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PUGWASH NEWSLETTER

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Editor : Martin M. Kaplan

CONTENTS

The photo on the front cover shows the participants in the 16th Pugwash Workshop on Nuclear Forces, held in Geneva, Switzerland, 11-13 June 1988.

ON WHISTLEBLOWING

Whistleblowing has indicated danger ever since it was first used in steam locomotives, and we print in this issue of the Newsletter an outstanding recent example of such an action (see below). For most of us, nuclear weapons are a total evil, but not it seems for the current crop of armchair warriors and advocates of deterrence who will love these weapons into eternity (shades of Dr. Strangelove). Here is a strange picture indeed - of Reagan and Gorbachev and those of us whose vision of a nuclear-free world is airily dismissed as starry-eyed idealism by the "realists". But, we will save for another occasion further consideration of one of the central dilemmas of Pugwash, i.e., how to balance idealism with realism.

Persons of conscience have grappled with the problem of responsibility of scientists in the nuclear age since the 1930s when nuclear fission was first discovered, and then later exploited to make bombs. The Russell-Einstein Manifesto which led to the founding of Pugwash focused on the ethical imperative of responsibility, and provided the substance for many of our meetings.[1] It brought into sharp relief the dilemma of individuals to choose between "national" and "global" patriotism (see my review of Herbert York's book Making Weapons, Talking Peace in the January 1988 issue of the Pugwash Newsletter, p.136).

A particularly striking example of the issues involved is the case of Mordechai Vanunu who was recently convicted of espionage and treason by an Israeli court because he revealed to the Sunday Times (London) Israel's presumed efforts to achieve nuclear weapons capability.

On page 29 is a letter concerning the Vanunu case, signed by a number of Nobel laureates and Pugwashites, which was published recently in a leading U.S. journal.[2] This case has overtones of unusual complexity. For example, the argument is forwarded that the nuclear powers have not kept faith with the Non-Proliferation Treaty in which they undertook to reduce drastically their stockpiles of nuclear weapons. This contention of lack of faith is presumed to justify horizontal proliferation to non-nuclear weapon states. Also, the fact that Israel is surrounded by hostile Arab states who vow to destroy it is held to be further justification for proliferation there. It is therefore important and helpful to return to first principles as enunciated by Russell, Einstein and others who believe that nuclear weapons embody the evil genius of mankind, and should be universally and unconditionally outlawed. Clearly, ridding the world of its nuclear stockpiles and creating an enabling environment to cope with problems thus raised (e.g., verification, potential blackmail by possible cheaters, enforcement of police powers) will take a long time. But at least goals, and alternative paths to follow, will be more clearly defined and thus provide guideposts for individual and group action.

More power, then, to the whistleblowers of conscience in all fields. May their courage be shared by all of us.

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This issue contains information on three meetings that make a total of six in the first half of a busy

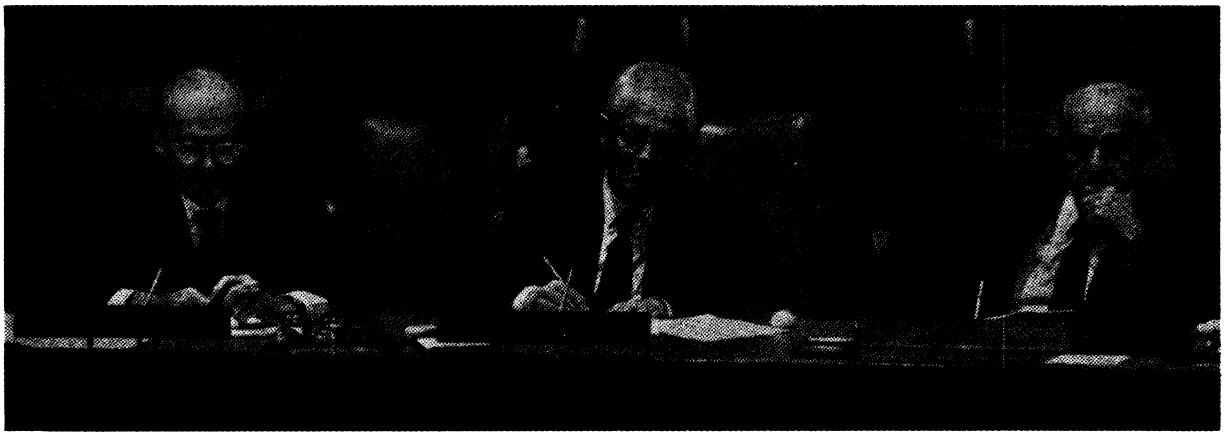
schedule this year: a symposium on European security, in Bochum, FRG (p.3), a workshop on nuclear and conventional forces in Europe, in Geneva, Switzerland (p.10), and a symposium on naval forces, in Oslo, Norway (p.19) The reports deserve careful reading because of the high level of discussions and participants involved. Particular thanks are due to Knut Ipsen and Horst Fischer (Bochum) and to Sverre Lodgaard (Oslo) and their staffs.

M.M. Kaplan

1. See for example the Unesco/ Pugwash book on Scientists, the Arms Race and Disarmament, (J. Rotblat ed.), Taylor and Francis Ltd., London, 1982.
2. The New York Review of Books 35:10, p.56, 16 June 1988. Also of interest to the reader may be the account of whistleblowing by Roy Woodruff of the Lawrence Livermore National Laboratory, published in the Bulletin of the Atomic Scientists, June/July 1988, p.7. Woodruff considered that Edward Teller and the director of the laboratory Lowell Wood were giving unjustifiedly optimistic information to high U.S. authorities on the state of art of the laser weapons with regard to the Strategic Defence Initiative. Woodruff resigned his administrative position in protest, and continued to pursue the matter; his professional career suffered.

DISTRIBUTION OF NEWSLETTER AND PROCEEDINGS

The increased costs of publication and mailing have required that our free mailing list be reduced to participants in Pugwash conferences, symposia and workshops in the preceding five years. The current mailing will include attendees at our meetings since January 1983. Pugwashites not covered in the above group who wish to continue to receive the Newsletter and Proceedings should notify our London office to this effect.



McGeorge Bundy, Miljan Komatina and Martin Kaplan at the Pugwash Symposium held at the United Nations, New York, 11 and 12 May (see Pugwash Newsletter, May 1988 issue, p.153).

51st Pugwash Symposium

POLITICAL CONDITIONS FOR PEACE AND SECURITY IN EUROPE: OBSTACLES AND PERSPECTIVES

Bochum, FRG, 21-24 April 1988

Agenda

1. Europe within East-West relations: global perspectives
   - 1.1 Global and/or regional cooperation
   - 1.2 Military blocs, deterrence and the role of nuclear weapons, and alternative concepts
   - 1.3 Scope and implications of economic, cultural and scientific cooperation between East and West Europe

2. The interdependence between global and European problems: European perspectives on specific issue areas
   - 2.1 The evolution of common interests between small and medium-sized European countries in their relations to the United States and the Soviet Union
   - 2.2 The position of the German states within the bloc system: the "German question" from the perspective of:
     - the Federal Republic of Germany (FRG) and the German Democratic Republic (GDR)
     - the United States and the Soviet Union
     - Western, Northern and Southern Europe
     - Eastern Europe
     - the neutral states of Europe

3. Action potentials and alternatives to the division of Europe
   - 3.1 Is a dissolution of the military blocs in Europe desirable from a peace policy perspective?
   - 3.2 The quest for a new identity of Europe beyond the present bloc confrontation
   - 3.3 The economic and political integration of Western Europe and its consequences for the division of Europe
   - 3.4 Action potentials for alternative security concepts

4. Final discussion

List of Participants

Mrs. Irmgard Baumgart, Foreign Ministry, Bonn, FRG

Prof. Georg Bluhm, Western Kentucky University, Bowling Green, Kentucky, USA

Prof. Joszef Bognar, Director, Institute for World Economics, Hungarian Academy of Sciences, Budapest, Hungary

Prof. Kenneth Booth, Department of International Politics, University College of Wales, Penglais, Aberystwyth, UK

Mr. Franz H.U. Borkenhagen, Study Group on Security, and Military Strategy, Meckenheim, FRG

Dr. Christian Catrina, Ministry of Foreign Affairs, Bern, Switzerland
Prof. Marian Dobrosielski, University of Warsaw, Warsaw, Poland
Mrs. Annegret Falter, Federation of German Scientists, Berlin, FRG
Dr. Horst Fischer, Ruhr-Universität, Bochum, FRG
Mr. Shalheveth Freier, Physics Department, The Weizmann Institute of Sciences, Rehovot, Israel
Prof. George Michael Fülgraff, Council of Experts on Environmental Matters, Berlin, FRG
Prof. Klaus Gottstein, Forschungsstelle Gottstein in der Max-Planck-Gesellschaft, München, FRG
Prof. John Holdren, Professor of Energy and Resources, University of California, Berkeley, USA
Prof. Knut Ipsen, Rector, Ruhr-Universität, Bochum, FRG
Mrs. Gertrud Ivri, Alva and Gunnar Myrdal Foundation, Stockholm, Sweden
Dr. Sergej Karaganov, Institute of Europe, Academy of Sciences, Moscow, USSR
Dr. Max Klein, Institut für Hochenergiephysik, Zeuthen, GDR
Dr. F. Stephen Larrabee, Director, Institute for East-West Security Studies Inc., New York, USA
Dr. Sverre Lodgaard, Director, International Peace Research Institute, Oslo, Norway
Dr. Wojciech Multan, Polish Institute of International Relations, Warsaw, Poland
Prof. Maciej Nalecz, Director, Institute of Biocybernetics and Biomedical Engineering, Polish Academy of Sciences, Warsaw, Poland
Dr. Götz Neuneck, Forschungsprojekt Stabilitätsorientierte Sicherheitspolitik in der Max-Planck-Gesellschaft, Starnberg, FRG
Dr. Ioan Pascu, "Stefan Gheorghiu" Academy of Sciences, Institute of Political Sciences, Bucharest, Romania
Dr. Stanislav Patejdl, Centre of Peace and Disarmament Research, Czechoslovak Academy of Sciences, Praha, Czechoslovakia
Prof. Daniil M. Proektor, Academy of Sciences of the USSR, Moscow, USSR
Prof. Earl Ravenal, School of Foreign Service, Georgetown University, Washington, DC, USA
Prof. Dieter Senghaas, Universität Bremen, Bremen, FRG
Dr. Yurii A. Shvedkov, Academy of Sciences of the USSR, Moscow, USSR
Prof. Janusz Symonides, Poland, temporarily at: Institute for East-West Security Studies Inc., New York, USA
Dr. Dieter Thielemann, Institut für Internationale Beziehungen, Potsdam-Babelsberg, GDR
Prof. Hylke Tromp, Rijksuniversität Groningen, Polemologisch Institut, Groningen, Netherlands
Prof. J.C. Victor, Ministry of Foreign Affairs, Paris, France
Mr. Ole Waever, Centre of Peace and Conflict Research, Copenhagen, Denmark

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CORRIGENDUM

The May 1988 issue of the Pugwash Newsletter (p.145), credited Horst Fischer and Albrecht von Müller as organizers of the 51st Pugwash Symposium held in Bochum FRG 21-24 April. This should have read Horst Fischer and Knut Ipsen. We regret this error.

REPORT ON THE SYMPOSIUM **

General Observations

With 33 participants from 16 countries (East, West, Neutral and Non-aligned) the Symposium continued the discussion in Pugwash on the political aspects of European Security. In connection with the 49th Pugwash Symposium in Mragowo (Pugwash Newsletter July 1987) and the 50th Pugwash Symposium in Prague (Pugwash Newsletter May 1988) having been finished immediately before the Bochum Symposium, the discussions at the Symposium focused on different aspects of the present situation under the three main topics:

Europe Within East-West Relations: Global Perspectives

The Interdependence between Global and European Problems: European Perspectives on Specific Issue Areas

Action Potentials and Alternatives to the Division of Europe

Though some of the present military aspects of European security were touched, the participants stressed the importance of the frank discussion at the Symposium and proposed to the Pugwash Council to institutionalize within Pugwash the discussions on the political problems of European Security in a forum the Council deems appropriate. It was widely believed that such a permanent forum could play a vital role in giving incentives to the political and scientific debate on this subject.

The direct connection between the Mragowo and the Bochum Symposium, organized in close cooperation between the Pugwash Groups in Poland and the Federal Republic of Germany, turned out to be a good link in the efforts to advance the exchange of views on European Security, especially in the definition of common views. It is intended to publish a selection of the papers of the two symposia in one publication to be edited jointly by Marian Dobrosielski and Knut Ipsen.

The changing climate in East-West relations and the ongoing internal process in the socialist countries were major factors for the high level of argumentation during the Symposium. Obviously, the participation of some new Pugwashites enriched the exchange of arguments and fostered the process of evaluating new ideas and concepts. For the success of the Symposium the prepared papers and the orally given commentaries on them proved to be another important factor. The authors introducing their papers and the pre-chosen commentators, by criticizing or backing the presented arguments, gave the discussion the necessary structure. Other ideas were incorporated into the general discussion step by step.

Europe Within East-West Relations

The discussion on this subject concentrated on two aspects. The first was on the definition of Europe's role in a global perspective. Three lines for the potential evolution on the continent were discussed:

Stabilization of the present balance, and gradual but slow progress through the CSCE process;

Europeanization of Europe's problems accompanied by increased détente;

Cooperation for survival combining collaboration in non-military and military field, and a necessary

enlargement of the structure and activity of international organizations as a form of multilateral diplomacy.

No agreement was reached about the prospects for one or the other line of evolution, although the relationship between vital elements of all three fields was stressed. Some proposals were made to tackle the most urgent problems using cooperative measures. No consensus existed about the importance of one or the other proposed measure and their chances of success.

In the second aspect - the evaluation of the military situation - particular attention was paid to the INF Treaty. Some participants stressed its importance in changing the parameters of the European security environment, emphasizing the contribution to the field of verification and the acceptance of asymmetries. Others suggested a rather less optimistic view of the agreement stressing the obvious barriers for further disarmament and arms control in the European dimension. The advantages of a START agreement were also mentioned. Though a positive attitude in general was detectable, some recalled the rather psychological impact of such an agreement.

Consensus seemed to exist among the participants on the importance of conventional weapons for the future of disarmament in Europe. In all sessions touching on the problem there were different attitudes towards the priority of either reducing first or restructuring the conventional forces. Also discussed was the relationship between tactical nuclear and conventional weapons. There seemed to be agreement about the close relationship between all actions concerning the two weapon categories.

Briefly discussed was the question of doctrinal aspects for the European theatre. Attention was especially paid to the role of nuclear weapons in general, the present status of the doctrines of the military blocs, and the possible future of talks between East and West on the doctrines.

European Perspectives on Specific Issue Areas

In discussing this topic the Symposium proceeded from the assumption that international cooperation is needed to solve global as well as regional problems like the military situation, trans-frontier pollution, economic dependencies and deficiencies. Some participants noted the importance of the responsibility of the small- and medium-sized European countries in solving European problems.

It was argued that though the division of Europe creates special fears and frustrations, the European countries could develop special means and methods for European solutions. One of the ideas discussed in this connection was the notion of the "Europeanization of Europe". In general, the idea was positively perceived. Nevertheless, the problems of defining the real content of the idea and the boundaries of the geographical area of its use could not be solved.

Attention was drawn to the economical questions, in particular to the economic cooperation between Eastern and Western Europe. The participants felt that improved economic relations could effectively contribute to European security. Some participants criticized the realization of an effective common market in EEC in 1992 as an obstacle to European security. Others argued for it on the basis of existing

treaty obligations and economic necessities. Some participants perceived the year 1992 as an important factor in economic relations between East and West, creating new economic problems for Eastern Europe, thus making European security problems even more complex.

Concerning scientific and technological cooperation some participants observed the COCOM list as a limiting factor, which should be changed or abrogated. It was the impression of other participants that the COCOM list could not be changed without new and effective measures in the arms control field. It was suggested to investigate more extensively the importance of the COCOM list, and also the humanitarian issues for European security.

The German Question

One of the main topics of the Symposium was the German question. The participants discussed constructively and in depth the German question from German, European and global points of view. Some participants of the Symposium were of the opinion that for a foreseeable future neither legal and political nor economic reasons will demand reunification. It was argued that from the perspective of other European states, but also in the interest of the two German states, a reunification would be desirable. Keeping in mind the ongoing economic integration into Western Europe the relationship between the two German states might evolve to a simple "European proximity". On the other hand it became quite clear that common history, culture and language will still create bonds between the two countries for the next decades.

Action Potentials and Alternatives to the Division of Europe

The Symposium discussed steps towards stable peace in Europe. The Symposium emphasized the need for and the utility of "new thinking". One of the possible strategies for the utility of the "new thinking" was discussed extensively and summarized as follows by the rapporteur:

> "European policy should first seek constructive engagement between East and West in a time of perhaps fifteen years. This stage would be characterized by a mutual commitment to make a relaxation of tensions last. It would be followed by a security regime or "legitimate international order" in which all major powers would agree on the permissible aims and methods of foreign policy. The outcome should be a condition in which states had a justifiably high expectation that there would not be a major war, and that their core values would not be threatened. As the next stage, a stable peace could be envisaged, a condition of mutual satisfaction with the prevailing situation. Rather than pressing for particular structures, one should only loosely set an objective and concentrate on those processes that increase the chances that the desired stages will be reached."

Consensus existed about the usefulness of a shift to non-provocative defence in the strategies of the alliances. On the other hand, the group were of the opinion that at least in the first stages, a dissolution of the military alliances might be neither necessary nor useful.

Concerning alternative security systems in Europe, the Symposium discussed different models and ideas including the concept of Common Security and non-provocative

defence. Some participants felt that the term Common Security was quite clear, while others held that it needed more clarification and substance. There was support for the idea of restructuring the conventional forces, though no consensus could be reached on the explanations for and evaluation of the asymmetries in forces. It was widely believed that talks about conventional stability should concentrate on common ceilings. Some participants suggested reciprocal unilateral reductions as one of the decisive means to overcome a possible stalemate in the new talks.

A constructive debate took place about the general importance of the political component of European security, and in particular for alternative security systems. Some argued for focusing in the future on the political and economic sphere, recognizing the effect of reducing the importance of the military question. Other participants were of the opinion that without at least some progress in the military field no success could be achieved in the political and economic fields.

Horst Fischer*

* This report is prepared on the sole responsibility of the author. It is partly based on the reports given by the rapporteurs. It should not be interpreted as a consensus of the Symposium participants, among whom a wide range of views was represented.

** We wish to acknowledge with thanks and appreciation the financial support of the Deutsche Forschungsgemeinschaft and the Vereinigung Deutscher Wissenschaftler which sponsors the FRG Pugwash Group.

Participants at the 51st Pugwash Symposium in Bochum, FRG.

LIST OF PAPERS

(Ed. note. It is planned to publish the papers as a monograph).

Georg Bluhm : Reflections on the Interdependence between Global and European Problems.

Jozef Bognar : Place and Role of Economic Cooperation in the Dynamic Security of Europe.

Kenneth Booth : Steps towards Stable Peace in Europe, A Theory and Practice of Coexistence.

Marian Dobrosielski : The Interdependence between Global and European Problems.

Max Klein : GDR and FRG in European Perspective, Remarks of a Physicist.

Wojciech Multan : What after the INF Treaty?

Götz Neuneck : Complexity, Common Security and Conventional Arms Control.

Ioan Pascu : Europe at Crossroads.

Stanislav Patejdl : Action Potentials for Alternative Concepts.

Daniil M. Proektor : Non-Offensive Defence; its Formation and Possible Structure.

Janusz Symonides : Prospects for an Alternative Security System in Europe.

Hylke Tromp : Interdependence and Security.

Hylke Tromp : SYLLABUS ERRORUM: Security Policy in the Nuclear Age.

Ole Weaver : New Political, Ideological, and Economic Areas Problematic to Détente between East and West in Europe.

The Minister-President of the Federal State of Northrhine-Westphalia, J. Rau, at a reception during the Bochum Symposium.

16TH PUGWASH WORKSHOP ON NUCLEAR FORCES

Geneva, Switzerland, 11-13 June 1988

REDUCING AND RESTRUCTURING NUCLEAR AND CONVENTIONAL FORCES: POSSIBILITIES, PROBLEMS AND NUCLEAR-CONVENTIONAL INTERACTIONS

Agenda

1. The future of nuclear forces reductions after the INF agreement
2. Links between nuclear and conventional forces: their character and implications
3. Reducing and restructuring conventional forces for improved stability
4. Shaping the Pugwash agenda

List of Participants

General (ret.) Hugh Beach, Kings College Chelsea Campus, London, UK.

Prof. Anders Boserup, Centre of Peace & Conflict Research, Copenhagen, Denmark.

Prof. Francesco Calogero, Physics Department, University of Rome, Italy.

Dr. Christian Catrina, Ministry of Foreign Affairs, Bern, Switzerland.

Ambassador Jonathan Dean, Union of Concerned Scientists, Washington, USA.

Prof. Bernard Feld, Physics Department, MIT, Cambridge, MA., USA.

Prof. Jacques Freymond, Centre for Applied Studies in International Negotiations and European Cultural Centre, Geneva, Switzerland.

Prof. Richard L. Garwin, IBM Research Division and Columbia University, Yorktown Heights, NY, USA.

Colonel Vassilii Grishayev, General Staff of the Armed Forces of the USSR, Moscow, USSR.

Prof. John P. Holdren, Professor of Energy and Resources, University of California, Berkeley, CA., USA.

Major-General Carlo Jean, Stato Maggiore Difesa, Roma, Italy.

Dr. Martin M. Kaplan, Secretary-General, Pugwash Conferences, Geneva, Switzerland.

Prof. Catherine McArdle Kelleher, University of Maryland, College Park, USA.

General (ret.) Glenn Kent, The Rand Corporation, Washington, DC., USA.

Dr. Jean Klein. Institut Français des Relations Internationales, Paris, France.

Dr. Mikhail Kokeev, Foreign Ministry, Moscow, USSR.

Dr. Francesco Lenci, CNR Instituto Biofisica, Pisa, Italy.

Colonel (ret.) Wilhelm Mark, Aarau, Switzerland.

Prof. Albrecht C. von Muller, Max-Planck-Society, Starnberg, FRG.

Mr. Robert S. McNamara, Former Secretary of Defense, retired President of the World Bank, Washington, DC., USA.

Dr. Krzysztof Ostrowski, Central Committee of the People's Republic of Poland, Warsaw, Poland.

Prof. Joseph Rotblat, Emeritus Professor of Physics, London University, London, UK.

Rear Admiral Elmar Schmähling, Chief of Office, Amt für Studien und Uebungen der Bundeswehr, Bergisch-Gladbach, FRG.
Dr. Jean-Pierre Stroot, CERN, Switzerland.
Prof. Hylke Tromp, Rijksuniversiteit Groningen, Polemologisch Institute, Groningen, Netherlands.
Dr. Matti Vuorio, Chief of Research Division, Ministry of Defence, Helsinki, Finland.
Lord Zuckerman, Former Chief Scientific Adviser to the British Government, London, UK.

Report on the Workshop *

The sixteenth in a series of Pugwash workshops, focused on nuclear arms control with an emphasis on aspects related to Europe, was held in Geneva from 11 to 13 June 1988. The participants comprised 27 scholars, public figures, and military people from the United States, the Soviet Union, and Europe ; they took part as individuals and not as representatives of their governments or institutions. This abbreviated account of the discussions at the Workshop is the responsibility of the rapporteur alone and has not been reviewed or endorsed by the other participants.

* * *

It seemed appropriate in the aftermath of the achievement of the INF Agreement to examine, in a Pugwash expert workshop, the prospects for further arms-control agreements in both the nuclear and the conventional-forces spheres, with special emphasis on the interactions between the two. Combining the topics in this way now seems imperative for at least three reasons. First, the political momentum, public expectations, and negotiating precedents established by the INF Agreement enhance the possibilities for conventiona-forces arms control as well as for further nuclear reductions. Second, some of the arms-control problems that remain to be solved are similar enough in the nuclear and conventional spheres that it can be advantageous for specialists in the two spheres to compare notes. Finally, and perhaps most importantly, nuclear forces and conventional forces are directly linked by aspects of doctrine, strategy, force structure, and arms-race dynamics in ways that make it militarily and politically impractical to achieve really major reductions or restructuring in either category without reference to what is happening in the other.

Some of the most important nuclear-conventional linkages arise from the perception of many people that the conventional-forces confrontation in Europe would be intolerably dangerous except for the extra caution induced in military and political leaders by the presence of nuclear weapons. This view finds concrete embodiment in NATO's doctrine of extended deterrence - the explicit threat to be the first to use nuclear weapons if that seems necessary to stop a conventional attack. The view that nuclear weapons are needed to stabilize the conventional-forces confrontation has arguably been a major source of pressure for "modernization" of nuclear armaments over the years, with NATO seeking ways to make credible that it could and would use nuclear weapons if

necessary, and the Warsaw Treaty Organization seeking ways to assure that escalation to nuclear conflict would bring no advantage to NATO.

THE ACTUAL RESULT OF FOUR DECADES OF THIS COMPETITION IN NUCLEAR WEAPONRY IS THAT ANY USE AT ALL OF NUCLEAR WEAPONS IN CONFLICT IS LIKELY TO LEAD TO TOTAL DISASTER FOR EVERYONE. It is hard to deny that this circumstance does produce some additional incentive for leaders on both sides to avoid conflict, beyond that provided by the expectation that even a strictly conventional war in Europe would be unimaginably destructive. The more controversial question is whether the extra caution induced by nuclear weapons is worth the extra costs and risks these weapons bring, including the danger of accidental or inadvertent nuclear war, the contribution of provocative nuclear-weapons postures to East-West tensions, and the diversion of attention and resources from other military and non-military problems.

Although the participants in the workshop held differing views on whether a nuclear contribution to deterrence of conventional conflict in Europe is really needed at all, or is worth its costs and risks, there was virtually unanimous agreement that the nuclear-deterrent effect that some think desirable as extra insurance against a conventional conflict in Europe COULD BE AMPLY PROVIDED BY NUCLEAR FORCES FAR SMALLER AND LESS THREATENING THAN THOSE THAT EXIST TODAY. This conclusion holds not only for nuclear weapons deployed in European countries - weapons that some think could and should be eliminated altogether - but also for those deployed in the United States and the Soviet Union; and it holds for the most basic nuclear-weapons function of deterring NUCLEAR attack as well as for the "extended deterrent" role.

IT WAS ALSO EMPHASIZED AND GENERALLY AGREED THAT NUCLEAR ARMS CONTROL SHOULD FOCUS NOT SO MUCH ON REDUCING THE AGGREGATE NUMBERS OF THESE WEAPONS AS ON ELIMINATING OR STRICTLY LIMITING THOSE SPECIFIC TYPES OF WEAPONS THAT MOST CONTRIBUTE TO CRISIS INSTABILITY AND ARMS-RACE INSTABILITY. Crisis instability is associated with incentives for and fear of pre-emptive strikes, and the nuclear-weapons characteristics that aggravate this problem include MIRVing, high accuracy, and vulnerability to pre-emptive destruction by the other side. Arms-race instability comes from mutually reinforcing incentives to expand the types and numbers of nuclear weapons, and is associated with nuclear weapons whose numbers are difficult to verify as well as with trying to give nuclear weapons functions beyond deterrence of nuclear attack. THE KINDS OF NUCLEAR WEAPONS THAT SHOULD HAVE HIGHEST PRIORITY FOR DEEP REDUCTIONS OR ELIMINATION ACCORDING TO THESE CRITERIA INCLUDE MIRVED ICBMS IN FIXED SILOS, NUCLEAR ARTILLERY SHELLS, AND SEA-LAUNCHED CRUISE MISSILES.

Workshop participants were in general agreement that, from the military and technical standpoints, and considering the precedents established by the INF Agreement, THERE IS NOW GREAT POTENTIAL FOR FURTHER ARMS-CONTROL AGREEMENTS THAT WOULD GREATLY REDUCE SOME OF THE MOST DANGEROUS CLASSES OF BOTH LONGER-RANGE AND SHORTER-RANGE NUCLEAR WEAPONS, THAT WOULD BE ADEQUATELY VERIFIABLE, AND THAT WOULD EN-

HANCE SECURITY ON ALL SIDES. There is even considerable room for unilateral restraint and reductions - especially with respect to weapons, such as nuclear artillery shells, that clearly threaten their possessors even more than they threaten the adversary. At the same time, it was recognized that from the POLITICAL standpoint there will be considerable reluctance in NATO to agree to any further nuclear-arms reductions that might somehow be thought of as weakening extended deterrence, unless and until the perceived danger from the conventional confrontation is correspondingly reduced.

This nuclear-conventional connection greatly adds to the incentives for conventional arms control that should already be apparent from looking at the conventional confrontation itself. The NATO-WTO conventional confrontation is almost incomprehensibly large (for example, some 70,000 main battle tanks and about 14 million active and reserve ground troops from the Atlantic to the Urals) and almost incomprehensibly expensive (at the equivalent of 600 billion US dollars per year). It is arguably no longer just a symptom of underlying political and ideological disagreements, which after all have considerably abated since the confrontation began, but rather is now a primary CONTRIBUTOR to East-West tensions as well as a primary continuing stimulus to the nuclear-weapons competition.

Much discussion at the workshop was therefore devoted to the possibilities for building down this increasingly dysfunctional, dangerous, and expensive conventional confrontation. The picture that emerges from this discussion is that THERE ARE TREMENDOUS NEW OPPORTUNITIES FOR AGREEMENT ON SHRINKING AND RESTRUCTURING THE CONVENTIONAL CONFRONTATION TO REDUCE BOTH ITS DANGERS AND ITS COSTS, AND TO AMELIORATE THE POLITICAL OBSTACLES TO FURTHER NUCLEAR ARMS REDUCTIONS. BUT THERE ARE ALSO MAJOR COMPLEXITIES AND DIFFICULTIES THAT WILL REQUIRE EXTENSIVE ANALYSIS AND ENERGETIC NEGOTIATION IF THESE OPPORTUNITIES ARE NOT TO BE MISSED.

The opportunities for major progress in conventional arms control arise from a convergence of several important factors: increasing recognition that the conventional confrontation is far out of proportion to any political rationale for it; increasing recognition of its connections both with the causes of the nuclear arms race and with the chances for further nuclear arms control; economic difficulties in many of the countries involved, making it plain that the costs of the conventional confrontation at its current level cannot be sustained; the emergence of increasingly detailed and persuasive analyses of HOW conventional forces could be restructured to provide much greater stability at lower levels; and the important precedents established by the INF Agreement in respect to asymmetric reductions and cooperative verification procedures.

THE KEY IDEA ABOUT THE FORM OF THE NEEDED RESTRUCTURING OF CONVENTIONAL FORCES IS THAT ITS AIM MUST BE TO REDUCE OFFENSIVE CAPABILITES, INCLUDING ESPECIALLY THE POTENTIAL FOR SURPRISE ATTACK, WHILE RETAINING STRONG DEFENSIVE CAPABILITIES. The desired "mutual defence dominance" can be accomplished mainly by focusing the reductions on the most offence-capable elements of modern conventional forces (for example,

tanks, self-propelled artillery, attack helicopters, and ground-attack aircraft) and by removing the residual stocks of these weapons from forward positions, along with their support infrastructures. The goal of greatly reduced potential for (and fears of) offensive action CANNOT be accomplished merely by pursuing numerical parity in conventional forces.

There is considerable reason for optimism in the steadily increasing credibility of the "defence dominance" idea over the past few years among political and military leaders (brought about in part by the series of Pugwash Workshops on the topic in which analysts from the academic, military, and political communities from East and West have jointly worked out some of the important details). It is now particularly encouraging that these concepts are regularly cited in the speeches of General Secretary Gorbachev and other Warsaw Treaty Organization heads of state, and that fairly detailed schemes for implementing such ideas are under serious review in a number of defence ministries and general staffs in the West.

Substantial favourable discussion was devoted at our Workshop, in this connection, to the approach to conventional arms control put forward by Mr Gorbachev at the Moscow summit and subsequently described publicly in speeches by Mr Sheveranadze and General Chervov. This approach consists of an initial complete exchange of official data on conventional forces, with resolution of disagreements by on-site inspections, preparatory to negotiating the elimination of the "existing imbalance and discrepancies" in tanks, artillery, helicopters, ground-attack aircraft, and other conventional weapons. A second stage of negotiations under this approach would seek cutbacks of about 500,000 troops, and a third stage would combine further reductions with restrucuring in which "the armed forces on each side would be given a defensive character and their offensive nucleus would be dismantled".

This Gorbachev approach is still far from a detailed and formal arms-control proposal, and it would have to be greatly elaborated before one could begin to determine what parts of it NATO would accept; but it already represents an important step forward from the far more limited conventional arms-control approaches that were able to gain endorsement by top leaders previously. The obstacles to reaching a comprehensive and effective agreement on conventional forces are formidable - as 15 years of largely unsuccessful MBFR negotiations in Vienna have demonstrated - but the potential benefits of pushing on to success are huge, and the promise of the new thinking now being focused on the problem is great.

As an illustration of the possibilities that become conceivable with equally bold thinking on the nuclear side of the problem - possibilities that would be made far easier to reach politically if conventional-forces transformations of the sorts described here were actually achieved - the Workshop gave some discussion to a particular scenario for extremely deep reductions by the year 2000 or so. On the NATO side there would be a total of 500 invulnerably based nuclear weapons (200 strategic weapons in the United States, 100 each in France and the United Kingdom, and 100 non-strategic nuclear weapons in Europe altogether), compared to the 25,000 nuclear weapons on the NATO side today; on the Warsaw Treaty Organization side there would also be a total of 500 nuclear weapons, again invulnerably based to assure stability, compared to about 25,000

today.

While the group did not reach agreement on whether something like this 50-fold reduction scenario could really be achieved by the year 2000, or on whether and how such progress could be continued all the way to complete elimination of nuclear weapons everywhere, the fact that such a proposal could now receive serious attention in an East-West working group such as ours is already a most encouraging sign. Such positive vision should serve as an incentive to Pugwash, political leaders, and publics to mount the tremendous further effort that will be required to bring the vision to life.

John P. Holdren

* We thank the John D. and Catherine T. MacArthur Foundation and Friends of Pugwash in Switzerland for their financial support of this meeting, as well as H. Dudley Wright and Prince Sadruddin Aga Khan for their kind hospitality extended to the participants.

Abstracts of Papers

THE NATO-WARSAW PACT CONFRONTATION IN THE TWENTY-FIRST CENTURY: A ROUGH MODEL FOR AN OPTIMAL FORCE POSTURE

by Jonathan Dean

There are grounds for concern that the potentiality of the pending Atlantic to Urals force reduction talks to build town the East-West military confrontation in Europe will not be realized. To seek to meet this concern, this paper suggests an outcome for the talks which goes beyond what both alliances appear to have in mind but which may nonetheless be mutally acceptable. The suggested approach combines early warning and stabilizing measures, force reductions, force restructuring and important money savings into a single integrated package.

The approach would begin with a stage of data discussion whose purpose is to reach general understanding on the confrontation of the forces of both alliances. Agreement between the figures of both alliances is desirable but not essential for proceeding to reductions which could in that event be computed on the basis of reducing NATO levels.

Next, agreement would be sought on a series of transparency and early warning measures including: 1) flights of radar equipped aircraft parallel to the dividing line between the alliances; low-level overflights over the territory of the opposing alliances; permanent posts of exit and entry points to the reduction area and at transportation choke points in the interior, and observers allocated to headquarters of divisions and major airfields. Reductions start with 10% reduction in NATO holdings of five armaments, with particular value for the offense: tanks, armoured personnel carriers, artillery, armed helicop-

ters, and ground attack aircraft, with the Warsaw Treaty forces reducing to the NATO level. Coordinated but separate US-Soviet negotiations take place with the aim to setting a low ceiling of 200-300 for surface-to-surface missiles equipped with either nuclear or conventional warheads. Reduction is by units, which will be disbanded, with their equipment destroyed or turned over to reserve units to be placed in secured storage checked by sensors and open to inspection by the opposing alliance. There is no limit on forces of a more defensive nature: anti-aircraft, anti-tank, and light infantry, and no ceiling in this stage on non-military manpower, enabling the personnel of disbanded units to be shifted to these functions.

In further cuts, holdings of both alliances in the specified armaments are reduced to a level of 50% of NATO's original level, and a step-by-step reduction of active duty ground and air force personnel of both alliances takes place, with the objective of a 50% saving in current defence budgets.

THE CRUISE - MIRV PARALLEL

by Bernard Feld

The recent decision by the U.S.A., to deploy cruise missiles (especially in submarines) is compared to the 1972 decision to deploy MIRV'd missiles inspite of the ABM Treaty which had rendered them unnecessary. The cruise missile is deployed by both sides, and is bound to destabilize and inflate the arms race between the U.S.A. and USSR. They are not really needed to improve an already robust deterrence. The answer should be an agreement to ban all cruise missile deployments while there is still time.

CONVENTIONAL FORCES IN EUROPE: CHANGING VIEWS OF THEIR STABILITY AND RELATION TO THE NUCLEAR CONFRONTATION

by John P. Holdren

There is little hope of a radical reduction of the dangers of the nuclear confrontation unless the threatening character of the conventional confrontation can be drastically diminished. In spite of many obstacles to the needed transformations in the conventional-forces postures on both sides, some positive factors are growing in importance, including: increasing dissatisfaction in the West with the dangers of relying on a nuclear threat ("extended deterrence") to offset perceived conventional instability; economic problems in East and West alike, making it ever harder to pay for a conventional confrontation at the current scale; development of increasingly detailed and persuasive proposals for achieving a stable "mutual defender superiority" in the conventional realm by restructuring forces to supress offensive capabilities and enhance defensive ones; and explicit acceptance and endorsement of this new approach by the top leadership on the Warsaw Pact side.

Views of U.S. analysts and politicians on the conventional-forces

issues are diverse and evolving. A majority believes that the current conventional confrontation strongly favors the Warsaw Pact, and that there is no realistic prospect of improving NATO's capabilities enough to be able to relinquish the threat of nuclear first use against a Warsaw Pact conventional attack. But a growing body of opinion holds that Warsaw Pact advantages in some aspects of conventional forces are offset by NATO advantages in other aspects so that conventional deterrence is actually rather robust. There is also growing alarm aobut the inconsistencies, dangers, and lack of public support for the nuclear first-use posture, but only a few analysts think the conventional confrontation stable enough to give up the first-use threat now.

Interest in the new thinking about mutual defender superiority is still modest in the U.S.A., but it is growing rapidly, including at official levels. My own view is that we must devise and implement conventional force postures so clearly defence-dominated that even pessimists can no longer believe a nuclear threat is needed to deter conventional attack. Otherwise, the promise of nuclear arms control, only recently awakened, will be smothered by the continuing demands for nuclear "modernization" driven by NATO's attempts to make extended deterrence credible and WTO attempts to assure that it is not.

A MODIFIED APPROACH TO CONVENTIONAL ARMS CONTROL

by Albrecht A.C. von Müller

The détente of the 1970s did not prevent the increase of military threats in Europe. Therefore, it was reversible. If one really wants a peaceful transformation of the East-West conflict, the drying up of the military threats in Europe is essential.

Up to now, both alliances seem to be preparing for positions that head in the right direction. But they are also characterized by a high degree of traditional thinking and lack of innovation. The danger of again getting trapped in MBFR/MFR type of quarrels is therefore imminent. In the paper a modified, more fundamental approach to increase stability is outlined.

FROM "STRUCTURAL DEFENSIVENESS" TO "DEFENSIVE SUPERIORITY"

by Elmar Schmähling

After having evaluated existing weaknesses in NATO's conventional force posture in central Europe, I propose a very far-reaching political concept for defence organization in the FRG.

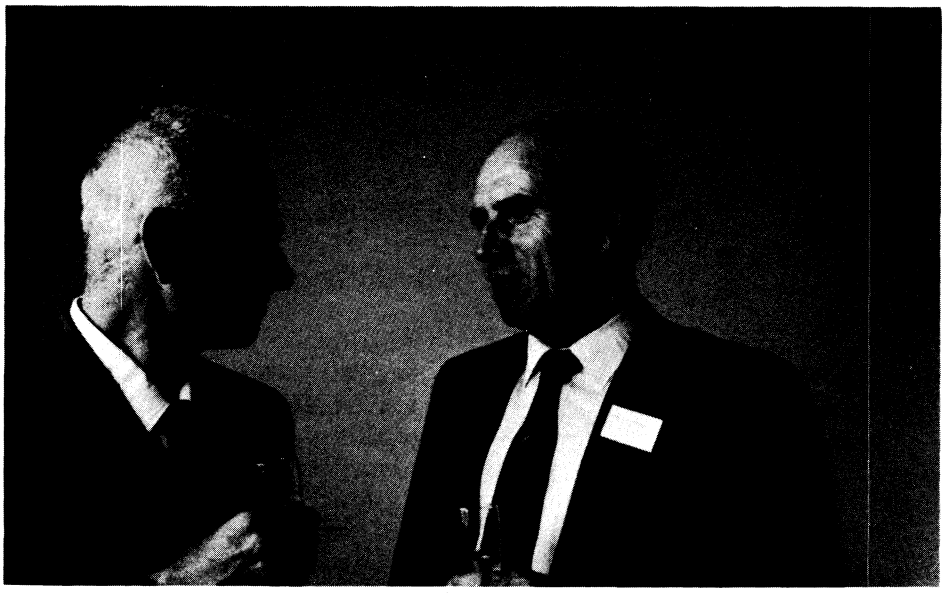
In the political field, this requires the adaptation of an overall defence concept without an artificial separation of the civilian and military realms. In practice, this means that all public expenditures should be examined on the basis of their contribution towards the establishment of a

highly effective defence posture.

For instance, by making more intelligent use of new technology, while exploiting the advantages of possessing the terrain where a battle could possibly take place, territorial defence can be improved tremendously. Exploiting new resources for defence and using a militia-type force structure would entail both a different NATO force structure and a shift from military-technical to political considerations of security issues.

The change towards a system of defensive superiority can be started unilaterally, but fits very well in the conventional arms control process.

Geneva Workshop, June 1988. From left to right: Robert S. McNamara, Joseph Rotblat, Tamar Magid (guest), Lord Zuckerman.



Francesco Calogero and Colonel Vassilii Grishayev.

52nd Pugwash Symposium

NAVAL FORCES: ARMS RESTRAINT AND CONFIDENCE BUILDING

Oslo, Norway, 23-24 June 1988

Agenda

1. The Context for Naval Arms Control
2. Characteristics of Naval Forces
3. Aims and Methods of Naval Arms Control and Confidence Building
4. Specific Proposals
5. Directions for Future Work

List of Participants

Prof. Desmond Ball, Director, Centre for Strategic Studies, University of Canberra, Australia

Mr. Frank Blackaby, former Director of the Stockholm International Peace Research Institute, UK

Dr. Barry M. Blechman, President, Defense Forecast, Inc., Washington, USA

Dr. Ove Bring, Head of Legal Section, Ministry of Foreign Affairs, Sweden

Mr. Maxwell Bruce, QC, International Law, London, UK

Cap. Jacob Borresen, Secretary to the Minister of Defence, Norway

Mr. Alexander Churilin, Councellor, Planning and Evaluations Department, Ministry of Foreign Affairs, Moscow, USSR

Mr. Gunnar Gunnarson, University of Iceland, Reykjavik, Iceland.

Prof. John Holdren, Professor of Energy and Resources, University of California, Berkeley, USA

Prof. Carl Gustav Jacobsen, Canadian Institute for International Peace and Security/ Carleton University, Ontario, Canada.

Dr. Michail E. Kokeev, Chief of Section (Disarmament at the UN), Department of International Organizations, Ministry of Foreign Affairs, Moscow, USSR

Mr. Sverre Lodgaard, Director, Oslo Peace Research Insitute (PRIO); Oslo, Norway

Mr. Carsten Lütken, Vice Admiral, Defence Research Establishment, Kjeller, Norway

Prof. Steven Miller, Center for International Studies, Massachusetts Institute of Technology, Cambridge, USA

Mr. Kari Möttölä, Director, Finnish Institute of International Affairs, Helsinki, Finland

Mr. Jan Prawitz, Consultant to the Minister of Defence, Stockholm, Sweden

Mr. Ron Purver, Canadian Institute for International Peace and Security, Ottawa, Canada

Prof. Paolo Cotta-Ramusino, Professor of Physics, University of Milan, Italy

Dr. Adam Daniel Rotfeld, Polish Institute of International Affairs, Warsaw, Poland

Mr. Elmar Schmähling, Rear Admiral, Director, Federal Armed Forces Office for Studies and Exercises, Bergisch Gladbach, FRG
Mr. Olivier Sevaistre, Contre-Admiral, Ecole Militaire, Paris, France
Mr. Ola Tunander, PRIO, Oslo, Norway
Mr. Stansfield Turner, Admiral (retired); former Director of the Central Intelligence Agency, McClean, USA
Prof. Robert S. Wood, Dean, Center of Naval Warfare Studies, U.S. Naval War College, Newport, USA

Report on the Symposium

Ed. note. Space limitations require that only excerpts from the report can be reproduced here. It is planned to publish all the papers and the complete report in a monograph. The full report can be obtained on request to Sverre Lodgaard (Oslo) or the London or Geneva Pugwash offices.

The 52nd Symposium of the Pugwash Conferences on Science and World Affairs was held in Oslo, Norway, from 23 to 26 June 1988 on the topic of naval arms control and confidence-building. The meeting was organized by the Norwegian Pugwash Committee and the Oslo Peace Research Institute (PRIO). The special role of the northern seas for the naval dimension of any East-West conflict makes Norway a particularly appropriate site for discussions of this topic.

The Symposium participants comprised 24 scholars, public figures, and military people from Europe, Australia, Canada, the United States, and the Soviet Union; they took part as individuals and not as representatives of their governments or institutions. The opening session of the Symposium was addressed by Dr. Johan Jorgen Holst, the Norwegian Minister of Defence, who also hosted a reception for the participants later in the meeting. The following abbreviated account of the discussions at the Symposium is the responsibility of the rapporteurs and has not been reviewed or endorsed by the other participants.

Characteristics of Naval Forces*

In mid-1987, the U.S. navy deployed 14 large aircraft carriers, 3 battleships, 205 other major surface combatants (frigates and larger), 36 ballistic-missile submarines (all nuclear powered), and 102 attack submarines (98 nuclear powered); and it accounted for 36 per cent of the active military manpower of the U.S. armed services. The 1987 Soviet navy had no large carriers, no battleships, 230 other major surface combatants, 77 ballistic missile submarines (62 nuclear powered), and 261 attack submarines (118 nuclear powered); it accounted for 10 per cent of the Soviet Union's active military manpower.

Roughly 16,000 of the world's nuclear weapons are intended for use by naval forces, of which about 9500 are warheads on SLBMs. About 3300 are anti-submarine weapons, 2000 are bombs for delivery by aircraft (including land-based Soviet naval aviation), and there are about 550 each on SLCMs and naval anti-air weapons. Another 200 warheads are for naval artillery and coastal missiles. More than 90 per cent of the total are deployed by the United States and the Soviet Union; fewer than 1000 of the naval nuclear weapons belong to the United Kingdom, France, and China.

Deployment of cruise missiles at sea is already extensive. The Soviet Union has about 500 cruise missiles on 62 attack submarines and some 400 more on 58 surface vessels. These missiles have both anti-ship and ground-attack roles, and about 400 of them are thought to be nuclear armed. The United States has about 250 cruise missiles on 31 attack submarines and about 370 more on surface vessels. About 150 of the U.S. SLCMs are nuclear armed. The U.S. navy plans to have deployed nearly 4000 SLCMs by the late 1990s, of which some 750 will be nuclear-armed for land attack and about 600 will be anti-ship missiles with conventional warheads.

The various classes of sea-based nuclear weapons differ markedly in their potential effects on crisis stability and arms-race stability. Strategic warheads on SLBMs have been thought to be less dangerous in a crisis than are strategic weapons in other basing modes; the key issue is whether a combination of improved ASW techniques and enhanced counter-force capabilities for SLBMs will change this verdict. Tactical naval nuclear weapons, by contrast, are thought by many to be more dangerous (in terms of escalatory potential) than tactical weapons for use on land. One reason is that the civilian casualties and environmental effects of nuclear weapons exploded at sea would be much smaller than those of nuclear weapons exploded on land. This, plus the very high value of such naval targets as carrier battle groups, might prove an irresistible temptation for nuclear use at sea - either to attack such targets or to defend them.

The dual-capable cruise missiles pose escalation problems because a side under attack by conventional versions may assume they are nuclear (before they reach their targets) and respond accordingly. They pose problems for arms-race stability and arms control because they are easy to conceal and because it is difficult to discriminate nuclear from conventional versions; both circumstances tend to promote worst-case assessments and resulting reciprocal build-ups.

Concern about the escalatory potential of nuclear weapons at sea is amplified by the circumstance that the U.S. weapons in this category do not possess electronic permissive action links (PALs) to prevent physically their being armed and fired without explicit permission from the central political authorities. (The U.S. navy has argued successfully up until now that the nature of combat at sea with a nuclear-armed adversary makes the use of PALs on naval nuclear weapons unacceptable). The procedures for control of Soviet naval nuclear weapons are not publicly known.

Aims and Methods of Naval Arms Control and Confidence-Building

A variety of objectives for efforts at naval arms control and confidence-building can be envisaged, including the following:

(a) to reduce the chance that a naval incident could start a war;

(b) to reduce the chance that naval operations could lead to escalation from conventional to nuclear war;

(c) to reduce fears, tensions, and mistrust arising from naval forces and operations, for example by

  (i) reducing the capacity for surprise attack against or by naval forces;

(ii) reducing the threatening character of naval exercises;

(iii) reducing the extent and feasibility of "gunboat diplomacy";

(d) to harmonize naval operations and naval arms control with the international Law of the Sea regime;

(e) to reduce expenditures on naval forces.

These objectives overlap to some extent. At the same time, it should be noted that different analysts have different views about where the emphasis should be and about whether some of the items are desirable at all.

Among the approaches discussed at the Symposium for the attainment of these sorts of objectives were the following (arranged here more or less in increasing order of difficulty and comprehensiveness):

(a) clarifying rules of behaviour (e.g., "innocent passage");

(b) exchange of information and observers (including notification of exercises);

(c) constraining sizes and types of exercises;

(d) establishing restricted zones and related constraints on operations (e.g., stand-off zones for SSBNs, ASW sanctuaries);

(e) separation of nuclear and conventional weapons and missions;

(f) limiting forces and capabilities (e.g., ceilings on nuclear attack submarines, a ban or ceiling on SLCMs, elimination of tactical nuclear weapons from naval vessels);

(g) drastic alteration of naval missions, as for example by restructuring naval forces into defensive modes, or renouncing the use of naval forces for power projection in the Third World, or transforming the conventional confrontation in Europe in ways to reduce NATO's dependence on SLOCs.

Possible mechanisms for implementing these approaches include (again in increasing order of difficulty or complexity): unilateral measures and gestures; extension of existing treaties and agreements (such as the Seabed Treaty, the Law of the Sea, the Antarctic Treaty, and the 1986 Stockholm agreements, and negotiation of new treaties and agreements.

Pros and Cons of Some Specific Proposals

Much of the discussion at the Symposium was devoted to the pros and cons of specific proposals for naval arms control and confidence-building. Here is a sampling of the points made.

Limits on exercises. Constraining the number, size, and threatening character of naval exercises is one of the most obvious and straightforward approaches to confidence-building in the naval arena. The idea of excluding from exercises the most offence-oriented elements, such as long-range strike aircraft and amphibious landing capabilities, is appealing from a confidence-building standpoint but likely to be strongly resisted by naval interests, who point out that the main aim of exercises in the first place is to gain experience in employing all types of forces in a coordinated

way. Ways to reconfigure exercises to gain confidence-building benefits without intruding too much on naval readiness deserve closer examination. Of course, a rigorous notification regime for exercises, requiring detailed specification of what forces will be involved and what they will do, would be useful even if the configuration of the exercises were not altered.

Zones of restricted activities. Zonal approaches - such as SSBN sanctuaries free of ASW activity, or stand-off zones from which missile-bearing vessels are excluded - are attractive in that they can be seen as straightforward extensions of zonal elements that have long been a part of maritime practice and international law, e.g., territorial waters and exclusive economic zones. These approaches have the drawback, however, that the zones probably would not be respected once hostilities commenced. Still, it can be argued that excluding ASW forces and exercises from particular regions in peacetime would greatly complicate the task of conducting ASW in those regions if war broke out (providing at least part of the desired benefit of reducing threats to the retaliatory forces on SSBNs); and a stand-off zone would surely have some benefit in complicating the task of orchestrating a surprise attack, because detection of any missile-bearing vessel entering such a zone prior to the start of hostilities would constitute effective warning of hostile intentions. (Some of the benefit of a stand-off zone might be obtained more reliably by a ban on testing depressed trajectory SLBMs and supersonic SLCMs). More ambitious zonal schemes sometimes mentioned include demilitarization of the Indian Ocean and strengthening of the demilitarization provisions for the Antarctic Ocean embodied in the Antarctic Treaty; these proposals are subject to the criticism that they intrude too directly on fundamental naval prerogatives and perceived national interests to be worth pursuing in the absence of a drastic change in the nature of international relations.

PALs for nuclear weapons on surface vessels. Electronic permissive action links for the nuclear weapons on surface vessels could reduce fears that these weapons might be the source of nuclear escalation unintended by the central authorities in the combatant nations. Most naval interests are either silent on this subject or insist that existing procedures for the control of naval nuclear weapons are adequate. Because of the difficulties in communicating with submerged submarines, the submarine-based nuclear weapons are likely to remain free of PALs; but the voices in favour of putting PALs on all nuclear weapons on surface vessels will probably become more insistent and eventually irresistible. The issue would become moot, of course, if the more drastic proposal to remove nuclear weapons from surface vessels altogether were to be accepted.

Ceilings on nuclear-powered attack submarines. Under an agreement for deep cuts in strategic nuclear forces, the number of SSBNs would surely diminish unless and until existing models were replaced with smaller submarines carrying fewer missiles each. A reduced number of SSBNs would increase fears that this hitherto secure retaliatory force might become vulnerable, promoting crisis instability, particularly if ASW capabilities were allowed to grow without limit. A possible remedy is to agree on numerical ceilings for the most capable ASW system, which is the nuclear-powered attack submarine (SSN). One objec-

tion to this proposal is that SSNs are used to protect one's own SSBNs as well as to hunt those of the adversary. (It is also true that SSBNs can both threaten and protect surface vessels). An analogy relevant to the question of limiting a weapon that is equally useful in offence and defence is the tank: the fact that the best anti-tank weapon is another tank seems unlikely to prevent, in the end, an agreement putting a ceiling on the number of tanks, which otherwise would tend to increase without limit. Similar logic may end up being applied to the SSN.

Ban on SLCMs. Some analysts argue that it is not too late to ban sea-launched cruise missiles, and that this must be done to avoid an unrestrained arms race featuring these weapons. Others counter with one or more of three main arguments: (a) the SLCM genie has long ago escaped from the bottle (see the deployment data cited above) and cannot be stuffed back in; (b) nuclear-armed SLCMs offer the ideal combination of high survivability and low suitability for preemptive counterforce attack, and therefore should be welcomed and emphasized in the role of a secure deterrent force; and (c) SLCMs with conventional warheads are perceived to be such useful weapons for naval land-attack and anti-ship roles that navies cannot be expected to give them up. It is also argued by some that the restraints on land-based theatre missiles agreed in the INF Treaty make it irresistible to deploy SLCMs for similar missions. On the other hand, the INF Treaty is an obvious precedent refuting the "genie out of the bottle" argument: banning modern weapons already deployed in significant numbers is not impossible, although admittedly verification would be more difficult for an SLCM ban than for INF. The central issue with the other arguments is comparing the military benefits of SLCMs with their liabilities in terms of arms-race instability and escalation potential. A more modest proposal that might circumvent some of these dilemmas is to ban SLCMs on surface vessels but permit them on submarines.

Elimination of all tactical naval nuclear weapons. This proposal has the great merit of dealing comprehensively and persuasively with concerns that naval tactical nuclear weapons might be the source of escalation from a conventional to a nuclear war. If it were adopted, the only nuclear weapons aboard naval vessels would be strategic weapons - presumably in the role of a secure, second-strike force consisting of SLBMs. Nuclear-armed SLCMs theoretically could play this role also, and indeed one proposal calls for putting such missiles on every naval surface vessel to maximize the dispersion of the force; but if that were done it is hard to see what would prevent the tactical use of these weapons. (Tactical use of SLBMs is less likely because a single launch gives away the position of the sub, risking prompt destruction of a very valuable asset and invalidating its strategic-reserve role). An argument made against the elimination of all tactical naval nuclear weapons is that a nuclear attack on naval vessels might come from land-based forces not constrained by such a ban; the navy needs the option, according to this argument, of responding to such an attack in kind (as, for example, with carrier-based nuclear-armed aircraft). It can be argued, on the other side, that retaliation for a land-based nuclear attack on naval vessels need not come from ships but could be carried out by land-based aircraft. Presum-

ably it is also the case that if naval surface vessels did not carry any nuclear weapons, they would be less tempting targets for nuclear attack.

Note

* The data in this section are from The Military Balance, 1987-88, International Institute for Strategic Studies, London, 1987, and Joshua Handler and William M. Arkin, Nuclear Warships and Naval Nuclear Weapons: A Complete Inventory, Neptune Paper No. 2, Greenpeace and Institute for Policy Studies, Washington, DC, May 1988.

Rapporteurs: John P. Holdren
Sverre Lodgaard

List of Papers

Desmond Ball, Some Implications of 50% Reductions in Strategic Nuclear Forces for Sea-Based Systems.

Frank Blackaby, Naval Forces: Arms Restraint and Confidence-Building.

Owe Bring, International Law and Arms Restraint at Sea.

Maxwell Bruce, The New Law of the Sea: Any Possibilities for Arms Restraint?

Jozef Goldblat, The Seabed Treaty and Arms Control.

Johan Jorgen Holst, Northern Europe and the High North. The Strategic Setting: Parameters for Confidence Building and Arms Restraint.

Carl Gustav Jacobsen, Soviet Naval Doctrine.

Carsten Lütken, Confidence and Security Building - À Naval Perspective

Karl Mottola, Maritime CSBMs and Naval Arms Control in the High North of Europe - Obstacles and Principles.

Jan Prawitz, Neither Confirming nor Denying: Thoughts on a Principle.

Adam Daniel Rotfeld, Naval Forces and CSBMs in the CSCE Process.

Elmar Schmähling, Naval Forces and Arms Control: Reflections on How to Include Naval Forces in the Process of Arms Control.

Ola Tunander, Confidence Building and Regional Restraint at Sea.

Robert S. Wood, Arms Control and Nuclear Disarmament at Sea: Superpower Perspectives (theme of panel discussion between Desmond Ball, Michail Kokeev, Stansfield Turner and Robert S. Wood).

REPORT ON THE ISODARCO COURSE IN BEIJING
4-7 April 1988

(Ed. note. The International School on Disarmament and Research on Conflicts (ISODARCO) is sponsored and organized by the Italian Pugwash Group.)

After twenty-two years of summer courses in Italy, ISODARCO this year organized its first winter course, as well as its first course outside of Italy, in the People's Republic of China. The course was held in Beijing, April 4-7 1988, and was organized in collaboration with the China Institute of Contemporary International Relations (CICIR) and the Institute of Applied Physics and Computational Mathematics (IAPCM). Approximately sixty people attended the sessions: eight Western and about fifty Chinese scholars.

The Western participants included four scholars from the United States (R.L. Garwin, E.C. Ravenal, Shu Yuan Hsieh and C. Schaerf) and one from SIPRI (Jane Sharp). The Chinese scholars came from CICIR, IAPCM and several other institutes, including the China Academy of Sciences (Academia Sinica), the China Academy of Social Sciences, the Academy of Military Sciences, the Ministry of Foreign Affairs, the Chinese People's Association for Peace and Disarmament (sponsors of the Chinese Pugwash Group) and many others. They constituted a very interesting example of Chinese intelligentsia, with contributions from the natural, social and political sciences.

The meetings were held in English and Chinese, with simultaneous translation provided. Its quality varied depending on the speed of the speakers and the availability of a written text, but it was generally good. Very few Chinese participants could sustain a conversation in English, therefore our interchanges were more formal than is normally the Isodarco tradition. On the other hand, we felt a strong and spontaneous desire to communicate with each other, which in many ways overcame the language barrier.

The meeting focused on three main topics: nuclear disarmament; nuclear strategies; and SDI.

Each topic was introduced by about five speakers, with a general discussion session (of a specified duration) following each of the presentations.

Western papers slightly outnumbered Chinese ones. A more macroscopic prevalence was in the time allotted to them and in the number of questions asked.

We had a total of 15-20 major presentations, and a larger number of other contributions, for a total of 24 hours of solid discussion, excluding breaks of any kind.

Of particular interest was the discussion on nuclear disarmament, and the repercussions which deep cuts in the strategic arsenals of the superpowers might have on the arsenals of smaller nuclear powers like China. We found our Chinese colleagues very sensitive to the problem, and very open to a discussion of the future course of the Chinese nuclear deterrent in this regard.

On SDI, we found most of them not very well-informed on the scientific and technical realities of the problem. Clearly they had received, without criticism, much optimistic propaganda from the project's spon-

sors, and they were very eager to get as much information as possible.

We met many bright, open-minded people, mostly in their thirties, who had spent time abroad and spoke English, and the fact that we got most of our information from them or through them (for reasons of language) might have constituted a bias in our impressions.

The effort by the Chinese to make this meeting a success was impressive (thanks to the two institutes and the Chinese organizers, Professors Liu Seqing and Hu Side, and their closest collaborators). The last session was devoted to a discussion of this experience and its possible future. Our Chinese colleagues remarked that, to the best of their knowledge, this was the first occasion in China in which natural and political scientists had met together in such a large group to discuss these problems; the fact that Western colleagues were also present made it an unique experience. They all hoped for a repetition, possibly in the fall of 1989.

Carlo Schaerf

BIOGRAPHICAL NOTES ON THE NEW OFFICERS

President elect: JOSEPH ROTBLAT

Born 4th November 1908 in Warsaw.

1925: Diploma in Electrical Engineering
1932: Degree of Magister of Philosophy
1938: Degree of Doctor of Physics of University of Warsaw
1939: Fellowship for research at University of Liverpool under Professor James Chadwick. Began work on the possibility of atom bomb
1940: Oliver Lodge Fellowship. Lecturer in Physics Department at University of Liverpool
1941-43: Member of Tube Alloys Project (atom bomb). In charge of Liverpool team during Chadwick's absence
1944: Work on Manhattan Project at Los Alamos in New Mexico as member of British team. Member of Co-ordinating Council of the Los Alamos Laboratory. Resigned from projects on moral grounds.
1945: Returned to Liverpool. Principal Scientific Officer in charge of atomic energy research.
1946-49: Acting Head of Physics Department of Liverpool University. Main scientific activities: rebuilding of 37-inch cyclotron at Liverpool; construction of 156-inch synchro-cyclotron; studies of nuclear energy states; investigations on photographic emulsions for nuclear research
1947: Consultant to the Atomic Energy Research Establishment at Harwell
1949: Degree of Doctor of Philosophy of University of Liverpool
1950-76: Professor of Physics in the University of London at St. Bartholomew's Hospital Medical College. Chief Physicist to St. Bartholomew's Hospital. Main scientific activities: biological and medical applications of nuclear physics; construction of 15 MeV linear accelerator for research and radiotherapy; clinical

uses of radioactive isotopes: biological effects of ionizing radiation
1953: Degree of Doctor of Science of the University of London
1955: Signatory of Russell-Einstein Manifesto
1957-73: Secretary-General of Pugwash Conferences.
1960-72: Editor of "Physics in Medicine and Biology"
1965: Order "Commander of the British Empire"
1966: Foreign Member, Polish Academy of Sciences
1966-71: Member Governing Board of Stockholm International Peace Research Institute
1969-70: President, Hospital Physicists Association
1971-72: President, British Institute of Radiology
1972: Honorary Foreign Member, American Academy of Arts and Sciences
1973: Honorary Degree of Doctor of Science, University of Bradford
1978-88: Chairman, British Pugwash Group
1983: Betrand Russell Society Award
1985: Honorary Fellow, University of Manchester Institute of Science and Technology
1987: Order of Merit, Polish People's Republic
1988: Gold Medal, Czechoslovak Academy of Sciences

His scientific research activities centred on the following fields: radioactivity, nuclear physics, radiation physics, and radiation biology. Especially noteworthy were his discovery of inelastic scattering of neutrons (1934), discovery of emission of neutrons at fission (1939) and discovery of spontaneous fission of uranium (1940).

In Pugwash his main areas of concern are: problems related to the social responsibility of scientists; nuclear disarmament; nuclear energy and proliferation of nuclear weapons; radiation hazards; consequences of nuclear war; and the history of Pugwash. His writings comprise over 200 articles on science and disarmament, and 18 books.

Secretary-General elect FRANCESCO CALOGERO

Born 6 February 1935 in Fiesole, Italy.

Graduated ("laurea in fisica") cum laude in Rome, February 1958. Has been associated since then with the Department of Physics of Rome University, except for the period of his military service (1959-1960) and various visits abroad.

Present position (since 1976): Professor of Theoretical Physics, Physics Department, University of Rome I ("La Sapienza").

Represents Italy in the Commission for Mathematical Physics of the International Union of Pure and Applied Physics (IUPAP). Member of the Societa' Italiana di Fisica (SIF), the American Physical Society (APS), the Unione Matematica Italiana (UMI), the American Mathematical Society (AMS), the International Association of Mathematical Physics (IAMP).

His scientific research activity has focused on the following fields: quantum field theory (mainly 1958-61); scattering theory (mainly 1961-67); nuclear many-body problem (1967-75); solvable dynamical systems (1971-); integrable nonlinear evolutions PDEs (1975-); special functions (1977-); matrix representations of the differential operator

and related results on notable matrices, polynomials and singular integral equations (1979-); techniques for the numerical computation of the eigenvalues of differential operators (1983-).

The scientific publications include about 190 articles published in international journals, two written books, and two edited books.

Has been interested in arms control and disarmament since 1963. Much of his activity in this field has been conducted in the framework of the Pugwash Conferences on Science and World Affairs. Has been one of the initiators, and continues to be one of the organizers, of the International School on Disarmament and Research on Conflicts (ISODARCO), that has organized every second summer since 1966 a course (in English) in Italy, and is now expanding this activity (in 1988 Beijing, China). Has been one of the initiators of the Italian Union of Scientists for Disarmament (USPID).

At present serves on the Pugwash Council and Executive Committee, on the Governing Board of SIPRI, on the Scientific Council of USPID, and on the Committee on International Security and Arms Control (SICA) of the Accademia dei Lincei. Member of the Arms Control Association (ACA) and of the Federation of American Scientists (FAS).

He has published over 160 articles and coedited a book on arms control and disarmament topics.

An Appeal on Behalf of Mordechai Vanunu

The vast arsenal of nuclear weapons in the world is a continuous threat to the survival of life on the planet.

Over the years, many peoples of conscience have sought to arouse world opinion to the grave danger posed to humanity by expanding nuclear weapons systems and their introduction to new arenas of conflict.

As early as 1946, Albert Einstein appealed to humanity to place ahead of every consideration the moral imperative of active opposition to the imminent prospect of annihilation presented by the stockpiling of nuclear weapons, their delivery system and the willingness of governments to threaten their use.

"Henceforth," wrote Einstein in 1946, "every nation's foreign policy must be judged at every point by one consideration: does it lead to a world of law and order, or does it lead back toward anarchy and death? When humanity holds in its hand the weapon with which it can commit suicide, I believe that to put more power into the gun is to increase the probability of disaster."

Citing Bernard Baruch's declaration that the problem is not one of physics but of ethics, Albert Einstein stated in 1946, "In all negotiations, whether over Spain, Argentina or Palestine, so long as we rely on the threat of military power, we are attempting to use old methods in a world which is changed forever."

Albert Einstein urged scientists to carry these truths "to the village square." He summoned people of conscience to speak out no matter the magnitude of personal risk and concluded with the words:

When we are clear in heart and

mind - only then shall we find courage to surmount the fear which haunts the world.

The Einstein declaration was taken up by the Emergency Committee of Atomic Scientists and signed by Linus Pauling, Harold Urey, Hans Bethe, Selig Hecht, Philip Morse, Thorfin Hogness, Leo Szilard and Victor Weisskopf.

By 1955, fifty-two Nobel Laureates added their voices in the Mainau Declaration, urging all "scientists of different political persuations," to speak out against the "horror that this very science is giving to mankind the means to destroy itself," If nations, the Nobel Laureates warned, did not heed the moral imperative to renounce such weapons and their use, "they will cease to exist."

Men and women of science have, over the years, responded to a moral imperative, aware that they occupied a unique position as creators of knowledge which had enabled governments to forge weapons of mass murder.

Albert Schweitzer, in his Declaration of Conscience, said in 1957 to the Nobel Peace Prize Committee in Oslo, "A public opinion of this kind stands in no need of plebiscites...to express itself. It works through just being there... The end of further experiments with atom bombs would be like the early sunrays of hope which suffering humanity is longing for."

In this same spirit, ninety-five Fellows of the Royal Society and thirty-six Nobel Laureates from twelve countries were among the 9235 scientists from around the world who signed the petition to the United Nations initiated by Linus Pauling, opposing the testing of weapons of mass destruction.

For over forty years, men and women of conscience have been stirred by the knowledge that the prospect of nuclear annihilation poses a moral imperative transcending lesser loyalties. Resistance to great evil, even when sanctioned by governmental authority, is its own justification. It is also the prerequisite to social advance.

The crime of Mordechai Vanunu is that he could not, in conscience, maintain silence about a program of nuclear weapons in his country and he spoke of this to a major newspaper. He was responding, in part, to the words of Bertrand Russell and Albert Einstein when they wrote:

> We appeal as human beings to human beings: remember your humanity and forget the rest. If you can do so, the way lies open to a new paradise. If you cannot, there lies before you the risk of universal death.

We appeal to the Israeli court to recognize that Mordechai Vanunu is a man of conscience, deeply disturbed by his role in a nuclear weapons program, who first sought religious guidance and then decided to make public his concerns.

However the court may view a citizen's responsibility to the state, this act - of making public the reality of Israel's nuclear program - deserves the court's understanding and its perception of a moral imperative seized by acknowledging the lonely courage of Mordechai Vanunu, who has acted from considerations of conscience.

We urge you to consider our appeal.

Hannes Alfvén, Edoardo Amaldi, Paul Beeson, Hans Bethe, Owen Chamberlain, Subrahmanyan Chandrasekhar, Ragnar Granit, Robert Hinde, Dorothy Hodgkin, Thomas Kibble, S.E. Luria, Philip Morrison, Linus Pauling, Rudolf Peierls, Francis Perrin, John Polanyi, Edward Purcell, Carl Sagan, Abdus Salam, Frederick Sanger, Roger Sperry, Nicolaas Tinbergen, Charles Townes, George Wald, Victor Weisskopf, Torsten Wiesel, Maurice Wilkins.

OBITUARIES

Miguel Wionczek (1918-1988)

Dr. Miguel Wionczek, a member of the Pugwash Council, died on 23 June 1988 a few days after he underwent an operation. Dr. Wionczek served for many years as a member of the Pugwash Council and Executive Committee and was the organizer of the 29th Conference held in Mexico City in 1979.

Wionczek was born in Poland and emigrated to Mexico in the 1950s. He was a renowned economist and served the Mexican Government for several years as a principal adviser on energy questions. He was an ardent proponent of the importance of Third World issues in the programme and activities of Pugwash. Wionczek was a devoted and active participant in many Pugwash Conferences, Symposia and Workshops, and his colleagues respected him highly for his wide-ranging knowledge of politics and economics. He will be greatly missed.

Øle Maaløe (1914-1988)

Professor Øle Maaløe, a former member of the Pugwash Continuing Committee (later termed Council), died in Copenhagen in June 1988. He was a founder and leading member of the Danish Pugwash Group and remained active and interested in Pugwash affairs to the end of his life. He attended many Pugwash meetings, the latest of which was the 36th Pugwash Conference held in Budapest in 1986.

Professor Maaløe was a world-renowned molecular biologist and friend of Niels Bohr whom he regularly briefed on advances in biological science. He was a founder of the European Molecular Biology Organization. He was a kind, friendly and cooperative person with abiding concerns about social injustices and the arms race.

CALENDAR OF FUTURE PUGWASH MEETINGS

1988

29 August - 3 September	38th Pugwash Conference: "Global Problems and Common Security", Dagomys (near Sochi), USSR.
17-20 October	53rd Pugwash Symposium: "Peace and Security in the Asian-Pacific Region", Beijing, China.
11-13 November	7th Workshop of the Pugwash Study Group on "Conventional Forces in Europe", Amsterdam, Netherlands.
29-30 November	Seminar, "Pugwash: Shaping Its Future" London, UK.

1989

January (tentative)	14th Pugwash Workshop on Chemical Warfare, Geneva, Switzerland.
17-19 February	54th Pugwash Symposium: "Science, the Media and World Affairs", Brussels, Belgium.
March	Workshop on "Non-Military Dimensions of Global Security", India.
6-7 May	55th Pugwash Symposium: "Non-Proliferation and the Non-Proliferation Treaty", Dublin, Ireland.
3-4 June	17th Workshop of the Pugwash Study Group on Nuclear Forces, Geneva, Switzerland.
July	Second Workshop on Accidental Nuclear War: "Psychological Aspects", Pugwash, Nova Scotia, Canada.
July	39th Pugwash Conference, Cambridge, MA, USA.
October (tentative)	8th Workshop of the Pugwash Study Group on "Conventional Forces in Europe".

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