South in equitable ways is an important task. More than industrial technology is needed: ecologically sound agriculture, environmental protection and restoration, energy, and management of toxic substances are obvious sectors needing cooperative technological development and

---

innovation. Technology transfers are not and should not be a one-way process, of course; indigenous technical capability must be developed and encouraged. Moreover, the South has much more to offer the North than is often appreciated; particularly in areas such as environmental management and agricultural development, traditional knowledge and practices might often be superior to the more disruptive technologies of the North.

Education also is seen as an important sector in which Pugwash could play a role. Education is a critical factor in development, particularly education of women as a prerequisite to acceptance of family limitation and to improvement of well-being at the most fundamental level--within the family. Education will be essential for coping with the myriad challenges facing humanity in the next century. Education, especially science education, in rich countries needs to be upgraded and made relevant to those challenges. Exchanges of information, expertise, and ideas between nations are a part of the solutions as well. Students in Pugwash, as well as people with established careers, could have many opportunities to participate in this.

Among a range of possible activities considered that Pugwash might undertake were several in the environmental field. One was to take a role in managing toxic or hazardous substances in world trade. A global convention on this matter might be worth exploration; or simply helping to set up a system for monitoring materials in international trade or cradle-to-grave tracking for industrial materials. Training or educating

people in developing countries and providing information on the safe handling and disposal of toxics would be very helpful.

Poverty as an important source of environmental degradation was a topic on which Pugwash might consider conducting seminars or workshops. Pugwash workshops also might explore development of ways to apply economic instruments such as tax policies with incentives and disincentives to solving environmental problems in both developed and developing nations.

The numerous connections of environmental problems to military activities, arms making, and the world arms industry and market were discussed. It was suggested that environment and development issues could be incorporated into the existing Pugwash study group on nonmilitary aspects of security, thus broadening its focus.

Finally, some observations about the human problematique were felt important enough to convey in this report. First, it should be pointed out that "sustainable development" in the world today, given the scale of human activities, is an empty term; indeed, it was described by one participant as the "ultimate oxymoron." Second, the problematique is characterized by the immediacy with which global problems are arising; the rapid rate at which materials available to deal with them are diminishing; and the rapid increase in environmental disruptions. Finally, what the meeting was all about was "How can we prevent the overdeveloped nations from making the world uninhabitable for our grandchildren?"

---

## **Report on Working Group 7: Three Worlds or One World in the 21st Century ?**

**Rapporteur: Tony Thorndike**

### *1. Introduction*

The Working Group's discussions, conducted in the spirit of "new thinking", were wide-ranging, a recognition of the complexity and multi-faceted nature of the development debate.

The central remit was to discuss the issue of divergence and convergence in the world as a whole, now and in the next century. It was tackled in three ways. First, by analyzing the reasons for the effective marginalization of a good deal of the world's population in an era of accelerating economic and commercial globalization and integration. Second, by discussing the requirements and characteristics of a global security regime. Third was a consideration of the role of the scientific community both in its realisation and in the achievement of "one world". The Group's discussions also incorporated the linkages between development and the environment especially in relation to energy use, the difficulties surrounding the incorporation of the rapidly changing developed socialist world into the global economy and thus into the "first world", technological transfer and education.

The paradox of marginalized peoples and economies co-existing alongside an increasingly integrated global industrialized economy and society, and the widening gap between the "haves" and the "have nots", provided the constant backdrop to the Group's deliberations. This contradiction, characterised by the Group as structural dualism, has been given greater emphasis as a result of the extraordinary changes in the developed former socialist countries. These changes will, over time, further accelerate the globalization process and risk deepening the marginalization of many non-industrialized economies as aid and resources once

earmarked for them are diverted to the former "second world". But, just as "new thinking" was a critical ingredient in promoting those changes and in opening up new opportunities for international cooperation, the Group stressed the importance of the same spirit of "new thinking" in identifying new approaches to the overall development debate.

In this spirit three dominant dimensions emerged, namely the moral, the intellectual and the policy and practical. Morally, in promoting a new sense of consciousness, extending beyond that of gross inequalities to the overall human condition, spiritually as well as materially. Intellectually, in developing new concepts of growth and security. Practically, in identifying both obstacles to development and means to overcome them, and new approaches to development and global economic prosperity which are environmentally sustainable, the total to combat what is truly a disgraceful state of affairs.

### *2. The Moral Dimension*

It is indisputable that the structural dualism in the world economy has resulted in at least a billion people in over 40 states living in abject poverty. In addition there are another three or four billion or so condemned to lives of poverty and relative deprivation in numerous other countries not necessarily only in the less developed world. Whether one adopts an economic or regionalist criterion to distinguish groups of economies, the overall result, that of division, remains the same. In the first case, the economic, the former three worlds--developed capitalist, developed socialist and the euphemistically termed "developing" economies--are, in effect, being replaced by a new trio--developed capitalist, emergent and undeveloped (some would

---

argue, with good reason, that there are four or five given the considerable disparities between the poorer economies in the so-called "South", but three is an easily handled number for analytical purposes). The Soviet Union, in this schema, would constitute a special case in the short to medium term, rather than a category, as it struggles to cope with the twin pressures of competing nationalisms and transition to a market economy. The latter, regionalist, categorization, is based on three trading blocs with varying degrees of exclusivity--North America, Europe and Japan--each with satellite economies in tow but with many other economies effectively excluded.

The factors underlying structural dualism are well-known. The most critical was readily identified by the Group, that of debt and the resultant capital transfer from poor to rich. Indeed, without its equitable solution the debt burden on poor countries will render virtually all attempts at development practically useless. Debt is also associated with structural adjustment policies. Adjustment programmes are framed by an economic "orthodoxy" favoured by the multilateral economic and financial institutions and supported by the rich, creditor nations, which are impressed upon poor, debtor economies with serious, socially decisive results. Another is inappropriate investment criteria by, for example, multinational companies, such as the promotion of export crop production at the expense of that of food, and of so-called "enclave industries" that contribute little to development for the many.

More generally there are the problems of excessive population growth, iniquitous land ownership structures, onerous conditions relating to technology transfer, adverse terms of trade, protectionist trade barriers established by richer economies against industrial exports from their poorer neighbours (particularly regarding textiles, the industry most characteristic of low wage countries), political and bureaucratic weakness, the parlous state of basic education particularly in science and technology and the lack of trained scientists and technologists.

Lastly, there is the lack both of political will and of economic and financial mechanisms, not exclusively on the "have" side of the structural divide, to address the problems of resource maldistribution, uneven development and social deprivation.

The results are also well-known: exclusion from the world trading place, ecological havoc as the shanty town urbanization process accelerates, cultural undermining and loss of social direction, and increasingly large movements of economic refugees. There is also the risk of conflict with poor pitched against the rich, as is currently to be seen in the Gulf crisis within the Arab world.

The moral dimension, however, goes further. "New thinking" must be concerned with human solidarity. Traditional thinking stresses, virtually exclusively, materialist and consumerist values. By contrast, "new thinking" has to concern itself equally with the satisfaction of spiritual and cultural needs, renewal of purpose and direction, considering minds as well as matter, yet avoiding the highly dangerous pitfalls of extreme forms of chauvinism and xenophobic nationalism. In short, this new moral consciousness is what Vaclav Havel has called a "spiritual renewal", a voyage of spiritual discovery whereby peoples discover not only themselves but also a deeper sense of responsibility toward the world generally, both human and physical. It implies a conscious decision to, for instance, limit consumerist consumption and highly wasteful agricultural subsidy programmes in the developed world, to promote efficient resource use and to put environmental sustainability in the forefront of policy.

It was with such philosophical considerations in mind that the Group considered the intellectual dimension.

### *3. The Intellectual Dimension*

"New thinking" also prompted the Working Group to reconsider and to redefine the concepts of growth, development and security. Growth was considered meaningless

---

unless it signified economic, social and cultural progress at the popular level. As a first step, therefore, the traditional measurement of growth through Gross National Product (GNP) was criticised as being both inappropriate and misleading. GNP compilation in subsistence economies is by definition suspect, telling us nothing about income distribution or what it represents in development. Alternative and more socially and economically accurate measures are being introduced, such as relative cost of living and basic needs satisfaction indexes. As for economic "orthodoxy", alternative monetary and trade instruments and policies must be identified and considered if "new thinking" on the focus and purpose of development is to mean anything.

Development, in the Group's deliberations, has to be, as the moral dimension implies, a human-orientated process, primarily aimed at the so-called "grass roots" level, as much in the often grossly neglected rural areas as in the festering slums of many Third World cities. Growth in GNP terms without such development is a fraud. New concepts of development emphasize the promotion of self-reliance whereby means of production and levels of income are developed, through pump-priming projects, to encourage job creation and local resource use, to sustain local and regional markets. This is not to be confused with self-sufficiency or economic isolation; rather, the aim is to provide liquidity, or buying power, directly to people rather than through government or corporation intermediaries. In short, development in this popular sense cannot be achieved unless local groups are involved and their cultures and social structures respected. "New thinking" also involves reopening the question of appropriate technology which, when it was first discussed in the mid-1960s, was quietly set aside as representing technological backwardness. A more politically neutral term, with positive economic and ecological connotations, is "equilibrium technology".

Development was also considered to include respect for, and promotion of, human

rights, although the practice of some donor countries to apply political conditionality to their aid programmes was regarded with some scepticism, given the subjective definitions of human rights which appear to be applied.

The third concept, security, was also redefined on a more human basis. It is widely accepted that security is multifaceted, extending beyond the military to the economic and the environmental. In the military sphere a distinction was drawn between legitimate defence capability on one hand, and militarization and military repression, unfortunately a phenomena only too common in many poor states, on the other. The scale of arms transfers from rich to poor states continues to be a cause for concern. Although precise numbers are difficult to come by, an average of almost 12% of annual government expenditure in low- and middle-income countries is spent on defence, the total amounting to almost \$100bn, considerably more than the total sum of development assistance. The potential for economic distortion is clear but more ominous is the use of imported arms in conflicts between poor countries, in civil wars in poor countries, and even against richer countries who helped supply the arms in the first place.

Economic security was considered at two levels. At the basic, human level it signifies the need to provide minimum standards in food supply, energy, shelter, health provision and care, and education. At the higher level of national economic security, this was considered impossible to achieve unless the regulation of international economic links take all countries' economic interests into account. Such regulations necessarily involve conflicting and not easily resolved interests, such as the need for poor economies to penetrate rich country markets, in short free trade; yet free trade in most circumstances benefits rich countries more than their poorer partners. Generally speaking the Group concluded that there were too many divergences, divisions and difference of interests to talk about global security whether military, economic or environmental. But regional security regimes were viewed as "stepping stones" which should be

---

encouraged and consolidated.

Clarification of these concepts by the Group enabled the identification of policies that should be pursued by governments, of practical measures which could be undertaken by scientists and technologists in the development struggle, and the formulation of recommendations.

#### 4. *The Policy and Practical Dimension*

Since the debt issue is central to the development debate, the Group urged debt forgiveness for the poorest countries, whether official or unofficial, as a top priority. For middle-income indebted countries consideration should be given to interest rate pegging and greater use of debt-equity swaps and other methods of alleviation, as well as debt reduction. The Group supported a proposal for an International Debt Commission composed of independent members free of political constraints to consider positive methods of debt reduction and to arbitrate between debt creditors and debtors. Structural adjustment policies also have to take far more account of social expenditure and social aspects of development, especially health and education.

The Group deliberately linked education and structural adjustment programmes, as educational--and health--expenditures were often the first victims of such programmes. It identified the particular need for science and technology education emphasizing scientific principles and analytical thought especially at early and primary school levels. Particular interest was expressed in the activities of the Third World Academy of Sciences and the African Academy of Sciences in this endeavour, and Pugwash is urged to exert a leadership role in its realisation. While Africa has been chosen for specific action it is clear that science and technology education in other, less developed, regions will need to be considered in the future.

Far greater involvement of scientists and technologists in poorer regions in global

research programmes such as international disaster reduction and climatic change was urged. This would both reduce the relative isolation of scientists in poorer countries and boost the stature of science in those areas. Science education and research in poorer countries would furthermore be encouraged by the development and exploitation of electronic communication networks between scientists in rich and poor environments, to their mutual benefit. By such means technology transfer outside multinational cooperations could also be made more effective. Indeed, technology transfer should be more of a two-way traffic than is presently the case, as scientists with well-endowed facilities have a lot to learn from colleagues with more primitive laboratories, working as many do on real problems which could affect the well-being of millions.

In the area of security, the Group believed that far greater limitation on, and careful monitoring of, arms transfers through export licensing would be a positive contribution to political stability, human rights and development. The issue of arms transfers, especially to poor countries, should form an integral part of Pugwash's concern with conventional weapons. Pugwash should also address the problem of promoting development and human rights in military-controlled states and especially those wracked by civil war.

On the multilateral level "new thinking" must also extend to the now revitalised United Nations, embarking as it is upon its fourth Development Decade. The reform of its economic and financial agencies to promote more human-orientated policies is now a pressing need; economic "orthodoxies" do, after all, change over time and Pugwash should encourage economic and financial policymakers to be more mentally flexible.

Special consideration should be given by Pugwash to the particular problems and tensions that are accompanying economic and political reform in the Soviet Union. The international scientific community could play a part in monitoring and alleviating the inevitable tensions in an historic era of

---

transition.

Pugwash is also invited to consider the establishment of "preservation parks" in different parts of the world to aid the preservation of species both fauna and flora threatened by development. Such parks would have limited human access and be financed on a multinational basis.

### 5. *Recommendations*

The Working Group made three specific recommendations for consideration by Pugwash Council as possible Pugwash projects.

(i) to discuss and formulate new definitions and methods of realizing growth and development;

(ii) to sponsor and encourage an electronic worldwide communication network linking scientists and technologists and, in doing so, to promote both indigenous scientific development and scientific convergence;

(iii) to encourage research into equilibrium and other forms of technology more appropriate to poorer countries' development programmes. Pugwash could use its influence to help change currently relatively negative funding policies by both official and non-official bodies towards such research.

### 6. *Conclusion*

The Working Group believes that a new consensus on developmental and environmental issues is emerging as the fact of marginalisation and associated ecological havoc is becoming more economically embarrassing and politically unacceptable. Development and growth policies based upon conventional strategies stressing indiscriminate growth have to be strongly discouraged in favour of environmentally sustainable development, and Pugwash should be in the forefront of this shift in focus.

Ultimately a realisation of self-interest by the richer countries will prevail, no matter how long the persuasion process takes. Pugwash can justly claim some credit for undermining the Cold War and the role of nuclear weapons in underpinning the ideological divide, and there is no reason to think that it cannot do the same with the North-South divide and the structural dualism of our world with all its attendant misery. Vision and imagination is needed in considering this issue, which is just as important politically and socially as was that of the East-West divide. Pugwash, after all, is uniquely placed to play an important role in promoting convergence to one world since it is multidisciplinary, multicausal and without political constraint.

---

## **Report on Working Group 8: Ethical Problems Facing Scientists**

**Rapporteur: Martin Rees**

The ethical problems facing scientists are a natural focus of attention for Pugwash--indeed, the social responsibility of scientists was on the agenda of the very first Pugwash Conference in 1957. The fundamental and perennial nature of these issues makes it hard to come to grips with them, or to seek a new angle. Working Group 8 cannot claim more

originality than its predecessors.

The simple claim that scientists, like other professionals, have a responsibility for the foreseeable consequences of their work unfortunately cannot be taken as read. This belief must be defended against the thesis that "science is neutral", and that "a scientist must

---

seek new knowledge and cannot be blamed for its misapplication". These familiar excuses for social irresponsibility, based on the premise that science is value-free, are eloquently demolished in a fine article by John Ziman in a 1982 Pugwash publication which deserves wider circulation (and more follow-up) than it has received. The *content* of science may aspire to objectivity, and science is indeed a part of the world's common culture. But the *practice* of science cannot be isolated from value judgments. To quote Ziman, "The principle that 'scientists are just technical workers'...is a very convenient doctrine for those who want to exploit the capabilities of scientists without raising questions about the morality of the enterprise on which they are engaged".

The working group accordingly discussed how the scientific community should responsibly relate to the closed world of defense (and other mission-oriented) research, as well as this community's relations with the non-scientific public and their political representatives.

The contribution of scientists to the arms race has been a traditional focus of Pugwash. However, there are now other areas--environmental science and biotechnology, for instance--which depend equally on the expertise of scientists, and where ethical issues arise. Moreover, in all these areas decision-making involves longer-term issues that are conventionally considered by elected politicians. Scientists, collectively, have technical expertise which is essential for the crucial long-term decisions facing humanity.

#### *Quality Control and Responsibility in Science*

The quality of scientific research is maintained by a continual process of self-monitoring, peer review, etc. This mode of operation, which generally works well in traditional academic contexts, comes under strain when external pressures are too strong. For instance, claims to have achieved cold fusion were heavily "hyped" in the media before formal publication; but these claims were quickly scotched by the failure of many

independent groups to substantiate them. Even this notorious failure of the peer review system therefore teaches a constructive lesson--that *open communication* permits an error-correction mechanism to operate.

It is generally the researchers themselves who can best foresee the long-term risks that may stem from their work. An example of self-monitoring by scientists was the "Asilomar declaration", restricting certain experiments on genetically engineered organisms.

Throughout the much larger community of scientists engaged in mission-oriented research, similar controls are required in order to maintain the integrity of the enterprise. But these controls become less effective when, for security or other political reasons, free exchange of information is inhibited. The benefits of openness can be seen by contrasting the cold fusion episode with Lysenkoism, which blighted Soviet biology and agriculture for years, as well as destroying careers and even lives.

Scientists in government are often under pressure to conceal the truth. Sometimes this may be a "classification" issue. In other cases--perhaps more insidious--there is pressure to mislead. For instance, after the Chernobyl accident, public statements underestimated the severity of the radiation risks.

#### *Scientists in Defence Research*

The largest group of mission-oriented scientists--and those with which Pugwash has been traditionally most concerned--are those involved in defence research and development. The atmosphere within weapons laboratories, in the US as well as the USSR, has surely "softened" since the extreme Cold War era. While the need for continuing secrecy in some matters must be accepted, it is not unrealistic to propose more openness than has prevailed in the past.

Excessive "classification" and restriction of information undoubtedly has adverse consequences. Weapons laboratories can exaggerate their achievements, and

---

thereby boost their budgets, while evading proper public and political scrutiny. Under the cloak of secrecy, politically sensitive facts can be hidden from the public domain, and the ability of working-level scientists within defence establishments to exert any coherent influence on policy can be frustrated.

A specific dilemma of conscience arises when a scientist wishes to argue an issue of policy, but cannot document his position without revealing classified information. Within the US, there have been cases of this type involving underestimation of radiation risks from atmospheric nuclear tests, alleged violations of the threshold test ban treaty, and exaggerated claims for SDI.

Even in the US, such "whistleblowing" activities within the weapons laboratories take some courage. However, the relative openness of the political process in that nation permits effective support from respected professional bodies such as the AAAS and the American Physical Society. In most other countries, secrecy is even more pervasive; such actions would be far harder, and may put more than "merely" a safe job at risk.

*There is therefore a need for social and institutional support for those scientists who take such action.* Tenured scientists within universities enjoy a privileged degree of independence, and therefore have a special obligation in this regard. Professional societies, especially those of international scope, can play a supportive role also. *National legislation might even be introduced to strengthen the safeguards for "whistleblowers". For instance, when a state becomes a party to an arms control or disarmament treaty, it could be made a legal obligation for any citizen to report violations.*

#### *Science, Education and the Public*

As the ramifications of science have grown, there has not been a commensurate spread in understanding among the public and their elected representatives--indeed, in both East and West there has been a disturbing decline in public confidence in science, and

even an upsurge of irrationality. This happens at a time when there is more need for scientific input into the political process. Politicians are responsive not to the truth, but to the electorate's perception of the truth. Scientists need to do more to inform and influence the public directly and through the media. This may be more effective than a direct approach to politicians.

Scientists involved in education have a special responsibility to impart greater awareness of global issues to their students. The new international situation calls for a special educational effort in this regard, with special emphasis on the long-term problems confronting the Third World. It is now imperative to formulate the discussion of scientists' responsibilities in terms of global rather than regional- or class-based ethical concepts. Pugwash itself could, within its limited resources, make distinctive contributions: *by compiling a text on social and ethical aspects of science; by circulating reading lists; and by encouraging the programmes initiated by Student/Young Pugwash groups.*

In the longer term, however, the goal must be a more scientifically aware public, more concerned with long-term issues of environmental quality, sustainable development, etc. Here the universities have a special role. Among many initiatives, one of special interest and promise was recently taken at a meeting of university presidents held in Talloires, a village in the French Alps, on the theme "the responsibility of universities in the nuclear age". The result was a declaration which stressed the importance of teaching the 60 million students of the dangers the world faces and giving them the tools to understand these problems, with special emphasis on conflict resolution and disarmament. The signatories also urged that *universities should not themselves carry out any research that cannot be freely published.* To date, more than 100 universities have subscribed to the "Talloires declaration"--a manifestation of their concern that students should be more aware of the implications of their work and their subsequent choice of career.

---

A "Hippocratic Oath" for Scientists?

There have, over the years, been numerous proposals advocating a "Hippocratic oath" for scientists. There are obviously doubts about the appropriateness of this--after all, scientists are not such a well-delineated professional group as medical practitioners. Earlier suggestions of "Pugwash Pledges" did not command general support. However, in recent years a substantial number of institutions have independently formulated or introduced such oaths, suggesting that there is now more support for such voluntary public declarations--these could reinforce the individual conscience, and stimulate those pursuing scientific careers to reflect more on the impact of their efforts. (Three specific variants of such oaths are reproduced as an addendum.) *Without itself suggesting any specific form or wording, the Working Group recommends that Pugwash, and individual Pugwashites, should encourage this practice.*

*Addendum*

*The Pugwash Pledge (22nd annual conference)* I will not use my scientific

training for any purpose which I believe is intended to harm human beings: I shall strive for peace, justice, freedom and the betterment of the human condition.

*Proposed Hippocratic Oath for Scientists, Engineers and Technologists (prepared by the "Institution for Social Inventions")* I vow to practice my profession with conscience and dignity; I will strive to apply my skills only with the utmost respect for the well-being of humanity, the earth, and all its species; I will not permit considerations of nationality, politics, prejudice or material advancement to intervene between my work and this duty to present and future generations.

*The "Buenos Aires" Oath* Aware that, in the absence of ethical control, science and its products can damage society and its future, I pledge that my own scientific capabilities will never be employed merely for remuneration or prestige or on instructions of employers or political leaders only, but solely on my personal belief and social responsibility--based on my own knowledge and on considerations of the circumstances and the possible consequences of my work--that the scientific or technical research I undertake is truly in the best interests of society and peace.

---

*Pugwash Meeting # 174*  
**40th Pugwash Conference, Egham, UK, 15-20 September 1990**  
**TOWARDS A SECURE WORLD IN THE 21ST CENTURY**

**LIST OF PAPERS**

---

**Commissioned Papers**

Working Group Topics	Title	Author(s)
1.1	National Security in the Absence of a Military Threat [C8]	F. Blackaby
1.2	Practical Implementation of the Concept of Common Security [C33]	J. Singh
1.3	Restructuring of Military Forces and Doctrines [C1]	H. Beach
1.3	Restructuring European Military Forces and Doctrine: The Role of Arms Control [C18]	C. Kelleher
2.1	Global Abolition of Nuclear Weapons--Verification of Compliance and Deterrents to Violation [C9]	T. Taylor
2.1	Verification of Compliance and Deterrents to Violation (Response) [C15]	S. Rodionov
2.2	A Nuclear-Weapon-Free World: Legal Problems [C31]	K. Ipsen
2.3	A Nuclear-Weapon-Free World: Role of Decision Makers [C21]	S. Elworthy
2.3	Political Obstacles to a Nuclear-Weapon-Free World [C2]	M. Kaplan
3.1	Is a Nuclear-Free Europe Feasible after the Cold War? [C26]	J. Sharp
3.2	Revision of Economic Principles--A Necessary Precondition for Global Security [C12]	H.-P. Dürr
3.2	A Need of Political Stability and Changes in the European Security System [C19]	A. Rotfeld
3.3	Fortress or Common House? The European Integration in the Early 90's [C3]	M. Simai
4.1	Extra Regional Factors and Regional Conflict--General Issues [C4]	A. Dvoretzky

---

4.1	Extra Regional Factors and Regional Conflict--General Issues (Response) [C22]	E. Ezz
4.2	The Past, Present and Future of the Conflict in Southern Africa [C14]	A. Gromyko
4.3	Military and Non-Military Threats to Security in Latin America [C5]	V. Gamba-Stonehouse
4.3	A Global Assessment of the Latin American Situation [C23]	A. Ruiz-Zúñiga
5.1	Conversion: Finding the Political Will [C6]	J. Reppy
5.1	Conversion: Finding the Political Will (Response) [C29]	M. Cooley
5.2	Re-orientation of Military R&D for Civilian Purposes with Special Reference to Energy and Environment [C34]	S. Sen and S. Deger
5.3	Problems of Conversion of Military-Oriented Activities to Peaceful Application [C10]	K. Subrahmanyam
5.3	Problems of Changing Military Industries to Civilian Production (Response) [C16]	A. Avduyevsky
6.1	Are Global Change and Sustainable Development in Conflict? [C13]	D. McLaren
6.3	Scientific Cooperation and Technology Transfer for the Amelioration of Environmental Problems [C30]	S. Okoye
7.1	Integration or Continued Marginalisation? [C27]	E. Korthals Altes
7.1	Three Worlds or One World in the 21st Century? Economic Integration versus Continued Marginalisation [C28]	T.S. Montgomery
7.2	Towards an Equitable Global Security Regime [C11]	E. Galal
7.2	Towards a Global Security Regime (Response) [C36]	J.P. Holdren
7.3	Cooperation in Science and Technology for Development [C17]	K. Gottstein
7.3	Cooperation in Science and Technology for Development (Response) [C35]	U. D'Ambrosio
8.1	Moral Issues of Science in the Modern World [C20]	S. Kapitza
8.1	Moral Issues Faced by Scientists in Nuclear Weapons Work [C25]	H. de Witt

---

8.2	The Dove and the Hawk [C7]	M. Thring
8.3	The Responsibilities of Scientists in a Complex Society [C24]	D. Parnas
8.3	The Responsibilities of Scientists in a Complex Society (Response) [C32]	L. Rydén

### Proffered Papers

Working Group Allocation	Title	Author(s)
1	Practical Implementation of the Concept of Common Security [P3]	G. von Bonsdorff
1	Transcending National Security: Towards a More Inclusive Conceptualisation of National and Global Security [P14]	K. Clements
1	Cooperative Security for a New Global Agenda: Two Additional Roles for Governmental Advisers [P4]	R. Higgins
1	Promoting Arms Control Research Among Chinese Scientists [P16]	Hu Side and Du Xiangwan
1	Global Interdependence and Social Learning [P11]	J. de Wilde
2	An Open Skies Regime--Keeping the Arms Race Out of Space [P23]	B. Feld
2	Ridding the World of Nuclear Weapons: A Goal for Our Lifetime [P24]	B. Feld
2	Exploiting Professional Skills to Stop the Nuclear Arms Race [P35]	U. Gottstein
2	Nuclear Disarmament versus Rising Proliferation Risk--Some Suggestions and Discussion Points [P27]	V. Knapp
2	Citizen Reporting as a Method of Arms Control Verification [P1]	H. Newcombe
2	The Elimination of Nuclear Arsenals. Is It Desirable? Is It Feasible? [P12]	J. Rotblat and V. Goldanskii
2	Toward Denuclearisation of the Pacific--The Kobe Formula [P26]	T. Toyoda

---

3	Towards an All-European System of Economic Ties: Two Options [P8]	N. Behar
3	A Joint European Force [P13]	J. Dahlitz
3	Is There Any Life on Earth Outside the Warsaw Pact? [P5]	L. Valki
4	The Case of Argentina and Brazil: A Model for Other Regions [P15]	J. Carasales
4	The Gulf Crisis [P39]	J.K. Miettinen
4	Is There a Dilemma in Crisis Management on the Korean Peninsula? [P20]	Chae-Ha Pak
4	A Global Call for "Common Security" for all Children [P36]	R. Rogers
5	Conversion: Verification, Military R&D, and New Technologies [P21]	A. Brinkmann
5	Co-Conversion, US and Soviet: Evidence and Strategies [P32]	J. Tepper Marlin
6	The Global Ecological Hazard of Significant Destruction of Chemical Plants [P31]	K.K. Babievsky
6	Energy and Environment (Global Interference Today and Tomorrow) [P29]	A.S. Ginzburg
6	Oriental Thought and Circular Economy [P30]	Y. Kawada
6	Atoms Against Global Warming [P25]	V. Knapp
6	Encouraging Energy Efficiency in Latin America: Suggested Actions for the Residential Sector [P37]	O. Masera
6	Economic Injustice: Is It Built Into the Future Already? [P19]	D. Paul
6	Energy Conservation [P10]	R. Peierls
6	Going Back to Fundamentals [P22]	A. Verganelakis
7	European Responsibility for Asia [P34]	E. Korthals Altes
7	Three Worlds or One? Global Sustainable Economic Development in the 21st Century [P6]	R. Lipschutz
7	Towards Global Economic Security [P17]	S. Stankovskii

---

7	Three Worlds or One World in the 21st Century? [P9]	M. Vrhunec
7	The Future of Pugwash [P38]	M. Vrhunec
8	The Role of Science and Scientists in Promoting Mutual Confidence and Friendship Among the Nations of Europe and the World [P2]	D. Berényi
8	International Scientific Cooperation and International Relations [P18]	R. Bulkeley
8	Eastern European Scientists Facing a New Ethics [P28]	C. Kiuranov
8	Hippocratic Oath: An Ethical Tool for the Nuclear Age [P7]	A. Lemarchand
8	High Technology, Humanity and Ethics [P33]	A. Petre

### Commissioned Summaries of Previous Pugwash Findings

Working Group Allocation	Title	Author
1	Global Security versus National Security-- A Change in Basic Approach [S1]	J. Boag
2	A Nuclear-Weapon-Free World. Is It Desirable? Is It Feasible? [S2]	M. Bruce
3	Europe in the 21st Century [S3]	R. Pease
4	Regional Conflicts and Global Security [S4]	A. de Reuck
5	Conversion of Military-Oriented Activities to Peaceful Applications [S5]	T. Walker
6	Environmental Degradation and Economic Development: Conflicting Interests? [S6]	J. Leggett
7	Three Worlds or One World in the 21st Century? [S7]	A. Thorndike
8	Ethical Problems Facing Scientists [S8]	M. Rees

---

## LIST OF PARTICIPANTS

- Amb. Oluyemi **Adeniji** (Nigeria)  
Mr. Mariano **Aguirre** (Spain)  
Miss Maximiliane **Alexander** (UK)  
Prof. M. Innas **Ali** (Bangladesh)  
Prof. Leslie **Allen** (UK)  
Dr. Yuri V. **Andreev** (USSR)  
Dr. Marco De **Andreis** (Italy)  
Prof. Gothom **Arya** (Thailand)  
Acad. Vsevolod **Avduyevsky** (USSR)  
Dr. John S. **Avery** (Denmark)  
Prof. Kirill K. **Babievski** (USSR)  
Acad. Angel T. **Balevski** (Bulgaria)  
Dr. Charles Frank **Barnaby** (UK)  
Prof. Pierre **Baudoux** (Belgium)  
Sir Hugh **Beach** (UK)  
Prof. Nansen **Behar** (Bulgaria)  
Acad. Dénes **Berényi** (Hungary)  
Dr. Frank **Blackaby** (UK)  
Prof. John W. **Boag** (UK)  
Prof. Göran von **Bonsdorff** (Finland)  
Dr. Jeffrey **Boutwell** (USA)  
Mr. Jeremy W. **Bray** (UK)  
Mr. Maxwell **Bruce** (UK)  
Dr. Rip I. **Bulkeley** (UK)  
Dr. Felix **Calderon** (Peru)  
Prof. Francesco **Calogero** (Italy)  
Ms. Cao Xiaobing (China)  
Amb. Julio C. **Carasales** (Argentina)  
Prof. Henry **Charnock** (UK)  
Dr. Kevin P. **Clements** (New Zealand)  
Prof. Germinal **Cocho** (Mexico)  
Dr. Thomas **Cochran** (USA)  
Prof. Michael **Cooley** (UK)  
Dr. Julie **Dahlitz** (Australia)  
Prof. Ubiratan **D'Ambrosio** (Brazil)  
Prof. Ogunlade R. **Davidson** (Sierra Leone)  
Dr. Daniel **Deudney** (USA)  
Prof. Edwin R. **Dobbs** (UK)  
Prof. Paul **Doty** (USA)  
Prof. Du Xiang Wan (China)  
Prof. Hans-Peter **Dürr** (FRG)  
Dr. Aryeh **Dvoretzky** (Israel)  
Mr. Paul **Eavis** (UK)  
Mr. John C. **Edmonds** (UK)  
Ms. Anne **Ehrlich** (USA)  
Mr. Omran **El-Shafei** (Egypt)  
Ms. Scilla **Elworthy** (UK)  
Prof. Abdel **Emara** (Egypt)  
Acad. Nikolay S. **Enikolopov** (USSR)  
Dr. William **Epstein** (Canada)  
Lt. Gen. Emmanuel A. **Erskine** (Ghana)  
Dr. Augusto-Caesar **Espiritu** (Philippines)  
Dr. Esmat **Ezz** (Egypt)  
Mrs. Annagret **Falter** (FRG)  
Dr. Paolo **Farinella** (Italy)  
Professor Paul **Fatt** (UK)  
Prof. Bernard T. **Feld** (USA)  
Dr. Eric **Ferguson** (Netherlands)  
Dr. Eduardo **Ferrero Costa** (Peru)  
Lord **Flowers** (UK)  
Sir Charles **Frank** (UK)  
Mr. Shalheveth **Freier** (Israel)  
Dr. Jean F. **Freymond** (Switzerland)  
Prof. Essam E. **Galal** (Egypt)  
Prof. Virginia **Gamba-Stonehouse**  
(Argentina)  
Prof. Terrell **Gardner** (Canada)  
Prof. Richard L. **Garwin** (USA)  
Dr. Alexander S. **Ginzburg** (USSR)  
Dr. Peter H. **Gleick** (USA)  
Prof. Helmut **Glubrecht** (FRG)  
Acad. Vitalii I. **Goldanskii** (USSR)  
Prof. Klaus **Gottstein** (FRG)  
Prof. Anatoli A. **Gromyko** (USSR)  
Prof. William F. **Gutteridge** (UK)  
Prof. Andrew **Haines** (UK)  
Mr. Ronald **Higgins** (UK)  
Prof. Dorothy **Hodgkin** (UK)  
Prof. John P. **Holdren** (USA)  
Prof. **Hu** Side (China)  
Prof. Kôdi **Husimi** (Japan)  
Prof. George **Hutchinson** (UK)  
Prof. Enrico **Jacchia** (Italy)  
Mr. Trevor **James** (UK)  
Maj. Gen. (ret.) Leonard **Johnson**  
(Canada)  
Dr. Venance **Journé** (France)  
Mr. Alain **Joxe** (France)  
Ms. Mary **Kaldor** (UK)  
Prof. Serguei P. **Kapitza** (USSR)  
Dr. Martin M. **Kaplan** (Switzerland)  
Acad. Nikolai V. **Karlov** (USSR)  
Prof. Catherine **Kelleher** (USA)  
Prof. Eduard **Kellenberger** (Switzerland)  
Prof. Boris M. **Khalosha** (USSR)  
Prof. Bjorn **Kirkerud** (Norway)  
Prof. Yasushi **Kitano** (Japan)  
Prof. Chavdar **Kiuranov** (Bulgaria)  
Dr. Jean **Klein** (France)  
Prof. Vladimir **Knapp** (Yugoslavia)

---

Dr. Edy **Korthals Altes** (Netherlands)  
Prof. Leszek **Kuznicki** (Poland)  
Dr. Yongsu **Kwak** (South Korea)  
Prof. Byong Whi **Lee** (South Korea)  
Dr. Guillermo A. **Lemarchand** (Argentina)  
Prof. Patricia **Lindop** (UK)  
Prof. Ronald D. **Lipschutz** (USA)  
Dr. Peter **Lock** (FRG)  
Prof. Lee **Lorch** (Canada)  
Dr. David **Lowry** (UK)  
Prof. Neil **Macfarlane** (USA)  
Prof. Jianqin **Mao** (China)  
Dr. Peter **Markl** (Austria)  
Dr. John Tepper **Marlin** (USA)  
Ms. Pauline **Marstrand** (UK)  
Prof. Omar **Masera** (Mexico)  
Dr. Digby J. **McLaren** (Canada)  
Mr. Robert S. **McNamara** (USA)  
Mr. André L. **Mechelynck** (Belgium)  
Prof. Jorma K. **Miettinen** (Finland)  
Prof. Mikhail A. **Milstein** (USSR)  
Prof. Octavio **Miramontes** (Mexico)  
Prof. Tommie Sue **Montgomery** (USA)  
Maj.-Gen. Talaat A. **Mosallam** (Egypt)  
Prof. Maciej **Nalecz** (Poland)  
Prof. Bent **Natvig** (Norway)  
Prof. Robert **Neild** (UK)  
Dr. Hanna **Newcombe** (Canada)  
Prof. Agu U. **Ogan** (Nigeria)  
Prof. Samuel E. **Okoye** (Nigeria)  
Prof. Oleg A. **Olkhov** (USSR)  
Dr. Chae-Ha **Pak** (South Korea)  
Prof. Tibor **Palankai** (Hungary)  
Dr. Peri **Pamir** (Turkey)  
Prof. Derek **Paul** (Canada)  
Prof. Amnon **Pazy** (Israel)  
Dr. Rendel Sebastian **Pease** (UK)  
Prof. Sir Rudolf **Peierls** (UK)  
Mr. Julian **Perry-Robinson** (UK)  
Prof. Augustin **Petre** (Romania)  
Mr. B. Terence **Price** (UK)  
Dr. Victor **Rabinowitch** (USA)  
Prof. Ratna **Rana** (Nepal)  
Prof. Martin **Rees** (UK)  
Prof. Judith **Reppy** (USA)  
Mr. Anthony de **Reuck** (UK)  
Dr. Stanislav **Rodionov** (USSR)  
Prof. Rita **Rogers** (USA)  
Prof. Joseph **Rotblat** (UK)  
Dr. Adam D. **Rotfeld** (Poland)  
Prof. Jack **Ruina** (USA)  
Prof. Angel **Ruiz-Zúñiga** (Costa Rica)

Dr. Lars **Rydén** (Sweden)  
Adm. Elmar **Schmähling** (Austria)  
Prof. Thomas **Schönfeld** (Austria)  
Dr. Somnath **Sen** (UK)  
Mrs. Jane M.O. **Sharp** (Sweden)  
Prof. Umaru **Shehu** (Nigeria)  
Lord **Sherfield** (UK)  
Dr. Bart van der **Sijde** (Netherlands)  
Acad. Mihaly **Simai** (Hungary)  
Prof. Emmanuel **Sivan** (Israel)  
Prof. Uzy **Smilansky** (Israel)  
Prof. Philip B. **Smith** (Netherlands)  
Mr. Krishnaswami S. **Subrahmanyam** (India)  
Mr. David M. **Summerhayes** (UK)  
Col. Peter **Szücs** (Hungary)  
Prof. Peter Agbor **Tabi** (Cameroon)  
Dr. Theodore B. **Taylor** (USA)  
Prof. Tony E. **Thorndike** (UK)  
Prof. Meredith W. **Thring** (UK)  
Prof. Alfred **Tissières** (Switzerland)  
Prof. Toshiyuki **Toyoda** (Japan)  
Dr. Ralf **Trapp** (GDR)  
Prof. Witold **Trzeciakowski** (Poland)  
Prof. Bhalchandra M. **Udgaonkar** (India)  
Prof. Laszlo L. **Valki** (Hungary)  
Prof. Antonis **Verganelakis** (Greece)  
Prof. Marko **Vrhunec** (Yugoslavia)  
Mr. Tim **Walker** (UK)  
Prof. Peter **Wallenstein** (Sweden)  
Dr. Christopher J.H. **Watson** (UK)  
Prof. Dorothy **Wedderburn** (UK)  
Prof. Maurice H. **Wilkins** (UK)  
Dr. Hugh **de Witt** (USA)  
Sir Gordon **Wolstenholme** (UK)  
Dr. Steve **Wright** (UK)  
Dr. James B. **Wyngaarden** (USA)  
Prof. Alexey **Yablokov** (USSR)  
Prof. **Zhang Zhijun** (China)  
Lord **Zuckerman** (UK)

*Observers*

Prof. Ulrich **Gottstein** (IPPNW)  
Dr. Roul **Pakkas** (UNESCO)

*Guests of British Pugwash*

Sir Ralf **Dahrendorf** (UK)  
Mr. Tomosaburo **Hirano** (Japan)  
Dr. Yoichi **Kawada** (Japan)  
Mr. John R. **Maddox** (UK)  
Ms. Carin **Wedar** (Sweden)

---

*Student/Young Pugwash*

Mr. Olusegun O. **Agesin** (Nigeria)  
Dr. André **Anders** (GDR)  
Ms. Angelika **Brinkmann** (FRG)  
Ms. Catriona J. **Bruce** (UK)  
Mr. Grant **Campbell** (UK)  
Mr. Jamie **Cleaver** (UK)  
Mr. Andrew S. **Cottey** (UK)  
Ms. Priya **Deshingkar** (UK)  
Mr. Howard **Evans** (UK)  
Ms. Betsy L. **Fader** (USA)  
Ms. Evguenia **Goncharenko** (USSR)  
Ms. Catherine H. **Gordon** (Australia)  
Mr. Paul K. **Guinnessy** (UK)  
Mr. Vipin **Gupta** (UK)

Mr. Simon T. **Hodgkin** (UK)  
Mr. Stefano **Leonardi** (Italy)  
Mr. Klaus **Marquardt** (FRG)  
Ms. Margot **Meijer** (Canada)  
Mr. John **Ragies** (UK)  
Mr. Sunil M. **Shastri** (UK)  
Dr. Sergei S. **Stankovskii** (USSR)  
Mr. Edward J. **Stanton** (UK)  
Ms. Nicola J. **Steele** (UK)  
Mr. Yannis **Stivachtis** (UK)  
Mr. Kari T. **Takamaa** (Finland)  
Mr. Joe **Thwaites** (Canada)  
Mr. Bruce A. **Wedgwood-Oppenheim** (UK)  
Mr. Jaap H. de **Wilde** (Netherlands)  
Mr. Igor A. **Zhukov** (USSR)



Thursday 20 September 1990, afternoon: Public Meeting organized by the British Pugwash Group, after the close of the 40th Annual Pugwash Conference, in Egham, UK. In the photo from the right: Lord Zuckerman, Dr. Sebastian Pease, Mr. Robert McNamara, Prof. Alexey Yablokov and Prof. Joseph Rotblat.

---

## A Vision of a Post-Cold War World by Robert S. McNamara

In 1941, in the midst of a titanic struggle not yet won, Franklin Roosevelt and Winston Churchill put forward their vision of a post-World War II world in the form of the Atlantic Charter. Their dream was never to be realized. The Cold War intervened.

Today, for the first time in half a century, we have another opportunity to formulate a statement of world order and the role of the West in achieving and maintaining it. That is what I propose to set before you this afternoon.

The title for my remarks--A Vision of a Post-Cold War World--and my text were prepared before the Iraqi invasion of Kuwait. Has that event required a revision of title or text? It may surprise you to learn that my answer is No. In the course of my statement I'll explain why that is so.

The major factor affecting global economic, political, and social trends in the last decade of the 20th and the early years of the 21st century, in my opinion, will be the revolutionary changes in Soviet policy introduced by Mikhail Gorbachev. Before I turn to how those changes shape my view of the post-Cold War world, I want to comment on the short-term outlook for the US.

No work of non-fiction has received more attention in the United States in the past two years than Paul Kennedy's book *The Rise and Fall of the Great Powers*. In it the British historian, now teaching at Yale University, examines the changing relationships among nations over a period of five hundred years. Based on that analysis, he concludes that when the security commitments and economic strength of Great Powers move out of balance, they fall into decline. The implication is that the US is at such a point today. As I will make clear later, I totally disagree with that view.

Kennedy's book followed by a few months an article in the London *Economist* entitled "Has America Lost Its Smile." It suggested that the US, on which the post-war world had depended for leadership in both economic and political affairs, had lost its sense of compassion, its optimism and its self-confidence. As a result, said the *Economist*: we had withdrawn from our leadership role,

we had turned inward, and because of our pessimistic mood, we had even lost our ability to deal with our own domestic problems.

I agree with that appraisal. But I believe that our failure to move toward a solution of both our domestic and international problems is more a function of our psychological strength and our political will than our economic capacity. And I see no evidence whatsoever to support the conclusion that our problem is a function of an imbalance between our economic capacity and our security commitments.

You are familiar with the economic problems which the US faces today:

*-Apart from the temporary effect of the oil price increase, the primary factor is that as a nation we have been on an enormous consumption binge, living beyond our means, selling our assets and borrowing heavily both domestically and abroad to finance an unprecedented expansion of domestic spending.*

*-While enjoying our consumption binge, we have permitted severe social problems to develop to plague our society: unacceptably high unemployment levels among youth and minority groups; a rapidly growing underclass--e.g., 51% of the births in the capital of the country, Washington, D.C., are illegitimate; high rates of crime and drug abuse; a failure to adequately address the problems of the poor, the aged, and the disadvantaged; a deteriorating physical infrastructure; severe distortions in sectional and regional growth patterns; and irresponsible economic policies toward other nations in both the developed and developing worlds.*

*-The consumption binge has been accompanied by a federal budget deficit of unprecedented magnitude.*

*-Because of a decline in national savings--private savings have continued at their traditionally low level while public savings have gone strongly negative--the US must borrow abroad more than half of the resources required to finance new domestic*

*investment.*

*-This has led to the huge trade deficit, a comparable current account deficit, and a rising external debt.*

But the external debt cannot continue to rise indefinitely. Therefore, the economy must be brought back into balance. The chances to do so are certain to occur. There is no way to deal with our problem other than by bringing consumption and investment into balance with production.

Put very simply: we must stop consuming more than we are producing. Whether such action will lead to an actual reduction in consumption, or simply a reduction in the rate of increase, depends on how skillful we are in formulating the adjustment program.

Under the best of circumstances, the adjustments will be painful and they are being opposed by many. However, they must and they will be undertaken. Had not the Iraqi action intervened, they would be underway by now. The Middle East conflict may delay them by a few months, but ultimately they must and they will be put in place. The Administration will be assisted in mobilizing political support for the unpalatable--but absolutely essential--adjustment measures by the developments on the international scene that few would have predicted possible 24 months ago. It is to those which I turn now.

Mikhail Gorbachev has said, and we in the West generally accept, that the Cold War is over. Gorbachev has emphasized on numerous occasions that war between the Superpowers is no longer an acceptable instrument of political change. He says "today's problems between East and West must be resolved through political means."

But we in the West have not yet revised our foreign or defense policies to reflect that proposition.

In the US, for example, in the current fiscal year the defense program calls for the expenditure of approximately \$300 billion. In constant dollars that is 35% more than a decade ago, only 6% less than at the height of the Vietnam War, and only 10% below the peak of Korean War expenditures. Moreover, many security experts forecast Superpower rivalry and global conflict throughout the 1990's. In

conformity with such views, the President's five-year defense program, presented to Congress January 29, projects that expenditures will decline only very gradually--at a rate of approximately 2% per year--from present levels. On that basis, defense outlays in 1996, in constant dollars, would be 45% higher than 20 years earlier, under Richard Nixon and Henry Kissinger, in the midst of the Cold War.

Such a defense program is not consistent with my view of the post-Cold War world.

I believe Gorbachev is presenting the West with the greatest opportunity in forty years to shift the basis for the formulation of its foreign and defense policy from "Cold War" thinking to a totally new vision of Superpower relations. By such a shift we should be able to enhance global stability, strengthen our own security, and at the same time produce significant long-term budgetary savings and the resources to support much-needed restructuring of many of our economies.

Is a world without risk of war between East and West--between Great Powers--an idle dream, an unrealistic hope? Many--probably most--students of history and geopolitics would claim that it is.

But is such a thought any more inconceivable than:

*-Jean Monnet's vision of a United Europe.*

*-Sadat's initiative to bring peace to Egypt and Israel.*

*-Adenauer and DeGaulle's determination to ensure peaceful relations between France and Germany after hundreds of years of war.*

*-the dramatic shift in US-Japan relations after World War II.*

Can we visualize such a post-Cold War world? What shape would it take? What steps would lead to it? Can we move in that direction without incurring unacceptable risks in the event we fail?

These are the questions I will pursue this afternoon. In the course of doing so I will:

*-Reflect on the causes and consequences of the changes in the attitudes of the Soviet*

---

*leaders toward continued conflict with the West.*

*-Then review the Western response to the Soviet initiatives and propose a far more radical set of moves in both the political and military spheres.*

*-And, finally, recognize and discuss potential criticism of the program I propose.*

I will conclude that we do indeed face an opportunity to enter a world without risk of war between East and West. To fail to grasp that opportunity will mean an indefinite extension of the risk we have faced for forty years: that conflict between East and West will endanger the very survival of our civilization.

Before Mikhail Gorbachev's appointment in March 1985 as General Secretary of the Communist Party, Moscow's view of national security appeared to assume that the USSR could guarantee its security only to the extent that other nations felt insecure. Soviet foreign and defense policy was likened to a zero-sum game in which Moscow gained the security lost by others. Since 1985, however, Gorbachev has sought to redefine Soviet perceptions of national security by introducing his so-called "New Thinking."

The point that he returns to more than any other when discussing foreign policy is his belief that modern military technologies, specifically nuclear weapons, have rendered war an inadmissible means of advancing a nation's security interests. He says there is a lack of proportionality in nuclear war: the destruction would far outweigh any conceivable political goal. And he recognizes, as I am sure you do, that any war between the East and West contains within it the seeds of a possible unlimited nuclear war.

What is the origin of the "New Thinking"? We should attempt to answer that question in order to judge whether, as some believe, it is a passing phase.

I believe that two forces have led to the fundamental change in the Soviet's views of its relationship with the West.

The first is the obvious one: the country's economic crisis.

In contrast to the 6% of GNP which the US has devoted to defense, the Soviets have been spending a minimum of 17% and perhaps

as much as 23% or 24% on military forces. They are indeed an example of a Great Power--as is implied in Paul Kennedy's book--in which economic strength and security expenditures are out of balance. To strengthen that economy, defense outlays in relation to GNP must be reduced. But to do so, without reducing security, requires a reduction in the political conflict between East and West and a start on winding down the arms race. That is the first reason for the New Thinking.

But there is a second reason as well, not often recognized.

At the same time that domestic economic problems have been pushing Gorbachev to search for ways to reduce East-West conflict, he has come to understand the increasing danger of military action in the nuclear age. The Soviets have studied the origin and implications of the confrontations over Berlin, Cuba, and the Middle East. They have recognized, perhaps more than the Western world, the great damage that through misinformation, misjudgment, and miscalculation, such crises may escalate. In this connection, let me tell you of a meeting I attended in Moscow in January of last year.

At Gorbachev's initiative the Soviet government, in association with Harvard University, invited McGeorge Bundy, Ted Sorensen, and me to join Andrei Gromyko, Anatoly Dobrynin and Fyodor Burlatsky, as well as three Cuban officials who are close associates of Fidel Castro, to discuss the causes of the Cuban missile crisis and the lessons to be learned from that event.

You will recall that in 1962, the Soviet Union, under the cloak of secrecy, and with the clear intent to deceive, had introduced intermediate-range nuclear missiles into Cuba. A series of actions followed which brought the US and the Soviet Union to the verge of military conflict and the world to the brink of nuclear disaster.

At the Moscow meeting, the Soviets spoke with extraordinary candor. They indicated that Khrushchev had acted in a spirit of adventurism and without consideration of the consequences. But, more fundamentally, Khrushchev did what he did, and Kennedy responded as he did, because each leader, their associates, and their peoples were captives of the gross misperceptions and deep-seated

---

mistrust which underlay the Cold War.

In addition, it is now clear that the decisions of each side, before and during the crisis, were distorted by misinformation and miscalculation:

*-Before the Soviet missiles were introduced into Cuba in the summer of 1962, the Soviets and Cubans believed the United States intended to invade the island to overthrow Castro and his government. But I can say without qualification, we had no such intention.*

*-The US believed the Soviets would not move nuclear warheads outside the Soviet Union. They did. In Moscow, we were told that by October 24, twenty Soviet warheads had been delivered to Cuba and their missiles were targeted on US cities.*

*-The Soviets believed the missiles could be introduced secretly into Cuba, without detection, and when their presence was disclosed the US would not respond. Here, too, they were in error.*

*-Finally, those who urged President Kennedy to destroy the missiles by a US air attack, which in all likelihood would have been followed by a sea and land invasion, were almost certainly mistaken in their belief that the Soviets would not respond with military action. At the time the CIA had reported 10,000 Soviet troops in Cuba. We learned in Moscow there were 40,000. We know now, too, that there were 270,000 well-armed Cuban troops. Both forces were determined, in the words of their commanders, to "fight to the death." The Cuban officials estimated they would have suffered 100,000 casualties. The Soviets expressed disbelief we would have thought that, in the face of such a catastrophic defeat, they would not have responded militarily somewhere in the world, most likely against US Jupiter missiles in Turkey or NATO forces in Berlin.*

By Saturday, October 27, 1962 the crisis had reached such a point that Burlatsky reported to us he and a Central Committee colleague decided to move their wives and children to the countryside in anticipation of a US nuclear strike on Moscow. And, at the same time in Washington, on a beautiful fall evening, as I left the President's office to return

to the Pentagon, I thought I might never live to see another Saturday night. I know this sounds melodramatic, but it reflects the state of mind of the participants on both sides at the critical moment in the crisis.

What were the lessons learned from the discussion in Moscow ?

We agreed there were two:

*1. In this nuclear age, crisis management is dangerous, difficult, uncertain. It is not possible to predict with confidence the consequences of military action between the Superpowers because of misjudgment, misinformation, miscalculation.*

*2. Therefore, we must direct our attention to crisis avoidance.*

That, I believe, is what Gorbachev is seeking to do by his proposals for dramatic changes in East-West political and military relations. But until quite recently--and I would say even today--Western reactions to Gorbachev's proposals have been very, very cautious.

Perhaps at this stage, little more than five years after Gorbachev came on the scene, that is to be expected. For forty years the foreign policy and defense programs of Western nations have been shaped largely by one major force: fear of, and opposition to, the spread of Soviet-sponsored communism. It will require a leap of the imagination for us to conceive of our national goals--our role--in a world not dominated by the struggle between East and West.

Before we can respond to Gorbachev--and before we can deter and, if deterrence fails, respond properly to Iraqi-type aggression--we need a vision of a world which would not be dominated by that rivalry. As the Iraqi action demonstrates, it would not be a world without conflict, conflict between disparate groups within nations and conflict extending across national borders. Racial and ethnic differences will remain. Political revolutions will erupt as societies advance. Historical disputes over political boundaries will continue. Economic differentials among nations, as the technological revolution of the 21st century spreads unevenly across the globe, will increase.

---

In the past 45 years, 125 wars, leading to 22 million deaths, have taken place in the Third World. Third World military expenditures, now approximately \$200 billion per year, quintupled in constant dollars between 1960 and 1987, increasing at a rate of 7.5% annually compared to 2.8% per year in the industrialized countries.<sup>1</sup>

It is often suggested that the Third World has been turned into an ideological battleground by the Cold War and the rivalries of the Superpowers. That rivalry has been a contributing factor, but the underlying causes for Third World conflict existed before the origin of the Cold War and will almost certainly continue after it ends.

In those respects, therefore, the world of the future will not be different from the world of the past--conflicts within and between nations will not disappear. But how different that world would be if the Superpowers and their allies agreed on, and adjusted their foreign and defense policies to reflect, two points:

1. *Neither would seek to take advantage of such disputes to increase or extend their political or military power beyond their borders;*

2. *Their bilateral relations would be conducted according to rules of conduct which precluded the use of force.*

Neither the Soviet Union nor the US has sketched out how the nations of East and West and North and South might relate to each other in such a world or how they could move toward it through a series of steps extending over a decade or more. I will try to do so, dealing first with political actions and later with changes in military forces.

It is clear that in the 21st century regardless of actions by the Superpowers, relations among nations will differ dramatically from those of the post-war decades. In the post-war years the US had the power--and to a considerable degree we exercised it--to shape the world as we chose. In the next century, that will not be possible. While remaining the world's strongest nation, we will live in a multipolar world and our foreign policy and defense programs must be adjusted to that reality.

The world has already seen the rise of Japan. It is destined to play a larger and larger role on the world scene, exercising greater political power and assuming greater political and economic responsibility. The same can be said of Western Europe, with your giant step toward economic integration in 1992. From that is bound to follow greater political unity which will strengthen Europe's power in world politics.

And by the middle of the next century several of the countries, of what we now think of as the Third World, will have so increased in size and economic power as to be major participants in decisions affecting relations among nations. India is likely to have a population of 1.6 billion, Nigeria 400 million, and Brazil 300 million. If China achieves its economic goals for the year 2000, and if it then moves forward during the next fifty years at satisfactory but not spectacular growth rates, the income per capita of its approximately 1.6 billion people in 2050 may be roughly equal to that of the British in 1965. China's total Gross National Product would approximate that of the US, Western Europe, or Japan, and very likely would exceed that of the USSR. These figures are, of course, highly speculative. I point to them simply to emphasize the magnitude of the changes which lie ahead and the need to begin now to adjust our goals, our policies and our institutions to take account of them.

In such a multipolar world<sup>2</sup>, neither the US nor the USSR would be able to so completely dominate their respective spheres as at present. The US must prepare to reposition itself politically for a new role in a new world.

I believe we should strive to move toward a world in which relations among nations would be based on the rule of law, supported by a system of collective security, with conflict resolution and peace-keeping functions performed by multilateral institutions--the United Nations and regional organizations.

This is my vision of the post-Cold War world.

It is, I believe, consistent with Roosevelt and Churchill's conception of the post-World War II world.

In contrast to my vision, many political theorists predict a return to the power politics of the 19th century. They claim that as ideological competition between East and West is reduced, there will be a reversion to more traditional relationships. They say that major powers will be guided by basic territorial and economic imperatives: the US, USSR, China, Japan and Western Europe will seek to assert themselves in their own regions while competing for dominance in other areas of the world where conditions are fluid.

This view has been expressed by Michael J. Sandel, a political theorist at Harvard, who was quoted in the *New York Times* on December 31, 1989 as stating:

“The end of the Cold War does not mean an end of global competition between the Superpowers. Once the ideological dimension fades, what you are left with is not peace and harmony, but old-fashioned global politics based on dominant powers competing for influence and pursuing their internal interests.”

Professor Sandel’s conception of relations among nations in the post-Cold War world is historically well-founded, but I would argue it is not consistent with the increasingly interdependent world--interdependent economically, environmentally, and in terms of security--into which we are now moving. In that interdependent world, I do not believe any nation will be able to stand alone. The UN Charter offers a far more appropriate framework for relations among nations in such a world than does the doctrine of power politics.

However, Sandel’s theories appear to underlie the views of the Soviet Union held today by many geopoliticians. For example, on a television program on which I appeared three months ago, Francois Poincet, the former French Foreign Minister, Paul Nitze, and Henry Kissinger had this to say about the Soviets:

Francois Poincet: “The Soviets have a broad idea of the European architecture of tomorrow--[they seek] military supremacy in Europe. That is their objective.”

Paul Nitze: “I share that view.”

Henry Kissinger: The objective is “in a situation of crisis the Soviet Union is [to be]

in a preponderant position.”

In contrast to Professor Sandel, Carl Kaysen, former director of the Institute of Advanced Studies at Princeton, wrote in a recent edition of *International Security* that:

“The international system that relies on the national use of military force as the ultimate guarantor of security, and the threat of its use as the basis of order, is not the only possible one. To seek a different system...is no longer the pursuit of an illusion, but a necessary effort toward a necessary goal.”

This is exactly what I propose we undertake.

Gorbachev’s initiatives present us an opportunity to move toward just such a conception of the post-Cold War world, a world in which order would be maintained through international cooperation and support for a system of collective security.

Had we made clear that was our objective, and that East and West would not only pursue their own political interests through diplomacy without the use of military force but would seek to protect Third World nations against attack by other nations, the Iraqi action might well have been deterred. In any event, it would have been responded to far more effectively than has been the case to date.

While steps are being taken to reduce the danger of East-West political conflict and to establish a world-wide system of collective security, the arms control negotiations now underway should be expanded rapidly in scope and accelerated in time. Short-term, medium-term, and long-term objectives should be set for the process.

The short-term arms negotiation agenda should stress the obvious: early completion of the START Treaty, which I will label START I; rapid progress in the Vienna negotiations leading to the restructuring and balancing of conventional forces in Europe, which I will designate CFE I; and, in association with the conventional force adjustments, large reductions in tactical nuclear forces.

START I and CFE I should be followed very quickly in the medium term by what I will call START II and III, and CFE II and III. We should begin now to set goals for those follow-on treaties.

---

START I will result in reductions of 20% to 30% in each side's strategic nuclear warheads, say from 12,000 to something on the order of 8,000 to 10,000. START II and START III could well cut those totals to 3,000. A reduction in NATO's strategic nuclear forces to 3,000 warheads, when matched by the Soviets, would still permit--irrational as it may appear--approximately the same coverage, as we have today, of Soviet military targets.

CFE I calls for balancing Warsaw Pact and NATO forces at levels 10% to 15% below NATO's 1989 conventional force levels. I would favor levels for CFE II or CFE III as low as have been proposed by the former Supreme Allied Commander in Europe, General Goodpaster, who recommended cuts in conventional forces to 50% of NATO's 1989 strength.

Such "short-term" and "medium-term" programs will greatly improve crisis stability. However, after they are completed, East and West will retain thousands of nuclear warheads. The danger of nuclear war--the risk of destruction of our societies--will have been reduced but not eliminated. Can we go further? Surely the answer must be Yes.

More and more political and military leaders are accepting that basic changes in NATO's nuclear strategy--beyond the shift to a strategy of "last resort"--are required. Some are going so far as to state that our long-term objective should be to return, insofar as practical, to a non-nuclear world.

That is a very controversial proposition: leading Western security experts--both military and civilian--continue to believe that the threat of the use of nuclear weapons prevents war. And Zbigniew Brzezinski, President Carter's National Security Advisor, has said with reference to a proposal for eliminating nuclear weapons: "It is a plan for making the world safe for conventional warfare. I am therefore not enthusiastic about it." However, even if one accepts their argument, it must be recognized that their deterrent to conventional force aggression carries a very high long-term cost: the risk of a nuclear exchange.

Gerard Smith, President Nixon's arms negotiator, has pointed out that recently disclosed, formerly highly classified,

documents of the Eisenhower administration<sup>3</sup> indicate that Secretary of State John Foster Dulles had recognized this problem. In 1954, writing in a top secret assessment of internal strategy, Dulles said, "The increased destructiveness of nuclear weapons and the approach of effective atomic parity are creating a situation in which general war would threaten the destruction of Western civilization and of the Soviet regime and in which national objectives could not be obtained through a general war even if a military victory were won." Dulles went so far as to state "atomic power was too vast a power to be left for the military use of any one country." Its use, he thought, should be "internationalized for security purposes." He proposed, therefore, to "universalize the capacity of atomic thermonuclear weapons to deter aggression" by transferring control of nuclear forces to a veto-less United Nations Security Council.

As you know, Mikhail Gorbachev has gone beyond the Dulles proposal of a United Nations multilateral deterrent force to suggest that the United States and the Soviet Union aim at achieving the total elimination of nuclear weapons by the year 2000. But the genie is out of the bottle--we cannot remove from men's minds the knowledge of how to build nuclear warheads. Therefore, unless technologies and procedures can be developed to ensure detection of any steps toward building even a single nuclear bomb by any nation or terrorist group--and such safeguards are not on the horizon--an agreement for total nuclear disarmament will almost certainly degenerate into an unstable rearmament race. Thus, despite the desirability of a world without nuclear weapons, an agreement to that end does not appear feasible either today or for the foreseeable future.

However, if the nuclear powers were to agree, in principle, that each nation's nuclear force would be no larger than was needed to deter cheating--secretly building nuclear weapons--how large might such a force be? Policing an arms agreement that restricted the nuclear powers to a small number of warheads is quite feasible with present verification technology. The number of warheads required for a force sufficiently large to deter cheating would be determined by the number any

nation could build without detection. I know of no studies which point to what that number might be, but surely it would not exceed one hundred. Very possibly it would be far less, perhaps in the low tens.

With existing nuclear forces totalling in excess of 50,000 warheads, with the Cold War ended, and with the danger of proliferation of weapons of mass destruction increasing with every passing day, should we not begin immediately to debate the merits of alternative long-term objectives for nuclear forces, choosing for example, from among:

*-A continuation of a "counterforce strategy", but with each side limited to approximately 3,000 warheads, or*

*-A minimum deterrent force for each side of perhaps 500 warheads, or*

*-As I myself would prefer, a return, insofar as practicable, to a non-nuclear world.*

And, should we not debate as well how best to deal with the proliferation of weapons of mass-destruction? If we truly wish to stop proliferation, I see no alternative to some form of collective action by order of the Security Council.

As we move to limit nuclear forces and as we complete as well Gorbachev's plan for restructuring and reducing conventional forces, Western defense budgets, while providing for collective action against military aggression wherever it may occur, can be reduced substantially. In the case of the US, I believe it should be possible, within 6 to 8 years, to cut military expenditures in half in relation to GNP, i.e., from 6% to 3%. That would make available, in 1989 dollars and in relation to 1989 GNP, \$150 billion per year. Such huge savings could be used to reduce the fiscal deficit and to address the pressing human and physical infrastructure needs, to which I referred earlier, of both our own and Third World societies.

So much for my vision.

After forty years, an attempt to shift relationships between East and West, as dramatically as is implied by a program to end the risk of war between the Great Powers, and to provide a system of collective security for the rest of the world, is by its very nature

uncertain of accomplishment, potentially risky, and likely to be highly controversial. Critics of the propositions I have outlined may claim my vision of the post-Cold War world is unrealistic. In particular, they will say that Gorbachev is likely to fail. And if he fails, his successor may reverse his policies, placing a complacent West in a position of inferiority.

No one can predict with certainty how long Gorbachev will remain in power. However, while noting the difficulties he faces, we should recognize he has diagnosed properly the basic problems confronted by his society. There is no alternative to political and economic reform if long-term economic and resultant political disorders are to be avoided. If Gorbachev's efforts fail--and they may--his successor will face the same problems. To solve them he will be required ultimately to introduce similar reforms. There may be steps forward and steps back, but for the next decade or two, it is likely the Soviet Union will move in the direction laid down by the President.

But suppose that is not the case. Can we protect ourselves against a collapse of *perestroika*--both nationally and internationally--and a resumption of political conflict and military confrontation?

I believe the answer is clearly Yes.

As nuclear arms agreements bring reductions in nuclear forces and add to crisis stability, there need never be a weakening of the West's nuclear deterrent. Concurrently with the changes in nuclear forces, it is clear that, through both unilateral actions and bilateral agreements, the former numerical superiority and offensive capability of Warsaw Pact conventional forces will continue to shrink and the danger of surprise attack will be--if it has not already been--eliminated.

Together these actions should give the West high confidence that we can move down a path which provides both for terminating the Cold War and for establishing a system of collective security.

With such a shift in foreign and defense policy, the long-term outlook for the United States will be brighter than at any time in the past half century.

As a nation, we are in the forefront of the technological revolution. We have the largest common market in the world--a union of fifty

---

states, in effect a union of fifty nations. We possess a flexible, skilled labor force (albeit one which requires large investments in continuing education and training); strong capital markets; adventuresome entrepreneurs; and stable political institutions. With these strengths, the US is uniquely situated to move into the 21st century as the strongest of the nations in a multipolar world in which there will be a far lower risk of war between the great powers.

It is true, as Paul Kennedy says, in the 21st century the relative power of the US will be less. But no nation will have greater power. And in absolute terms, we can be far stronger than today: economically, politically and

psychologically. There need then be no divergence, as there has been in recent years, between our ideals--our belief in representative government, individual liberty, economic and social advances for all peoples--and our international behavior.

If together we in the West are bold--if we dare break out of the mind sets of the past four decades--we can help reshape international institutions, as well as relations among nations, in ways which will lead to a far more peaceful world and a far more prosperous world for the peoples of East and West as well as North and South.

It is the first time in my adult life we have had such an opportunity. Pray God we seize it.

---

*Footnotes*

<sup>1</sup>These data are drawn from *World Military and Social Expenditures: 1989*, by Ruth Leger Sivard.

<sup>2</sup>Professor Joseph F. Nye, Jr. of Harvard prefers to use the word "polycentrism" to describe such a world (see *Foreign Affairs*, Winter 1989-90, p.52). But whether we use the term "multipolar" or "polycentrism," it is clear we must establish regimes to deal with the diffusion of power that is occurring and will continue into the 21st century.

<sup>3</sup>See *John Foster Dulles and the Diplomacy of the Cold War*, by John Lewis Gaddis, Princeton University Press, 1990.

[This paper was read by R. S. McNamara at the Public Meeting held in Egham, UK, in the afternoon of Thursday, 20 September, 1990.]

# VERIFICATION

## monitoring disarmament

---

EDITED BY

Francesco Calogero, Marvin L. Goldberger  
& Sergei P. Kapitza

### Contents

<i>Preface</i>	vii
<i>List of Acronyms</i>	ix
<i>About the Contributors</i>	xiii
1 Introduction <i>Francesco Calogero (Italy), Marvin L. Goldberger (USA), Sergei P. Kapitza (USSR) &amp; Mikhail A. Milstein (USSR)</i>	1
2 Arms Limitation and Control: Improving the Institutional Mechanisms for Resolving Compliance Issues <i>Gloria Duffy (USA) &amp; Vitali A. Loukiantzev (USSR)</i>	7
3 The Technical Basis for Verification of a Low Threshold or Comprehensive Nuclear Test Ban Treaty (Summary) <i>Charles B. Archambeau (USA), Mikhail B. Gokhberg (USSR), Oleg K. Kedrov (USSR) &amp; Jeremy Leggett (UK)</i>	21
4 Verification of Compliance with the ABM Treaty and with Limits on Space Weapons <i>Richard L. Garwin (USA) &amp; Roald Z. Sagdeev (USSR)</i>	23
5 Verified Destruction of Nuclear Warheads and Disposition of Contained Nuclear Materials <i>Theodore B. Taylor (USA) &amp; Lev P. Feoktistov (USSR)</i>	45
6 Verifying a Production Cutoff for Nuclear Explosive Material: Strategies for Verification and the Role of the IAEA <i>Lawrence Scheinman (USA) &amp; Irakli G. Gverdzteli (USSR)</i>	67

---

7	Verifying START <i>Steve Fetter (USA) &amp; Stanislav N. Rodionov (USSR)</i>	95
8	Verification and Chemical-Warfare Weapons <i>Karlheinz Lohs (GDR), Julian P. Perry-Robinson (UK) &amp; Nikita P. Smidovich (USSR)</i>	123
9	Verification of Biological and Toxin Weapons Disarmament <i>Matthew Meselson (USA), Martin M. Kaplan (Switzerland/USA) &amp; Mark A. Mokulsky (USSR)</i>	149
10	Verification and Conventional Arms Reductions <i>Jürgen Altmann (FRG), Peter Deak (Hungary), Catherine McArdle Kelleher (USA) &amp; Vadim I. Makarevsky (USSR)</i>	165
11	The Elimination of Nuclear Arsenals: Is it Desirable? Is it Feasible? <i>Joseph Rotblat (UK) &amp; Vitali I. Goldanskii (USSR)</i>	205
12	Arms-Control Verification in a Changing World <i>John P. Holdren (USA) &amp; Andrei A. Kokoshin (USSR)</i>	225
	Annotated Bibliography <i>Ishak Lederman (Israel)</i>	241
	<i>Index</i>	255
	<i>Pugwash Conferences on Science and World Affairs</i>	263
	<i>Pugwash Council</i>	266

## WESTVIEW PRESS

BOULDER & LONDON

[The Preface from **VERIFICATION--monitoring  
disarmament** is contained on the following two pages.]

---

## Preface

The idea of a project aimed at producing a book with chapters co-authored by individuals from East and West was conceived at the end of the 1987 Annual Pugwash Conference (Gmunden, Austria, 1-6 September 1987). Martin Kaplan, then Secretary-General of Pugwash, immediately supported the idea and suggested "verification" as the most appropriate topic. A plan of the book, a list of prospective authors, and a request for financial support were then put quickly together, with the help of John Holdren and Catherine Kelleher, who have played a key role as advisors throughout this project. Most of the authors then met in May 1988 in New York, in September 1988 in Moscow and in December 1988 in London; the task to produce final agreed texts was then turned over to the co-authors of each chapter. Although all authors profited from the interactions provided by the meetings of the entire group, it is understood that each author is responsible solely for the chapter he/she signs; this applies as well to the editors. And of course all authors and editors contribute in their personal capacity; any mention of the institutions with which they have been or are associated is reported merely for the purpose of identification.

Since this project was conceived, the global political situation has greatly changed. In particular East-West contacts have become much easier. But to produce agreed texts remains a nontrivial achievement; indeed in some cases it has been made quite difficult by the avalanche of commitments that have crowded the schedule of some of the authors of this book, precisely due to the latest political developments and their role in them. Moreover the time of completion of the whole book has, of course, been set by the chapter handed in last. Nevertheless, as the reader may verify, most of the material of this book remains up to date, largely because of its lasting character, but also, in part, due to the unfortunate fact that progress in arms control and disarmament so far has not been as rapid and dramatic as the political developments might have warranted. A case that stands out in this respect is the chapter on conventional forces--there indeed the pace of political change in Europe, as well as arms control developments (including unilateral arms reductions and breakthroughs on verification issues), have challenged the authors to deal with a fast moving target--but they have managed to cope.

Only a summary is printed below of Chapter 3 on verification of a test ban treaty. The reason for this is that the version of this chapter that was drafted turned out to be much more technical, more detailed and more extended than any of the other chapters; moreover some details had still to be ironed out among the co-authors well after all other chapters had been completed. For these reasons we regrettably had to omit the complete version of this chapter from the English version of the book. We expect that the complete agreed text will appear soon in English as a journal article; and it might perhaps be included in the Russian version of this book. Comments on this chapter, as well as on all other chapters, are in any case included in the last chapter of this book.

All chapters were prepared specifically for this book, except Chapter 5 on the verified elimination of nuclear warheads, which constitutes a joint elaboration of an article published earlier by one of the two co-authors. Chapter 10 on the verification of conventional reductions has been distributed as an occasional paper by the American Pugwash Committee through the American Academy of Arts and Sciences.

The book is published in English by Westview Press and in Russian by Mir. The camera-ready copy of this English version has been produced by Andrea Belloni and by Stefano Leonardi, both of them working in the Rome Pugwash Office as "conscientious objectors". They deserve our thanks; as does Marco De Andreis, for his help in proofing the camera-ready copy and especially in preparing the index. The Russian version has been translated in Moscow by Mir, under the supervision of Ms. Valentina Samsonova, whom we also wish to thank for her cooperation in the whole project.

---

Last but not least, we wish to thank the John D. and Catherine T. MacArthur Foundation and the Carnegie Corporation of New York for providing the financial support to the English version of this book which has made this project possible, the Peace Fund of the Soviet Union for support of the Russian version, as well as the Istituto Nazionale di Fisica Nucleare (INFN) and the Consiglio Nazionale delle Ricerche (CNR) of Italy for the financial support provided to the Pugwash Office in Rome, where the final editing of the book has been done and the camera-ready copy produced.

*F. Calogero, M.L. Goldberger; S.P. Kapitza*

30 July 1990

*for your information for your information for your information for your information*

**A Pugwash Monograph**  
**VERIFICATION--monitoring disarmament**  
edited by F. Calogero, M. Goldberger and S.P. Kapitza

This book, published in English by Westview Press and in Russian by Mir Publishers, provides the first comprehensive treatment of verification to be jointly authored by top experts from the United States, the Soviet Union, and Europe. The English version is available to Pugwashites at a 20% discount off the hardcover price of \$32.50.

To claim this discount write to Westview Press, 5500 Central Ave., Boulder, Colorado 80301, USA, enclosing a copy of this announcement.

*please copy, circulate and post*

**ISODARCO**  
**(International School on Disarmament and Research on Conflicts)**  
**IV WINTER COURSE**

“SECURITY PROBLEMS IN THE ‘NEW’ EUROPE”

Folgaria (Trento), Italy  
3-10 February 1991

ISODARCO has been organizing Summer Courses on disarmament and arms control since 1966, and has already held three Winter Courses. The IV Winter Course is intended for people already having a professional interest in problems of disarmament and conflict, or for those who would like to play a more active and technically competent role in this field. The course will have an interdisciplinary nature, and its subject matter will extend from the technical and scientific side of the problem to its sociological and political implications.

**MAIN TOPICS:** New and old threats to European security; Restructuring the European military forces;  
Nuclear weapons in Europe;  
Status of the discussions on arms control;  
Europe and the Mediterranean region.

**PRINCIPAL LECTURERS AND PANELISTS:**

Mohamed Abdel-Moneim	Egyptian Embassy, Vienna, Austria
Francesco Calogero	Pugwash Conferences on Science and World Affairs
David Carlton	University of Warwick, UK
Mirco Elena	IRST, Trento, Italy
Venance Journé	Université de Paris Sud, France
Catherine M. Kelleher	Center for International Security Studies, University of Maryland, USA
Hilmar Linnenkamp	Führungsakademie der Bundeswehr, Hamburg, Germany
Reneo Lukic	Institute for East-West Security Studies, New York, USA
Valery Mazing	Academy of Sciences of the USSR, Moscow, USSR
Elmar Schmähling	Flottillen Admiral, Bundeswehr, Köln, Germany
Jack Steinberger	CERN, Geneva, Switzerland
Mario Zucconi	CeSPI, Rome, Italy

**ADMISSION**, which includes attendance, accommodation and full board, is free. Please note that the School is not able to provide any contribution towards travel expenses.

**LETTER OF APPLICATION** should arrive (please fax, if possible) before **December 31, 1990**, and should be addressed to:

Prof. Carlo Schaerf  
Dipartimento di Fisica  
II Università di Roma “Tor Vergata”  
Via E. Carnevale  
I-00173 ROMA Italia  
Fax No. (\*\*39-6) 2040309  
Tel. (\*\*39-6) 79794-560/561  
Telex: 626382 FIUNTV I  
Decnet/Infnet 39992::SCHAERF or VAXTOV::SCHAERF  
Bitnet/Earn SCHAERF@ROMA2.INFN.IT

---

## Book Review

*An Essay on Strategy as it Affects the Achievement of Peace in a Nuclear Setting*, by Robert Neild, Macmillan 1990, pp 163, including appendices and index, paperback.

At the beginning of his Preface, Neild pays fitting tribute to Anders Boserup, who worked closely with him in developing the essential message of Mutual Defensive Superiority that is the central thrust of the book. The book was completed before Boserup's untimely death a few months ago. Boserup was primarily responsible for the inauguration of the series of meetings, which are continuing, of the Pugwash Study Group on Conventional Forces in Europe. Neild and others have been closely associated with the group over a number of years, starting with its first meeting in Denmark in 1984. Several members of the group wrote to Mikhail Gorbachev in 1987. They outlined the idea of Mutual Defensive Superiority (also termed Defensive Defence and Non-Provocative Defence), to which Gorbachev replied, acknowledging his interest in the idea (see *Pugwash Newsletter* May 1988, p. 160). This has become the official policy of WTO and is now under serious consideration in NATO.

Mutual Defensive Superiority implies that the characteristics of the military forces of both sides deployed in a land area of considerable depth are defensive in nature, and visibly so, in order to allay fears of being overwhelmed by an attack on the part of the opponent's conventional forces. Neild goes into detail of the qualitative rather than the quantitative requirements for such a stance.

The rapid pace of political change in Europe doesn't outdate this essay which should remain cogent for many years. The crisp and clear style in which it is written is a pleasure to read.

The actual text of Neild's essay is 117 pages of closely reasoned analysis of strategy underlying nuclear weapons from 1946 onwards. Neild defines strategy, after

Clausewitz, as the art of pursuing political aims by the use or possession of military means. He stresses that the political aims of a country, which must be clearly defined and understood, rather than military considerations, should constitute the driving force of all strategic policy.

Neild carefully dissects the arguments by official and academic think-tankers (including Herman Khan, et al.) supporting the use or threat of use of nuclear weapons under different scenarios. He pays special attention to the concept of deterrence, the cover-all rationalisation for all nuclear weapons. The ultimately self-defeating nature of deterrence is well brought out.

There are many excellent formulations, for example (p. 41):

"Where either side might succeed in a non-nuclear surprise attack and there is pressure to act pre-emptively, or at least to react quickly in a crisis, there is instability and negative feedback....Moreover, the knowledge that the other side might succeed in a surprise attack will increase reliance on nuclear weapons in order to discourage any such move....Thus instability at the non-nuclear level may produce instability at the nuclear level too....Where the two sides follow the strategy of Mutual Defensive Superiority, stability will be maximised and feedback positive, two conditions that should minimise the probability of non-nuclear war breaking out and escalating to the use of nuclear weapons."

Logically, Neild's arguments take him to consider favourably the possibility of a world devoid of nuclear weapons (p. 32), which is no longer dismissed as unthinkable, and in fact is now becoming the subject of serious study.

This essay should be read by all concerned with the strategy of nuclear weapons. It will clarify foggy thinking in this area.

M.M. Kaplan

---

## OBITUARIES

### **Pavel Alexeievich Cherenkov (1904-1990)**

Academician Pavel Alexeievich Cherenkov was born on 28 July 1904 and died on 6 January 1990. He was awarded the Nobel Prize in Physics in 1958, along with Igor Tamm and I.M. Frank, for discovering what is known as the Cherenkov radiation effect. He attended the 22nd Pugwash Conference in Oxford, UK.

### **Ilya Michaelovich Frank (1908-1990)**

Academician Ilya Michaelovich Frank was born on 23 October 1908 and died on 22 June 1990. He shared the Nobel Prize in Physics with Tamm and Cherenkov in 1958. He had worked out the theoretical basis for the Cherenkov radiation effect. Frank attended three Pugwash Conferences--the 27th in Munich, the 28th in Varna and the 30th in Breukelen. He will be remembered as a quiet, reserved, kindly person with an intense interest in the social responsibility of scientists.

### **Bruno Kreisky (1911-1990)**

Bruno Kreisky, former Chancellor of Austria (1970-1983), died on July 29, 1990. He suffered from a long-standing kidney ailment which he bore with great fortitude. Kreisky will be remembered as an outstanding international statesman of the last half of the 20th century. Kreisky, Willy Brandt and Olof Palme made a powerful trio in their dedication to peace, social democracy and concern for the plight of developing countries. While he was Chancellor, Kreisky was able to use his official position to forward action in all these and other fields close to his heart with his policy of "active neutrality".

Kreisky's interest in Pugwash started as early as 1958 when, after a visit with Hans Thirring to Joseph Rotblat's house in London, Kreisky and Thirring arranged a financial donation by the Theodor-Körner Foundation, of which Kreisky was Director, to subsidise the Third Pugwash Conference in Kitzbühel and Vienna in September 1958. This was the first large Pugwash Conference; it was attended by 70 scientists from 20 countries, and 14 observers. The second part of the Conference was held in Vienna, and included a public meeting attended by some 10,000 people who were addressed by ten of the outstanding scientists from the Conference, including Bertrand Russell. The meeting was held in the Wiener Stadthalle.

Kreisky's interest and support of Pugwash continued until practically the end of his life. He hosted and addressed the 1974 Baden Conference for which he arranged an official reception and dinner in the Chancellor's palace.

Kreisky had a gracious social personality, but he was sharp, firm and uncompromising in his convictions. Pugwash and the world have lost a great fighter for peace and social justice.

*M. M. Kaplan*

### **Ben Lockspeiser (1891-1990)**

Sir Ben Lockspeiser, of the UK, died on 18 October 1990, at the age of 99. He was born on 9 March 1891, which made him the oldest Pugwashite at the time of his death.

Sir Ben was a physicist who specialized in aeronautics. He played an important role during World War II as Director-General of Scientific Research of the Ministry of Aircraft Production. In his post of Chief Scientist to the Ministry of Supply, he was involved in the early development of nuclear energy and nuclear weapons in the UK. Later he became the head of the Department of Scientific and Industrial Research, the channel for financing most of the research work in the UK.

He attended some of the earliest Pugwash Conferences in Moscow, Stowe and London.

*J. Rotblat*

## CALENDAR OF FUTURE MEETINGS

- |   |  |
|---|--|
| <b>9-12 November 1990</b><br>Helsinki, Finland                | Pugwash Meeting #177:<br>10th Workshop on Conventional Forces in Europe  |
| <b>26-27 January 1991</b><br>Geneva, Switzerland              | Pugwash Meeting # 178:<br>16th Workshop of the Pugwash Study Group on Chemical Warfare   |
| <b>3-10 February 1991</b><br>Folgaria (near Trento),<br>Italy | ISODARCO Meeting # 19:<br>4th Winter Course  |
| <b>3-5 May 1991</b><br>Torino, Italy                          | Meetings of Working Parties of the Pugwash<br>Projects on a Nuclear-Weapon-Free World and on<br>Conversion, and of the Pugwash Executive Committee |
| * <b>20-24 May 1991</b><br>Seoul, Korea                       | Pugwash Meeting # ?:<br>3rd Workshop on "Peace and Security in the Asia-Pacific<br>Region"   |
| <b>8-9 June 1991</b><br>Geneva, Switzerland                   | Pugwash Meeting # ?:<br>20th Workshop on Nuclear Forces  |
| * <b>June 1991</b><br>Warsaw, Poland                          | Pugwash Meeting # ?:<br>3rd Workshop on "Foreign Debts and International<br>Stability"   |
| * <b>August/September 1991</b><br>Rehovot, Israel             | Pugwash Meeting # ?:<br>1st Workshop on "Brain Drain"  |
| <b>17-22 September 1991</b><br>Beijing, China                 | Pugwash Meeting # ?:<br>41st Annual Conference   |
| * <b>October 1991</b><br>Lima, Peru                           | Pugwash Meeting # ?:<br>3rd Workshop on "Non-Military Dimensions of Global<br>Security: Environmental Issues"                                      |
| * <b>November 1991</b><br>Paris, France                       | Pugwash Meeting # ?:<br>11th Workshop on Conventional Forces in Europe"  |
| * <b>January/February 1992</b><br>New Zealand                 | Pugwash Meeting # ?:<br>4th Workshop on "Peace and Security in the<br>Asia-Pacific Region"   |
| * <b>19-24 September 1992</b><br>Halifax, Canada              | 3rd International Student/Young Pugwash Conference   |

---

\* tentative

## PUGWASH CONFERENCES ON SCIENCE AND WORLD AFFAIRS

President : Professor Joseph **Rotblat**  
Secretary-General : Professor Francesco **Calogero**

### Pugwash Council

Chairman : Academician Maciej **Nalecz** (Poland)  
Members : Academician Angel T. **Balevski** (Bulgaria)  
Academician Dénes **Berényi** (Hungary)  
Professor Francesco **Calogero** (Italy)  
Professor Ubiratan **D'Ambrosio** (Brazil)  
Professor Hans Peter **Dürr** (Germany)  
Professor Bernard T. **Feld** (USA)  
Mr. Shalheveth **Freier** (Israel)  
Professor Essam E. **Galal** (Egypt)  
Professor Virginia **Gamba** (Argentina)  
Academician Vitalii I. **Goldanskii** (USSR)  
Professor Lameck K.H. **Goma** (Zambia)  
Professor Anatoly A. **Gromyko** (USSR)  
Professor Andrew **Haines** (UK)  
Professor John P. **Holdren** (USA)  
Professor Serguei P. **Kapitza** (USSR)  
Dr. Martin M. **Kaplan** (Switzerland)  
Professor Catherine M. **Kelleher** (USA)  
Academician Karlheinz **Lohs** (Germany)  
Dr. Peter **Markl** (Austria)  
Professor Samuel E. **Okoye** (Nigeria)  
Professor Joseph **Rotblat** (UK)  
Professor Jack **Ruina** (USA)  
Professor Philip B. **Smith** (Netherlands)  
Professor Bhalchandra M. **Udgaonkar** (India)  
Professor **Zhou** Peiyuan (China)

### Pugwash Executive Committee

Chairman : Professor John P. **Holdren**  
Members : Professor Francesco **Calogero**  
Professor Bernard T. **Feld**  
Professor Essam E. **Galal**  
Academician Vitalii I. **Goldanskii**  
Dr. Martin M. **Kaplan**  
Academician Maciej **Nalecz**  
Professor Joseph **Rotblat**  
Professor Bhalchandra M. **Udgaonkar**

#### *Geneva office*

11A, Avenue de la Paix  
1202 GENEVA  
(Switzerland)  
Phone \*\*41-22-7331180  
Fax \*\* 41-22-7337313  
Telex 412 151 pax ch

#### *London office*

Flat A Museum Mansions  
63A Great Russell Street  
LONDON WC1B 3BJ  
(Great Britain)  
Phone \*\*44-71-4056661  
Fax \*\*44-71-8315651

#### *Rome office*

Palazzina dell'Uditorio  
Accad. Nazionale dei Lincei  
Via della Lungara 229  
00165 ROMA (Italy)  
Phone \*\*39-6-6872606  
Fax \*\*39-6-6878376