

May 1979 Volume 16 No. 4

Pugwash Newsletter

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

ARE WE HEARD ?

At least "sometimes". Although an equivocal answer, it is not a negligible accomplishment when hearing aids tend to be turned off by decision-makers who deal with the momentous questions with which we are concerned.

The persistent question is again posed - and answered - because of views expressed to the Newsletter by various correspondents that our laborious efforts to formulate official Pugwash statements for United Nations' conferences suffer the fate of an eye-dropper of words in the flood of paper that engulfs such meetings. What, it is asked, happens to our formal statements submitted to such meetings as the United Nations Special Session on Disarmament (UNSSOD) last year, the United Nations Conference on Science and Technology for Development (UNCSTD) to be held in August this year, and the preparations now underway for the UN review conferences on the Non-Proliferation Treaty (NPT) and the Biological Warfare (BW) Convention next year.

For UNSSOD it is too early to answer concerning results from our submissions on nuclear-free zones and on chemical warfare (see Newsletter of May 1978). For NPT and BW we are proceeding on the basis that we are carrying out our function of pinpointing the weak spots and prodding for corrective measures.

For UNCSTD we can already claim encouraging results. The Pugwash Guidelines for International Scientific Cooperation for Development, (see Newsletter, January 1979) have had considerable impact. The Fourth Preparatory Committee of UNCSTD has just concluded its meeting in New York and many of the recommendations made in the Pugwash Guidelines have been incorporated in the Draft Programme for Action adopted by the Group of 77 (developing countries). This Draft Programme is now being negotiated between official delegates of the developing and developed countries, and negotiations will continue at the Fifth Preparatory Committee meeting in late June and at the Conference itself in August. It is very likely that a goodly number of the Pugwash principles advanced in the Guidelines will survive the negotiating process because of the recognition given to their validity not only by the Group of 77, but also by several major UN agencies, representatives of some developed countries and even of trans-national corporations who have corresponded with us on the subject.

The second Pugwash contribution, transmitted only recently, to UNCSTD, is the statement on Disarmament and Development (see p. 93 of this Newsletter), a draft which was prepared at a Pugwash Workshop held in Baden, Austria on March 19-21, and completed by the Executive Committee which met in Baden immediately afterwards.

* * * *

The Austrian Pugwash Group was host to the meetings in Baden. Otto Hoffmann-Ostenhof was in charge of local arrangements and provided excellent facilities in Baden, which was the site of two previous Pugwash meetings (the Fourth Conference in 1959, and the Twenty-fourth Conference in 1974). Minister of Science and Research Hertha Firnberg gave a reception for the Workshop and the Austrian Pugwash Group, and emphasized the great value the Austrian Government placed upon the work of Pugwash.

Our other recent activities included the Helsinki Symposium on "Impact of Current Political Developments and Arms Control Efforts on European Security", April 21-23 (see p. 96 of this Newsletter). Foreign Minister Paavo Väyrynen opened the meeting which was of a high technical level, and marked the continuing preoccupation of Pugwash with problems

of European security, especially with reference to developments in arms technology. Jorma Miettinen and the Finnish Pugwash Group assured the smooth functioning of the meeting which received considerable local publicity in the newspapers and on TV.

The Executive Committee in March covered many items. The Committee devoted considerable attention to the forthcoming Mexico Conference, including the pre-Conference Council session, and reviewed future meetings (see Calendar p.119). Mexican Ambassador Gonzales de Leon and Miguel Wionczek reviewed the careful preparations being made in Mexico City for the Conference, which promises a fine blend of serious work and Latin American hospitality.

We can look forward to the Mexico Conference for a discussion on whether our voices are being sufficiently heard, and how we can increase our impact.

M. M. Kaplan

PUGWASH WORKSHOP ON DISARMAMENT AND DEVELOPMENT :
IMPLICATIONS OF THE ARMS RACE AND DISARMAMENT ON DEVELOPMENT

Baden, 21-23 March 1979

Participants

Professor U. Albrecht

Duisburger Str. 17, D-1000 Berlin 15, F.R.G.

Dr. N. Behar

ul Iskar 16, 1000 Sofia, Bulgaria.

Mr. A. Boserup

Onsgaardsvej 13, DK-2900 Hellerup, Denmark.

Prof. F. Calogero

Via Sant 'Alberto Magno 1, 00153 Roma, Italy.

Mr. J. van Ettinger

Foundation Reshaping the International Order, P.O. Box 299, Rotterdam, Netherlands.

Prof. B.T. Feld

42 Arlington Street, Cambridge, Massachusetts 02140, U.S.A.

Dr. E.E. Galal

4, A. Hishmat St., Zamalek-Cairo, Egypt.

Dr. J. Handler

11A Avenue de la Paix, Geneva, Switzerland.

Prof. Dorothy Hodgkin

Crab Mill, Ilmington, Shipston-on-Stour, Warwickshire, U.K.

Prof. O. Hoffmann-Ostenhof

Institut f. Allgemeine Biochemie der Universität Wien, Währinger Strasse 38,
A-1090 Wien, Austria.

- Ms. Mary Kaldor
Science Policy Research Unit, University of Sussex, Falmer, Brighton, U.K.
- Dr. M.M. Kaplan
11A Avenue de la Paix, 1202 Geneva, Switzerland.
- Dr. R. Kothari
Centre for the Study of Developing Societies, 29 Rajpur Rd., Delhi 54, India.
- Ms. Signe Landgren-Bäckstrom
S.I.P.R.I., Sveavagen 166, 113 46 Stockholm, Sweden.
- Dr. P. Markl
Institut f. Analytische Chemie der Universität, Währinger Strasse 38, A-1090 Wien, Austria.
- Acad. M.A. Markov
Academy of Sciences, Leninsky Prospekt 14, Moscow V-71, U.S.S.R.
- Dr. E. März
Schottenring 23/12a, A-1010 Wien, Austria.
- Prof. M. Nalecz
Palac Kultury i Nauki, p. 2318, Warsaw, Poland.
- Dr. V. Rabinowitch
8606 Battailles Court, Annandale, Virginia 22003, U.S.A.
- Prof. B.A. Röling
Rijksstraatweg 76, P.O. Box 121, Haren (Gron.), Netherlands.
- Prof. J. Rotblat
8 Asmara Road, London NW2 3ST, U.K.
- Prof. V.G. Trukhanovsky
Medvedeva St. 12, Flat 31, Moscow K6, U.S.S.R.
- Ms. L. Waldheim-Natural
U.N. Disarmament Centre, Geneva, Switzerland.
- Dr. M.S. Wionczek
El Colegio de Mexico, Camino Al Ajusco No.20, Mexico 20, D.F., Mexico.

Agenda

1. Socio-Economic Implications
 - (a) Global expenditure on armaments
 - (b) Impact on economic growth
 - (c) Impact on human and natural resources
 - (d) Implications to trade and international economic relations
 - (e) Effect on national social, economic, cultural and other natural infrastructures.

2. Political Implications
 - (a) National and regional security
 - (b) Outside interference and power politics
 - (c) Right of self-determination and self-reliant development
 - (d) Freedom for internal political evolution and democracy
3. Constraints and Remedies
 - (a) Global strategic considerations
 - (b) Foreign alliances and bases
 - (c) Nuclear proliferation
 - (d) Arms Sales and Transfers of Military Technology
 - (e) Possibility of regional cooperation in maintenance of security and furthering economic development
 - (f) Mounting transfer of advanced weapon systems to conflict areas in the developing world
 - (g) Regional disputes
 - (h) Lack of international guarantee and security alternatives
 - (i) Impact on the economies of the industrialized countries.

Papers Presented to the Workshop

| | |
|-------------------------------------|--|
| U. Albrecht | Third World Selection of Military Technology in Hindsight. |
| N. Behar | Disarmament and Economic Growth in Developing Countries : A Systems Approach. |
| A. Boserup | Considerations on the Financial Linkage: An Alternative to Current Proposals. |
| G. Chichilnisky | Disarmament in the Context of the International Economic Order (Background paper - taken from RIO document). |
| M. Elmandjra & O. Hoffmann-Ostenhof | Draft Statement on Disarmament and Development. |
| E. E. Galal | The Socio-Economic Impact of the Arms Race. |
| O. Hoffmann-Ostenhof | The Armament Race and the New International Economic Order. |
| Mary Kaldor | Disarmament and Development: The Main Issues. |
| Signe Landgren-Bäckstrom | World Arms Production. World Arms Trade (Background paper - extract from SIPRI Yearbook on World Armaments and Disarmament, 1979). |
| P. Lock | Some Hypotheses Why the Military Burden and the Growth of Destructive Capacity are Generally Underestimated. |
| E. Marz | The Impact of Military Expenditure on Economic Development. |
| RIO paper | Science and Technology for Development and Disarmament. |
| (Reshaping International Order) | |
| B. A. Röling | Conclusions concerning the Process of Development and the Achievement of Development (Background paper taken from RIO document). |

Requests for copies of papers should be addressed to the author.

Report

The Workshop prepared a report which was submitted to the Executive Committee. After minor amendments this report was accepted as a Pugwash Statement (see p.93).

STATEMENT FROM THE PUGWASH EXECUTIVE COMMITTEE ON
MILITARY TECHNOLOGY, DISARMAMENT AND DEVELOPMENT

Foreword

For many years Pugwash has been concerned with the inter-relationships of disarmament and development. Much has been written on the economic and social consequences of the arms race and military expenditures, for example the United Nations report on that subject updated in 1978. The Pugwash Council and its Executive Committee, however, considered it would be useful to prepare a brief consideration of the subject specially designed for the United Nations Conference on Science and Technology for Development (UNCSTD) to be held in Vienna, August 1979.

A Pugwash Workshop on Disarmament and Development was held in Baden, Austria, for this purpose in March 1979 and was attended by 24 scientists from 15 countries, including representatives from the United Nations Disarmament Centre, the Stockholm International Peace Research Institute (SIPRI) and the Foundation for Reshaping the International Order (RIO). The Pugwash Executive Committee, greatly appreciative of their work, submits the following statement to UNCSTD with the hope that concrete action will be taken on the outlined proposals.

Introduction

In many cases, armaments and military technology are the dominant form of scientific and technical cooperation between rich and poor nations. An effective programme of action for science and technology for development cannot be elaborated in ignorance of this fact. Moreover, the continued arms race, with its massive diversion of scientific and technological resources and its distortion of the direction in which science and technology are moving, is perhaps the single most important obstacle to development. The magnitude of the problem is illustrated by the following facts:

- Total world military spending amounts to approximately \$400 billion a year; this is greater than world expenditure on health or education and equivalent to two thirds of the aggregate gross national products of those countries which together comprise the poorest half of the world's population.
- Total world military R & D spending is \$25 billion a year and more than 400,000 scientists and engineers work on armaments. This represents 40% of the world's total R & D resources and 25% of the world's scientific and technical manpower.
- Total world arms trade with developing countries exceeds \$ 8 billion. Total arms production is many times larger.
- Since 1945, almost all wars have been fought in developing countries, with weapons and sometimes manpower imported from advanced industrial countries. These wars are estimated to have resulted in over 25 million casualties and untold social, economic and ecological dislocation.

* * * *

The military application of science and technology is deeply embedded in prevailing economic, social and political structures. This is a phenomenon with far-reaching

implications which affect the whole world. Those implications which concern primarily the terms of reference of UNCSTD include the following:

1. Distortion of Science and Technology

Military R & D represents a diversion of scientific and technical resources away from civil R & D. The immense potential available if resources currently devoted to military purposes were transferred to socially useful purposes might drastically change the prospects of development in the next decades. This evident truth is confirmed by the fact that even military R & D does result in some civilian benefits, although of course minor (since they appear as secondary "spin-offs") and distorted. Indeed, the pervasive influence of the military in all kinds of R & D spending has unduly oriented civilian development towards highly complex and capital-intensive types of technology. For example, resources are devoted to such things as supersonic transport aircraft or to nuclear energy instead of cheaper forms of transport or alternative and less hazardous forms of energy and energy conservation.

The particularly deleterious effect of the arms race on the use and transfer of science and technology is best illustrated by a series of dual purpose technologies, i.e. technologies that can be used for both civil and military purposes. The impediments against the diffusion of nuclear energy technology for peaceful uses is a case in point. A variety of other technologies could have important uses for development tasks but are often prevented from this by considerations of military secrecy. There is scope for international regulation in this area.

2. Slow-down of economic growth

In advanced industrial countries, military spending absorbs resources that would otherwise be used for investment, and the military application of science and technology slows down productivity growth. This could be one reason why among developed market economies the most successful are Germany and Japan, which are the lowest military spenders. Among developed centrally planned economies, the fastest growing appear to be Bulgaria, Hungary and Poland, which are also the lowest military spenders.

3. Distortion of Development Strategies

In developing countries, weapons and military equipment are, for the most part, imported. Even third world countries that are attempting to develop an indigenous armaments industry are heavily dependent on foreign technology, foreign capital equipment, components and material and, in the process, using up much needed import capacity on unproductive activities. Both cases - imports or production - tend to foster a capital-intensive pattern of industrialization, through their influence and demands on infrastructure, skills and values. It is a pattern which entails an unequal distribution of income, growing indebtedness or increased export of primary products and a drainage of resources from countryside to town. In sum, the use and transfer of technology for military purposes further incorporates third world countries into a world economic system which primarily benefits advanced industrial countries.

4. The Growth of Militarism

In advanced industrial countries military technology is the link between various institutions such as the R & D establishments, the armaments manufacturers, and the armed forces, that together are often referred to as the Military Industrial Complex and have a powerful political influence.

The transfer of military technology to developing countries creates, so to speak,

subsidiaries of the military industrial complex.

Programme of Action

A programme of action to limit and eventually eliminate the military application of science and technology would not automatically remove all obstacles to development. Rather, progress towards the diminution of poverty and injustice could pave the way for a reorientation of science and technology to socially useful purposes because it would alleviate some of the causes of conflict in developing countries, and some of the incentives for interventionist policies of the major powers. The two goals, reversal of the trend towards ever increasing military technology with the ultimate aim of achieving genuine disarmament on the one hand, and effective progress towards economic and social development on the other, should be viewed as interlinked processes, which, once set in motion, would reinforce each other.

A programme of action to redirect the application of science and technology to peaceful purposes and thus contribute to the establishment of the New International Economic Order, could include the following steps:

1. An investigation of the specific effects of the military application of science and technology on civilian and particularly developmental tasks, and the extent of possible distortions thereof, with a view to enhancing understanding of the implications of military technology. Such studies could examine the influence of military technology on diverse areas like energy, transportation, manufacturing, agriculture, health and education.
2. An investigation as to the ways in which the present practices of transfer of arms and military technology - contribution to, and often intensifying, the arms race, in perpetuating the waste of R & D resources and in increasing global insecurity - can be constrained by international control, for instance through a code of conduct.
3. A tax on military expenditure in all countries, which would be pooled centrally and used for development purposes. This may be more acceptable than the as yet unsuccessful proposals for reducing military expenditures and using some of the funds saved for development purposes, in that it would not interfere with the ability of states to assure their defence as provided for in the United Nations Charter, but would simply raise the cost of military spending equally for all, and provide much needed resources for development. It could be based initially on voluntary assessments but eventually it should be applied in a more institutionalized manner that is obligatory for all nations.
4. International conversion projects whereby scientists and engineers, as well as development and production facilities, are transferred from militarily-oriented programmes, in order to solve urgent problems of civilian relevance particularly important for developing countries. Such conversion should not be conceived merely as a problem which would follow disarmament but instead as a positive impulse for disarmament. This is because it would reduce the pressure to create spurious military demands in order to fill excess capacity in armament industries in advanced industrial countries.
5. An international programme of conversion linking armament manufacturing capacity to the satisfaction of genuine needs. There have been proposals by trades unionists in the defence sector to invest in socially useful production as an alternative to arm-

ament and to increasing unemployment. These range from new transport systems on road, rail, or canal; energy conserving equipment or alternative energy systems, based on renewable energy sources like waves, wind, tides, or direct solar collection; medical systems like sight for the blind using radar; as well as ideas for improving the process of production in agriculture, mining and manufacturing. The preparation of detailed plans for the conversion of arms industries on an international scale to production in areas such as these would provide strong incentives for disarmament leading directly to development.

* * * * *

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

Thirty-Third Pugwash Symposium

IMPACT OF CURRENT POLITICAL DEVELOPMENTS AND ARMS CONTROL
EFFORTS ON EUROPEAN SECURITY

Helsinki, Finland, 19-21 April 1979

Agenda

1. Impact of Political Developments
 - a. Influence of the Conferences on Security and Cooperation in Europe (CSCE) (Helsinki, Belgrade) on the continuance of détente.
 - b. Making measures of military détente possible through political détente.
 - c. Influence of areas which have become strategically important to the security of Europe (e.g., Arctic Ocean, Barents Sea, Northern Atlantic, Mediterranean).
 - d. Reflection of exo-European crises on Europe (e.g., Middle East, Asia, Africa, Persian Gulf - Indian Ocean).
 - e. Europe as part of a global security system.

2. Impact of Arms Control Developments
 - a. SALT II and III.
 - b. Nuclear weapons of the "gray area" between SALT and Mutual Force Reductions (MFR).
 - c. Vienna negotiations.
 - d. Confidence Building Measures (CBMs) at the CSCE.
 - e. European arms control in global disarmament efforts.
 - f. Obstacles to disarmament and measures to remove them.

Participants

- Professor G. von Bonsdorff
University of Helsinki, Vuorikatu 3, 00100 Helsinki 10, Finland.
- Dr. H.G. Brauch
Institut für Politische Wissenschaft an der Universität Heidelberg, Alte-Gergsteige 47,
D-6950 Mosbach, F.R.G.
- Professor B. Broms
Puistokatu 5, 00140 Helsinki 14, Finland.
- Dr. S. Brown
Dept. of Politics, Brandeis University, Waltham, Mass. 02154, U.S.A.
- Dr. D. Carlton
Polytechnic of North London, Dept. of History, Prince of Wales Rd., London NW5, U.K.
- Professor W.F. Gutteridge
The University of Aston in Birmingham, Gosta Green, Birmingham B4 7ET.
- Lt. Gen. T. Huitfeldt
FKN, Postboks 357, 8001 Dodø, Norway.
- Dr. P.O. Järvenpää
Institute of Military Science, Maurinkatu 1, 00170 Helsinki 17, Finland.
- Professor C.G. Jacobsen
Dept. of History, Acadia University, Wolfville, N.S., BOP IXO, Canada.
- Dr. M.M. Kaplan
11A Avenue de la Paix, 1202 Geneva, Switzerland.
- Dr. A. Karkoszka
SIPRI, Sveavägen 166, S-113 46 Stockholm, Sweden.
- Dr. U.A. Kostko
Academy of Sciences of the USSR, Leninsky Prospekt 14, Moscow V-71, U.S.S.R.
- Dr. V. Krestianov
Academy of Sciences of the USSR, Leninsky Prospekt 14, Moscow V-71, U.S.S.R.
- Dr. S. Lodgaard
Peace Research Institute, Radhusgata 4, Oslo 1, Norway.
- Professor J.K. Miettinen
University of Helsinki, Unioninkatu 35, 00170 Helsinki 17, Finland.
- Mr. K. Møttölä
The Finnish Institute of International Affairs, Dagmarinkatu 8C40, 00100 Helsinki 10,
Finland.
- Dr. W. Multan
Palac Kultury in Nauki, p. 2318, Warsaw, Poland.
- Dr. J. Prawitz
Dept. of Defence, Försvarsdepartementet, Fack, 10320 Stockholm, Sweden.

Dr. K. Ruhala

Institute of Military Science, Maurinkatu 1, 00170 Helsinki 17, Finland.

Professor M. Schmidt

Institute für Internationale Politik und Wirtschaft, Breite Strasse 11, 102 Berlin, G.D.R.

Dr. I. Susiluoto

Tunturikatu 3 as 2, 00100 Helsinki 10, Finland.

Professor R. Väyrynen

Institute of Political Science, University of Helsinki, Vuorikatu 3, SF-00100 Helsinki 10, Finland.

Dr. R. Vukadinovic

Faculty of Political Sciences, University of Zagreb, Yugoslavia.

List of Papers

| | |
|------------------------------|---|
| Finnish Organizing Committee | Background paper on Impact of Current Political and Arms Control Developments on Security in Europe. |
| G. von Bonsdorff | Europe as Part of Global Security Systems. |
| B. Broms | The Neutralization and Demilitarization of Svalbard. |
| H.G. Brauch | Gray Area Systems and Problems of European Security |
| H.G. Brauch | Nuclear Weapons of the "Gray Area" between SALT and M(B)FR and Problems of European Security. |
| D. Carlton | Potential Threats to European Stability. |
| W.F. Gutteridge | The Impact of Current Development in Southern Africa on International Security and Cooperation generally and in Europe in particular. |
| C.G. Jacobsen | The "Central Balance" in the 1980s - No Longer Central? |
| P.O. Järvenpää and K. Ruhala | Arms Control in Northern Europe: Some Thoughts on a Nordic Nuclear-Free Zone. |
| A. Karkoszka | Implications of New Conventional Technologies. |
| W. Multan | Impact of Current Political and Arms Control Developments on Security in Europe. |
| K. Möttölä | The Grey Area Systems and the Future of Détente. |
| K. Ruhala | Naval Confidence-Building Measures (CBMs) in the Baltic. |
| R. Vukadinovic | The Outlook for Mediterranean Security. |
| P. Väyrynen | Opening address |
| R. Väyrynen | Zbigniew Brzezinski's Thinking on European Security. |

Requests for copies of papers should be addressed to the author.

Report

SALT

The importance of the SALT negotiations for European security was widely recognized. The expected signature of SALT II was particularly in the minds of participants, as were the prospects for ratification.

It was noted that an important part of the emerging SALT II agreement will be the joint Statement of Principles that will set the stage for the next round of negotiations. The maintenance of strategic stability will clearly be a principal goal. In this context concern was expressed about the possibility of technological innovation that may lead to the reality or even appearance of destabilization.

Much attention was paid to those technologies that have led to the development of more accurate missiles. Some participants suggested that in SALT III the phasing-out of land-based missile systems should be considered. There was, however, no consensus on that question. A difficulty is the asymmetry between the strategic force structures of the Soviet Union and the United States. It was also pointed out by several participants that the degree of ICBM vulnerability should not be exaggerated. Severe disincentives to a first-strike attack remain. Others stressed that perception of a serious threat to the survivability of the ICBM-forces in itself is an important factor: the perception might be politically utilizable by those who favour initiation of new weapons programmes to secure land-based missile survivability, but it was also pointed out that if land-based missiles should be de-emphasized, measures to enhance the invulnerability of strategic nuclear submarines should have high priority.

The view was expressed that because of the threat perception, a promising approach in future SALT talks might be to try to control the first-strike mission. It was doubted, however, by some of the participants, whether it would be possible to control accuracy improvements in such a way that the possible restrictions could be adequately verified.

GRAY AREA SYSTEMS

Gray area systems reflect incompatibilities between rapid technological change and the formal criteria of existing arms control negotiations. They comprise a wide range of multi-purpose and multi-mission systems that can be used both in an offensive and defensive mode, that is for theatre tactical and theatre strategic roles with both nuclear and conventional warheads (dual capable systems). No agreement could be reached among the participants on a precise definition of the gray area.

Special concern about the implications of present and future gray area systems is warranted for the following reasons:

- SALT in the view of some West Europeans neutralizes the strategic capabilities, and magnifies the significance of the disparities in the theatre nuclear regime.
- It was stated that the SALT process has rechannelled weapons modernization to areas not covered by the negotiations. Modernization of theatre nuclear forces (TNF) has been and probably will be part of the domestic political price to make SALT agreements acceptable.

The assessment of TNF capabilities is based exclusively on Western sources. Some participants referred to the hypothetical nature of these figures while others stressed the need for the publication of detailed data on the systems concerned. Various participants pointed to the overall negative political impact of the deployment of new long range TNF in Europe and on the overall prospects for détente if arms control efforts should fail.

Participants agreed that the gray area systems should be dealt with in an arms control framework, but expressed different suggestions as to how this should be done. The following alternatives were discussed: SALT III, a separate forum for theatre arms limitation talks (TALT), the Vienna talks, and other high level discussions between the US and the USSR.

Some participants argued that several gray area systems could be dealt with at SALT III. It was suggested that the inclusion of these systems in SALT III may dramatize existing disparities and therefore provide legitimacy for a limited levelling up. The various views advanced included: a comprehensive approach to the whole substrategic balance in a separate forum (TALT) which might be preferable; unilateral self-restraint by the major countries concerned, e.g. public statements indicating that one country would not deploy more than a certain number of gray area systems; the SS-20 should become the primary candidate for unilateral self-restraint; a return to the idea of disengagement. Concrete steps in military détente could open up potential for political and functional cooperation in various fields (e.g., economic, cultural) to be implemented on their own merits.

It was suggested that Pugwash should set up a working group on theatre nuclear systems and on questions of regional security in Europe.

NORDIC SECURITY

This was discussed with special emphasis on nuclear-free zone (NFZ) possibilities. The growing strategic importance of the Northern areas were seen to be due to a number of factors:

- the growth of naval potentials, especially submarines and SLBMs
- surveillance and early warning systems
- new technological developments that make use of the Arctic possible in military as well as in economic respects.

These developments have an impact on the security calculations of the Nordic countries. Different approaches to increasing security were proposed which included a Nordic NFZ and confidence-building measures in the Baltic.

The special features of the Northern "security equation" were considered, especially the nuclear option of Norway and Denmark and the strategic weight of the Kola peninsula for the Soviet Union.

At least three different approaches to the Nordic NFZ were presented:

1. Individual countries could declare themselves nuclear-free, for example as suggested in the Draft Treaty presented by Pugwash in the Special Session on Disarmament in 1978.
2. A second possibility forwarded by some participants was a joint Nordic initiative in the form of a multilateral agreement or commitment to maintain and strengthen the existing non-nuclear weapon status of the Nordic area.
3. Some participants advocated a wider zonal agreement involving Scandinavian countries and also other states. One participant argued that this approach should include the withdrawal of nuclear weapons geographically close to the zone, notably those with limited delivery ranges making them generally suitable for attacking targets within the zone.

IMPACT OF DEVELOPMENTS OUTSIDE EUROPE

Consideration was also given to some of the ways in which developments in the rest of the world are now affecting European security and steps towards arms control and disarmament.

The oil crisis of 1973 and the general debate on "limits to growth" have alerted not only governments but public opinion to the ultimately finite nature of the world's resources.

The roles of industrialized nations in different parts of the world, their relationships with each other and with less developed countries, are now influenced by the growing competition for resources - energy supply, food and mineral raw materials.

Events in Iran have recently highlighted this aspect and there is concern about the future stability of other countries with oil and other resources. The situation in Southern Africa is proving particularly important in this respect because Western European countries are heavily dependent upon imported mineral raw materials. The United States and Japan are also affected. They are concerned that political developments may deprive them of access to supplies of materials such as vanadium, chrome, platinum and manganese and also facilitate interference with their lines of communication to and from the major oil production areas. Some participants felt that this was a factor which might seriously affect attitudes to arms control and disarmament, even SALT III.

The African peoples of the region must be involved in any approach to these problems and their desire for political independence taken fully into account, as well as the development of a new world economic order. The prevention of conflict arising from competition for scarce resources requires a comprehensive and rational approach respecting the interests of both producers and consumers. The development of understandings and conventions with regard to this and the role of foreign intervention is necessary. The definitions of legitimate and illegitimate actions already evolved within the UN are not enough in themselves for confidence-building purposes. Similar problems are apparent in the Middle East. In spite of an attempted coordination amongst NATO and EEC countries of policies towards the oil producing countries, there is a tendency for the fragmentation of relationships with the region. This cuts across the East-West basis for relationships within Europe and raises the question as to whether SALT and other negotiations may need in future to be on a multi-lateral basis. This would, however, make formal agreements or treaties even more difficult to achieve.

The role of China in the Far East also reflects in a different way back upon US-USSR relations and on East-West relations in Europe. While the prospects of a major conflict there may be relatively remote, and Soviet commitment to arms control and disarmament measures not affected, exploitation by NATO countries of a Chinese connection could well prove counterproductive for détente in Europe.

In general the importance of US-USSR negotiations and the significance of the strictly European aspects of European security was re-emphasized. Competition and rivalry in one form or other in areas outside Europe will, however, be in no one's interest: even tacit agreements about the limits and objectives of intervention in non-European areas would go some way towards alleviating apprehensions. In this connection, however, it was suggested by some participants that confidence-building measures relating to notification of movements of naval squadrons outside territorial waters may be particularly valuable. These would need monitoring by some form of UN peace-keeping force.

CONFIDENCE-BUILDING MEASURES (CBM)

Two aspects of CBMs were discussed, the first pertaining to military movements and the second to cultural, economic and scientific cooperation.

Prior notification of military exercises is useful in avoiding misinterpretation of their possible aggressive intent, particularly with respect to large scale manoeuvres. Also attention was called to the poor impression made on the public when specific enemy targets

are designated with particular weapons accordingly deployed.

Many participants considered as even more important CBMs associated with the need for increasing East-West cooperation in the cultural, economic and scientific spheres. The group noted and endorsed the measures for this purpose advanced at the Pugwash Symposium held in Zakopane in April 1978. The hope was expressed that this dimension be given special attention at the meeting on the Helsinki Final Act to be held in Madrid in 1980.

VIENNA MUTUAL BALANCED FORCE REDUCTION (MBFR) NEGOTIATIONS

The group noted with great regret the continued lack of progress in the MBFR talks. Some optimism was expressed that following the signing of SALT II progress could be expected in the Vienna talks.

ENERGY NEEDS, NATURAL RESOURCES

The impacts of energy needs and limited natural resources by various countries have great potential for increasing tension and precipitating conflicts. Since this problem is a highly complex one requiring careful study and analysis, the group recommended that consideration be given for holding a Pugwash symposium or workshop on the subject.

W. F. Gutteridge
J. K. Miettinen

PROFILES OF PUGWASH OFFICERS AND COUNCIL

At the Munich Conference it was suggested that profiles of the members of Pugwash Council should be published in the Newsletter. Members of the Council were asked to answer a questionnaire seeking information on the following items:

1. Field of work
2. Date of birth
3. Education and academic degrees
4. Present position
5. Relevant past positions
6. Professional associations
7. Honours, awards
8. Main line of research
9. Publications.

Profiles of some members of the Council were published in the January 1979 issue of the Newsletter (vol. 16, no. 3). The following are the remaining profiles with the answers to the above points.

DR. MARTIN M. KAPLAN

1. Microbiology and Public Health.
2. 23 June 1915.
3. University of Pennsylvania A. B., V. M. D. (1940), M. P. H. (1942).
4. Director-General, Pugwash Conferences on Science and World Affairs.
5. Staff member of the World Health Organization 1949-1976
Special Scientific Adviser to the Director-General
Director, Office of Science and Technology
Director, Research Promotion and Development
Visiting Professor of Epidemiology and Public Health, University of Pennsylvania, and
Visiting Member, Wistar Institute of Biology 1960, 1965, 1970 (on leave of absence
from W. H. O.).
Distinguished Visiting Professor, University of Wisconsin, 1976-1978.
6. American Association for the Advancement of Science.
7. K. F. Meyer Gold Headed Cane (Epidemiology and Public Health) 1964.
Schofield Memorial Medal, University of Guelph, Ontario 1974.
8. Virology and Epidemiology.
9. Over 100 papers in scientific journals, and 1 book on laboratory techniques.

PROFESSOR GEORGE B. KISTIAKOWSKY

1. Physical Chemistry.
2. 18 November 1900.
3. D. Phil., Berlin 1925.
4. Professor Emeritus, Harvard University.
5. Professor of Chemistry, Harvard University 1938-1971.
President Eisenhower's Assistant for Science and Technology 1959-1961.
6. Member National Academy of Sciences (Vice-President 1965-73).
Member American Academy of Arts and Sciences.
Chairman NAS Committee on Science and Public Policy.
Foreign Member Royal Society.
7. Medal for Merit 1946. Medal of Freedom 1961.
National Medal of Science. 1967. Gibbs Medal 1968.
Priestley Medal 1972. Franklin Medal 1972.
11 Honorary D. Sc. Degrees.
8. Kinetics of Chemical Reactions.
9. Over 200 papers in scientific journals and 2 books.

PROFESSOR EBERHARD LEIBNITZ

1. Chemistry.
2. 31 January 1910.
3. Technical High School Berlin: Eng. Diploma 1932.
Doctor-Eng. 1933.
4. Professor Emeritus.
5. Rector of Technical High School in Merseburg.
Director of several research institutes of Academy of Sciences.

- Chairman of GDR Pugwash Group.
7. National Prize of German Democratic Republic.
Hon. Degree of Doctor of Sciences of Technical High School in Merseburg.
 8. Chemistry of fossil fuels and organic polymers.
 9. Over 500 publications in scientific journals.

ACADEMICIAN MOISSEI ALEXANDROVICH MARKOV

1. Theoretical Physics.
2. 13 May 1908.
4. Secretary Nuclear Physics Section of the USSR Academy of Science.
6. Member of USSR Academy of Sciences (Member of Praesidium).
8. Quantum Electro Dynamics, Theory of Elementary Particles, Neutrino Physics.
9. Several books on Elementary Particles and Nature of Matter and a number of scientific papers.

PROFESSOR JORMA KALERVO MIETTINEN

1. Radiochemistry.
2. 11 August 1921.
3. M.Sc. Helsinki 1948.
Ph.D. Helsinki 1954.
4. Professor of Radiochemistry, University of Helsinki since 1964.
5. Assistant and Project Leader Biochemical Research Institute, Helsinki.
6. Member Finnish Academy of Sciences.
Finnish Defence Research Board. (Chairman 1969-73).
Societas Biochemica Biophysica et Microbiologica Fennica (Chairman 1969-72).
Finland's Delegate at UN General Assembly 1972.
8. Biochemistry, Radiochemistry, Civil Defence, Chemical and Nuclear Disarmament.
9. 185 papers in scientific journals.

PROFESSOR MACIEJ NALECZ

1. Technology.
2. 27 April 1922.
3. M.Sc. Warsaw 1949.
D.Sc. Warsaw 1959.
4. Head of Institute of Biocybernetics and Biomedical Engineering of Polish Academy of Sciences.
5. Director Institute of Automatic Control.
Secretary of Technical Sciences and Chairman of Committee Biomedical Engineering of Academy of Sciences.
6. Member Polish Academy of Sciences (member of Praesidium since 1972).
Chairman Pugwash Council.
Foreign Member USSR Academy of Sciences.
8. Cybernetics and Biomedical Engineering.
9. Many publications and book on Control Components.

MR. ASHOK PARTHASARATHI

1. Electronics, Radiophysics and Science Policy Research.
2. 11 July 1940.
3. B.Sc. (Hons) Madras 1960.
M.Sc. Cambridge 1964.
4. Secretary, Electronics Commission, Government of India, New Delhi.
5. Special Assistant for Science and Technology, Prime Minister's Secretariat, Government of India (1970-1974).
Head, Programme Analysis Group, Department of Atomic Energy, Government of India (1967-1970).
6. Member, Governing Council, International Foundation for Development Alternatives, Geneva.
Member, Executive Committee, Third World Forum.
8. Earlier radio astronomy: currently science and technology policy research.
9. About 30 papers in various journals and books mostly on science and technology policy issues.

ACADEMICIAN OLEG ALEXANDROVICH REUTOV

1. Organic Chemistry.
2. 5 September 1920.
3. Degree of Candidate Moscow University 1948.
Doctor of Chemical Science Moscow University 1953.
4. Professor of Organic Chemistry at the University of Moscow since 1954.
5. Head of Organic Chemistry Laboratory of Organic Elements Institut of Soviet Academy of Sciences.
6. Member Soviet Academy of Sciences.
Vice-President of the Soviet Committee for the Protection of Peace.
8. Chemistry of Organometallic Compounds, Stereochemistry and Mechanisms of Organic Reactions.
9. About 500 papers in scientific journals and 6 books.

PROFESSOR ALEXANDER RICH

1. Molecular Biology.
2. 15 November 1924.
3. A.B. Harvard College 1947.
M.D. Harvard Medical School 1949.
4. Professor of Biophysics at M.I.T. since 1961.
5. Research Fellow Caltech 1949-1954.
Chief, Section of Physical Chemistry, National Institute of Mental Health 1954-1958.
6. Member National Academy of Sciences.
Fellow American Academy of Arts and Sciences (Member of Council and Chairman of Nominating Committee).
Member Biology Team, Viking Mars Mission NASA.

7. Skylab Achievement Award NASA.
Presidential Award, New York Academy of Sciences.
8. Molecular structure of nucleic acid compounds and proteins; x-ray crystallography;
origin of life.
9. Over 200 publications in scientific journals and 1 book.

PROFESSOR MARCEL ROCHE

1. Parasitology.
2. 15 August 1920.
3. B.S. Philadelphia 1942.
M.D. Johns Hopkins 1946.
4. Director of Venezuela Institute for Scientific Research.
5. Director Louis Roche Institute for Medical Research.
Professor Latin American Studies at University of Cambridge, U. K.
6. National Research Council (Founding President).
Editor-in-Chief of Interciencia.
7. Hon. D.Sc., Case Inst.
National Research Prize, Venezuela.
8. Endemic goitre; pathological physiology of tropical parasites.
9. More than 100 scientific papers and 5 books.

PROFESSOR JOSEPH ROTBLAT

1. Physics and Radiation Biology.
2. 4 November 1908.
3. M.A. (Warsaw) 1932.
Doctor of Physics (Warsaw) 1936.
Ph.D. (Liverpool) 1950.
D.Sc. (London) 1953.
4. Emeritus Professor of Physics of University of London.
5. Professor of Physics University of London 1950-1976.
Chief Physicist St. Bartholomew's Hospital London.
Editor Physics in Medicine and Biology 1960-1972.
Member SIPRI Board 1966-1971.
Secretary-General of Pugwash 1957-1973.
6. British Institute of Radiology (President 1971-72).
Hospital Physicians' Association (President 1969-70).
Foreign Member Polish Academy of Sciences.
Hon. Foreign Member American Academy of Arts and Sciences.
7. Commander of the Order of the British Empire.
Hon. D.Sc. Degree Bradford University.
8. Nuclear Physics, Medical Physics, Radiation Biology.
9. Some 160 publications in scientific journals and 8 books.

PROFESSOR VLADIMIR G. TRUKHANOVSKY

1. International Relations, History.
2. 15 July 1914.
3. Doctor of History.
4. Editor-in-Chief of "Problems of History" of USSR Academy of Sciences.
5. Professor of International Affairs (1947-1975).
Foreign Office (1941-1953).
6. Corresponding Member of USSR Academy of Sciences.
Vice-President of Commission on Social Structures of International Congress
of Historians.
7. Three orders of the Soviet State.
8. Contemporary History of International Relations, History of Gt. Britain.
9. 12 books and numerous articles in journals.

DR. MIGUEL S. WIONCZEK

1. Economics.
 2. Warsaw, 1918.
 3. University of Warsaw 1939, A.B., Ph.D.
 4. Senior Research Associate, University of Mexico.
 5. Deputy Director-General for Planning and Programming, Mexican National
Council for Science and Technology, 1974-76.
Senior Adviser, Ministry of Industry and Commerce, 1972-76.
Senior Adviser, Centre for Latin American Monetary Studies, 1969-73.
 6. Member of Advisory Board, Development and Change (The Hague).
Co-Director, Journal of Common Market Studies (Oxford, U.K.).
 8. Economics and planning in science and technology.
 9. Author and co-author of some 20 books on international economic relations
and science and technology policy.
-

REPORTS FROM NATIONAL AND REGIONAL PUGWASH GROUPS

Report of the National Seminar on Pugwash
held on 7th March 1979 in Dacca, Bangladesh

The Seminar was organized jointly by the Bangladesh Pugwash Group and the Bangladesh Association of Scientists and Scientific Profession. More than 100 scientists, social scientists, planners and administrators participated in the Seminar. The main topic for discussion was the role of Pugwash in establishing world peace and progress based on the mutual respect of all nations and peoples and on the principles of individual and collective social justice. The Seminar stressed the need for general and complete disarmament in order to achieve lasting peace and progress, and discussed in detail the part played by Pugwash in bringing about the Partial Nuclear Test Ban Treaty, NPT, SALT talks, the Biological Warfare Convention, and other arms control measures.

The Seminar further discussed Pugwash involvement in security and development problems of the developing nations, and laid special emphasis on the role of scientists and of science and technology in improving the quality of life in these countries. There was a lively discussion on the establishment of the New International Economic Order with particular reference to its scientific and technological aspects which envisage strengthening of endogenous scientific and technological capability of the developing nations and increasing their access to the resources and of scientific and technological know-how available in the world. Utmost stress was given to the growth of problem-solving capacities of these countries themselves through developing and adapting technologies compatible with their social, economic and environmental conditions and cultural values.

M. Innas Ali

Meeting of the Pan African Pugwash (PAP) Steering Committee

A meeting of the Steering Committee of PAP was held in Cairo on 8-10 February 1979. Attendees were Prof. R. Andriambololona (Madagascar), Prof. M. Elmandjra (Morocco), Dr. E.E. Galal (Egypt), Prof. L.K.H. Goma (Zambia), Prof. J. Kamsu Kom (Cameroon), and Prof. J. Yanney Ewusie (Ghana). Also present were Prof. M. Mahfouz who was host of the first PAP Symposium (Cairo, 1975), and Prof. A. Sidky and Prof. F. El-Bedewy who served as consultants to the editorial committee charged with editing and publishing the proceedings of the Pugwash Symposium on "Feeding Africa" held in Ghana in June 1978 (see Newsletter July 1978). Absentees were Ambassador W. Chagula (Tanzania) and Prof. F.G. Torto (Ghana). Dr. Galal is Convener of PAP.

Attention centred on publication of the Ghana Symposium proceedings, raising of finances for PAP's activities and the future programme.

The Canadian International Development Agency (CIDA) had made a generous contribution in 1978 which made possible the holding of the Ghana Symposium and publication of the proceedings. Approval for publication had been obtained from the Pugwash Executive Committee. The background papers and reports of the working groups were reviewed by the

Steering Committee after previous editing by the editorial committee. It was decided to print 1,500 copies of the proceedings for distribution to governments and international organizations.

It was decided to undertake an energetic drive to raise funds for PAP's activities, which would include the maintenance of PAP's office in Cairo, subsidizing travel of African participants to Pugwash meetings, and the holding of workshops and symposia in different countries.

For future activities, a follow-up of the Ghana Symposium was important since food security was a high priority for all African countries. Unfortunately, no progress could be reported with respect to the planned symposium in Sudan in 1980. Other subjects which might be considered included Crisis Management in Africa, and Science and Technology for Development in Africa which would be related to the outcome of the United Nations Conference on Science and Technology for Development scheduled for Vienna in August 1979.

UNITED STATES STUDENT PUGWASH CONFERENCE ON
SCIENCE AND ETHICAL RESPONSIBILITY

University of California, San Diego, June 19-26, 1979

I. Conference Background and Objectives

The first United States Student Pugwash Conference on Science and Ethical Responsibility will be held at the University of California, San Diego during the week of June 19-26, 1979. The conference is modelled in many respects after the international Pugwash Conferences and enjoys the endorsement of the U.S. Pugwash Group. The conference is supported by a joint grant from the National Science Foundation and the National Endowment for the Humanities. The aims of the U.S. Student Pugwash Conference are: 1) to sensitize advanced undergraduate and graduate students, both scientists and humanists, to the ethical issues surrounding their work; 2) to provide an opportunity for students to identify new questions needing examination, and to discuss their concerns with senior scientists and humanists; 3) to prepare and disseminate curricular materials based on conference presentations for use in appropriate college and university programmes and courses; 4) to generate additional materials for broader dissemination; 5) to provide a model for a training ground for future leaders in a technological society.

II. Organizational Design

Applications will be invited from American undergraduate and graduate students, and foreign students enrolled in American colleges and universities. Invitations will be extended to 50-75 of the strongest applicants. Selection criteria will include disciplinary distribution, regional diversity, academic record, and of course interest in the subject. Students selected will be considered official delegates from their institution.

In the spirit of the international Pugwash Conferences, the meeting will be devoted to the theme of science and ethical responsibility in a variety of contexts. The conference will be organized on two separate but intersecting planes. One plane will be the daily plenary sessions, open to the public. At the early plenary sessions, invited speakers will

discuss general issues from different disciplinary perspectives. Plenary sessions will include special presentations on Arms Control, Scientists and Human Rights, and the Social Implications of Biomedical Research. At the later plenary sessions, the workshops will present reports. The other plane, a series of daily workshops, will run parallel to the plenary sessions, focusing on five topics. Each workshop will consist of two distinguished faculty members (one generally a scientist, the other a humanist) and 10-15 student members, assigned according to special interest. The workshops will enable student participants to examine some special set of issues in detail. The seminars will be devoted to the following topics: 1) Biomedical Research and its Social Implications; 2) Scientists and Defence Policy; 3) Technology and the Needs of the Developing Countries; 4) Scientific Knowledge and Human Values; 5) Scientists and Political Activity.

Following the conference, each student participant will submit an original paper on a topic treated in the workshops. These papers, together with material from the plenary sessions, will form the basis for a volume of proceedings to be disseminated to university programmes on science and society. Other dissemination efforts will be developed in collaboration with the University's Extension Programme and the San Diego public television station, KPBS-TV, as well as other media. An evaluation report will also be presented by both the conference organizers, and the participants.

III. Topics for the Workshops

The workshops will be organized as follows:

- 1) Biomedical Research and Its Social Implications. The ethical responsibility of scientists in DNA research, problems raised by new developments in genetic intervention and related subjects.
- 2) Scientists and Defence Policy. What rules should scientists follow in performing classified research? What responsibilities do they have for the consequences of their work? How can they participate responsibly in the formulation of public policy? What are the technical considerations relevant to arms control negotiations? What is the economic impact of the arms race?
- 3) Technology and the Needs of Developing Countries. How can developing countries be assisted by technology transfer, the provision of appropriate technology, capital, education, et cetera, without imposing external values and distorting internal priorities? What is now known about population control?
- 4) Scientific Knowledge and Human Values. The workshop will survey the restrictions in the pursuit of knowledge, and the value conflicts inherent in this pursuit; it will discuss the moral limits to experimentation and research.
- 5) Scientists and Political Activity. What options are available to scientists within the political process? What about "whistle blowing", "going public", presentation of controversial findings, and the use of political techniques for disseminating scientific findings? Human rights: what are the issues and what are the options?

The conference is linked to the international Pugwash Conferences in several ways. The conference coordinator, Jeffrey Leifer, attended the 1977 Pugwash Conference in Munich and the 1978 Conference in Bulgaria; the theme of science and ethical responsibility was emphasized at both conferences. Planning for the student's conference will be undertaken with the assistance of Professor Bernard Feld, Chairman of the Executive Committee of the

Pugwash Conferences. Five of the leading senior participants (Feld, Kistiakowsky, Revelle, Scoville, and York) have taken part in past Pugwash Conferences.

The senior faculty advisor is Professor Sanford Lakoff, Chairman of the Department of Political Science, University of California, San Diego.

IV. Anticipated Results and Dissemination of Materials

For the student participants, the most immediate result will be an intensified awareness of the ethical issues their work as scientists and humanists will likely entail. It is hoped that this will improve their ability to think about such issues and to participate more effectively as scientists, humanists, and citizens in the formulation of policies concerning the application of scientific findings and the development of research strategies. Each student will be asked to submit a paper, after the conclusion of the conference, on a topic treated in one of the workshops. The best papers will be edited and published in a volume of proceedings, along with an introductory essay, drawing together the separate strands of the conference, and materials from the plenary sessions. This volume will be made available to university and college programmes on "science and society" as well as to libraries. The editing of the proceedings and mechanics of dissemination will occupy the project directors during the summer following the conference. Materials will be made available to existing programmes and to other interested potential users perhaps with the help of the American Association for the Advancement of Science Committee on Science, Engineering, and Public Policy.

Dissemination possibilities include a collaborative effort with KPBS-TV for the videotaping of the plenary sessions for the purpose of making a documentary. The station is also interested in interviewing individual participants. Other local television stations have expressed interest as well.

University of California Extension is currently planning interdisciplinary programmes and classes for the general public that will coordinate with the conference in a number of different ways.

REPORT ON ISODARCO 1978

The seventh course of the International School on Disarmament and Research on Conflicts (ISODARCO), sponsored by the Italian Pugwash Group, took place at Ariccia in Italy between 18 August and 27 August 1978. The first half of the course was concerned with the problem of energy demand and supply and its implications.

Energy and Economic Growth

Energy prices are likely to continue to rise at least until the end of the century. High capital costs are involved both in extracting the natural gas and oil from the more difficult geological formations than those commonly tapped in the past, and in the development of new sources including those in the Arctic and off-shore areas. At the same time the widespread use of all electric buildings, particularly in the USA, has progressively increased demand and cost-cutting opportunities are now virtually exhausted.

Efficiency measures are, however, possible in the development of automobiles; and

building energy uses can probably be reduced by up to two-thirds.

Nuclear Energy and Proliferation

Disastrous global consequences will almost inevitably follow uncontrolled nuclear proliferation, and the proposition that it is not possible to generate electricity by nuclear energy without creating some weapons-grade material was not seriously challenged. The danger to civilization has arisen because the development of nuclear energy for military purposes in the first instance has concentrated attention on this new source of energy at the expense of all the other valid alternatives which might have been developed as a result of similar application of technical and financial resources.

The Nuclear Non-Proliferation Treaty, Article 4, prescribing the right to develop the peaceful uses of nuclear energy has been overemphasized at the expense of the non-proliferation aspect. A proposal to establish a world energy organization concerned with all forms of energy was discussed. A new international organization would have an advantage over IAEA in that it would not have to attempt to reconcile the contradictory functions of providing safeguards and at the same time promoting nuclear energy.

Participants discussed the technical aspects of the dangers of radiation and came to the conclusion that on the whole the risks had been understated. There is a danger that countries with weaker environmental groups and the need for foreign currency might be prevailed upon to permit the dumping of waste.

There is no technical arrangement which will prevent proliferation. What requires attention are political and security incentives to institute safeguards to prevent proliferation, including means of distinguishing the peaceful from the military uses of nuclear power, if this is possible. Once-through fuel cycles are the most resistant to proliferation. The greatest risk lies where reprocessing is involved and where the product is a militarily usable material, e.g. plutonium. 'Spiking' of plutonium is an effective deterrent to nuclear theft, but not a significant deterrent to proliferation by nation states. It is necessary to concentrate on weakening the links between nuclear energy and weapon development and production.

In a session devoted to the nuclear policy of the EEC, some participants stressed the South African case because of Western European involvement as the most dangerous model of the potential for proliferation, especially as it highlighted the possible utility in international relations of the threat to acquire or to use nuclear weapons in order to establish credibility in national negotiations.

Some participants in the course opposed the concept of management of nuclear weapons on the basis that this implied acceptance and institutionalization. However, a detailed strategy for proliferation management was expounded by one lecturer and another stressed the need for understanding of national decision-making processes relating to arms control especially in the Soviet Union.

The possibility of new missiles with longer range and greater accuracy being introduced during the 1980s has to be considered as a factor which may affect the nuclear balance between the superpowers and therefore the general attitude towards nuclear proliferation and arms limitation. There was general agreement that new defensive measures such as the installation of local silo defences ought to be accompanied by negotiated reductions.

Political and Strategic Importance of Raw Materials

Finally, a speaker set the problem of energy resources into the wider context of the availability of raw materials. There had not been any discussion earlier of the possibility of conflict arising from scarcities of energy sources partly because the fast breeder reactor appeared to provide a viable alternative. Real dangers to international peace in fact lie in the prospect of international competition by all means for all kinds of resources not only of energy, but food, and perhaps especially mineral raw materials, which were more readily perceived as finite. Though oil had a unique position at this present time in the world economic system, at the same time it was probably not the only material which could be used as a political and diplomatic weapon. Dependence of NATO countries on mineral raw materials from Southern Africa had already tended to deprive them of a freedom of political action in other respects.

The mineral sources of South Africa might at present seem indispensable to some countries. In effect there is a close parallel between the need to avoid environmentally and politically dangerous energy resources, and reliance on mineral resources in such a way as to prevent the effective resolution of acute political and social crises.

* * *

Violence at Sub-State Level

The second half of the course at Ariccia was concerned with the problem of violence at sub-state level. The opening speaker divided the subject into trans-national terrorism, national liberation movements and international terrorism. He concentrated on what he termed 'rational rebels' who are usually, but not always, concerned with the seizure of power.

Terrorism has become primarily a problem in open states where materials are readily accessible and movement is more or less free. An important consideration is whether the violence is linked with some kind of nationalistic view, for example the Basque movement in Spain or in Northern Ireland.

There is now virtually no limit to the technology which can be employed and there are targets of increasing vulnerability such as jet airliners and computer centres. A particular danger lies in the over-reaction of the state machinery and bureaucracy. Some participants argued that the time and effort involved are inherently likely to deter the development and use of a nuclear device. Others were sceptical of this view and even suggested that the revolutionary way of life might well involve very long periods of lying low in conditions of secrecy, which if the materials and skills were there, might actually favour long-term development and planning of relatively sophisticated devices. Governments need to be prepared to cope with such a situation. Excessive security, however, or a few well known nuclear scientists continually discussing nuclear terrorist potential might enhance the importance of this weapon in the eyes of terrorist groups to the point where they felt a challenge to use it.

Northern Ireland as a Case Study

The situation in Ulster was traced back to its origins in the eighteenth and nineteenth centuries and an analysis was attempted of the social and economic conditions in Northern Ireland which have continually fuelled a violent situation in that province. There is no easy solution such as a re-partitioning in Ireland.

The character of the IRA as a terrorist movement has been progressively confirmed

since 1968. Unlike other contemporary terrorist movements, the IRA is essentially working class. There is a danger that the Irish situation might poison the metropolitan society.

The last decade has been one in which a pessimistic view about human nature has become entrenched in Northern Ireland. The establishment, for example, of quota systems in employment and other walks of life might accommodate stereotypes but would probably further consolidate them. The Peace Movement's concern for victims and sickened response to bloodshed was probably widely shared, but it seemed to have little bearing on the reduction of violence, until perhaps a point came when the IRA had no refuge, at least inside the urban areas.

Terrorism in Germany

A graphic account was given of the development of the Baader-Meinhof gang, who it was argued were appropriately described as terrorists, because this was the term which they applied to themselves. The Baader-Meinhof gang and their associates are, unlike the IRA, predominantly a middle-class intellectual movement with many members coming from relatively affluent backgrounds. Their rationale relates to disillusionment with the established processes of government in Germany and was originally essentially based on the notion of a need for an extra-parliamentary opposition. Such success as they had achieved lay in the over-reaction of the authorities and the German establishment. It was argued by participants that political and social factors, even in the German case, were more important than personalities.

Italian Terrorist Movements

The origin of the Italian terrorist movement owed little to individual histories for its motivation. Over a period of years changes in government in Italy have not been recognized as providing an outlet for the real forces of change, and in the process, the Communist Party at all levels has shifted towards the centre, and is no longer regarded as an opposition party in the real sense. The danger is that with unemployment and general disillusionment amongst a whole generation, especially of University students, there is a potential 250,000 - 300,000 recruits from whom the urban guerrillas might draw.

The political violence which had arisen in Italy is essentially a product of the way in which the crisis has been managed, especially the much publicized re-organization of the secret service. The real question is how effective reforms can be achieved in Italy where a corrupt administration and bureaucracy is in control, without at first bringing down the whole system.

The Mass Media in Terrorism

Terrorism operates under pressure and seeks to enhance its threat by magnifying its achievements. Today, terrorists pose a threat to contemporary society because they put the survival of democracy at stake or appear to do so, and they are encouraged by international links and publicity.

In discussion, it seemed to be generally agreed that the success of any terrorist act is often related to the level of coverage in the mass media. Publicity is particularly useful for obscure minorities like the South Maluccans in the Netherlands, who might otherwise have remained unknown. Terrorism ironically is capable of generating pressures against the free press. This is particularly the case where police operations demand secrecy and a control of publicity.

Hostage-taking incidents were discussed and it was felt that there was probably a need to distinguish between political kidnapping and kidnapping for ransom. Political kidnapping might require a hard-line policy provided that there was a widely accepted international agreement on penalties and on the question of deportation.

Sub-State Violence - Conclusion

One man's terrorist is another man's freedom fighter. This sums up the problem which faces political leaders in contemporary states in tackling the problem of terrorism. There is not clear moral line which can be adopted except one based on absolute pacifism.

The more rational terrorist movements, however, clearly have to make an evaluation of the productivity of their actions and there have been cases in which killings and bombings, whether in Rhodesia or Birmingham, have tended to prove counter-productive as far as the political cause is concerned. A serious danger however lies in state authorities finding themselves intensively persuaded to enrol security personnel specifically to deal with known threats - for example, armed guards on aircraft or special police connected with the nuclear industry.

The discussion concluded with the suggestion that terrorism and arms control might turn out in a way to be linked, in that if rigorous measures of arms limitation are applied, and legal military force reduced, there might in some circumstances be a temptation to use terrorism by proxy as a means of influencing international attitudes. As with the international military situation, the first requirement is to realize the perceptions on which terrorist action is based or justified. When, the question was asked, does the terrorist movement become a revolutionary movement, which has the prospect of mass endorsement? Is proven neglect of basic human rights in a state justification for the use of violence against the agents and institutions of that state?

Terrorist groups clearly recognize the dilemma posed to relatively free societies and exploit the difficulties of those bureaucracies which are responsible for the maintenance of law and order, but become unable to maintain it without resorting to anti-democratic and repressive measures. These may engender the politicization of what were relatively impartial security forces. Governments and international organizations often try to resolve terrorism by technical means with little regard for the moral and political issues which lie behind the actions. It is in these circumstances impossible to separate terrorist activities from such questions as the non-proliferation of nuclear weapons and Third World perceptions of the attitudes of the developed world towards them. There is a tendency to confuse sub-state violence as a means to an end, especially in the Third World, with its general objectives which might well be justifiable resistance to exploitation.

At all points in the discussions of both the energy and the sub-state violence issues, at this year's ISODARCO, a wide range of views spanning virtually the whole political spectrum and many different national attitudes were expressed and debated in circumstances which were unusually congenial. ISODARCO continues to be one of the most successful activities associated in any way with the Pugwash Movement.

W. F. Gutteridge

STATEMENT BY DANISH SCIENTISTS ON THE QUALITATIVE ARMS RACE

The following statement was prepared by Dr. Jens Bang, The Niels Bohr Institute, former president of the Danish Physical Society and Professor P. L. Ølgaard, The Technical University of Denmark, and Vice-Chairman of the Danish Pugwash group. They collected 184 supporting signatures from university institutes of physics and other institutions in Denmark.

The statement was sent to Academies of Science and physical and chemical societies of the countries known to possess atomic weapons, to Danish authorities, and to major newspapers.

— — — —

The undersigned scientists in Denmark wish to add their support to the many warnings which have been given about the dangers of the continuing qualitative arms race in which the great powers are engaging. This arms race has recently been manifested in the development of new and fearsome weapons, in the USA the neutron bomb, the cruise missile and the trident submarine, and in the USSR the backfire aeroplane, and the SS-17, SS-18, SS-19 and SS-20 rockets.

A continuation of this qualitative arms race threatens the security of the world in a number of ways. It undermines the Non-Proliferation Treaty of 1970, by which those signatory nations which possess nuclear weapons committed themselves to negotiate a cessation of the nuclear arms race and a reduction in their nuclear armaments. Such negotiations have so far given only very limited results, and it is unlikely that other large nations will be prepared in the long run to desist from acquiring nuclear weapons, while the nuclear powers not only retain theirs, but also develop new types. Furthermore, the qualitative arms race could lead to the situation in which one of the great powers considered that it had weapons of so great a superiority that it would be tempted to use them before others could develop effective counter-weapons.

For these reasons, and considering the immense destruction in both lives and property which would result from a major war fought with modern weapons, we urge our colleagues in all countries to support efforts to halt the arms race as quickly as possible, and to begin an effective policy of disarmament.

NEWS ITEMS

The following cable was sent to Academician Peter Kapitza for his award of the Nobel Prize in 1978:

Warmest congratulations for Nobel Prize you greatly deserved. We in Pugwash are proud of your active participation in our Movement and look forward to many more years of your contributions to the cause of peace.

Martin Kaplan
Director-General Pugwash.

The brochure "The Pugwash Movement at Twenty-One" issued by the Central Office in 1978 has been translated into Spanish by the Mexican Pugwash Group in the same format as the English version.

The March 1979 issue of the Bulletin of Atomic Scientists is devoted entirely to Einstein. It is a splendid compilation.

The day of 6 August 1979 will be devoted to Pugwash at the annual Youth Science Fortnight, held in London, which is attended by several hundred students from all parts of the world. Pugwashites who plan to be in London on that day are requested to contact Professor Joseph Rotblat, c/o Pugwash Central Office, London for their possible participation in the meeting.

Copies of the following Pugwash publications can be obtained from the Central Office upon remittance of the stated amount to cover publication and mailing costs:

Scientists in the Quest for Peace: A History of the Pugwash Conferences until 1971, by J. Rotblat, \$4.00 or £2.

The Fourth Pugwash Quinquennium, 1972-1977. A Supplement to the History of the Pugwash Conferences, by J. Rotblat, \$2.00 or £1.

The Pugwash Movement at Twenty-One (1978)
Minimum, 4 copies for \$2 or £1.

A New Design for Nuclear Disarmament. Proceedings of the 25th Pugwash Symposium, Kyoto, Japan, Edited by William Epstein and Toshiyuki Toyoda. Published by Spokesman Press, U.K., 1977. Paperback \$5 or £2.50.

Pugwash on Self-Reliance. Proceedings of the 24th Pugwash Symposium, Dar-es-Salaam, Tanzania, Edited by W.K. Chagula, B.T. Feld and A. Parthasarathi. Published by Ankur Publishing House, Uphaar Cinema Building, Green Park Extension, New Delhi 110016, India. Paperback \$4 or £2.

The Dynamics of the Arms Race, and
International Terrorism and World Security.
Proceedings of the Fifth Course (1974) of the International School on Disarmament and Research on Conflicts (ISODARCO), Edited by David Carlton and Carlo Schaerf. Published by Croom Helm Ltd., London, 1975.
Hardbacks £6.50 and £8.50, respectively.

Arms Control and Technological Innovation. Proceedings of the Sixth Course (1976) of ISODARCO - same editors and publishers as preceding item, 1977.
Hardback £9.50.

Special Announcement on Forthcoming Publication of the 30th

Pugwash Symposium : Dangers of Nuclear War by the Year 2000:

An Attempt at Assessment, Toronto, 1978

A brief report on the above Symposium was published in the Newsletter of July, 1978, p.12. We have received word that the University of Toronto Press will publish the Symposium in hardcover and paperback copies in September 1979. Purchase prices have been tentatively set at \$15 and \$5.95 respectively. As you will see from the following table of contents, the publication will be of very great interest to many prospective readers.

Preface

Foreword : The Rt. Hon. P. E. Trudeau

Statement by the Participants

| | | |
|-------------|---|-----|
| Chapter 1. | The Consequences of Nuclear War. J. Carson Mark | 7 |
| | The Avoidance of Nuclear War up to the Present | |
| Chapter 2. | The Avoidance of Nuclear War Since 1945. McGeorge Bundy | 36 |
| Chapter 3. | An Assessment of Nuclear Crises. John Steinbruner | 54 |
| Chapter 4. | Existing Systems of Command and Control. Vice-Admiral G. E. Miller (Ret.) | 87 |
| Chapter 5. | The Achievements of Arms Control. George Ignatieff | 120 |
| | Future Developments, as They Affect the Threat of Nuclear War | |
| Chapter 6. | A World of Many Nuclear Powers. Walter Schütze | 154 |
| Chapter 7. | Weapons Developments Affecting the Threat of Nuclear War. Richard L. Garwin | 170 |
| Chapter 8. | Nuclear Terrorism and Nuclear War. William Epstein | 198 |
| | Nuclear War | |
| Chapter 9. | Local Wars and Their Escalation. Shalheveth Freier | 232 |
| Chapter 10. | Nuclear War between the Superpowers. George W. Rathjens | 253 |
| | Retrospect, and Prospect | |
| Chapter 11. | Remarks Made at a Special Session with the Prime Minister of Canada: Georgi A. Arbatov, P.R. Chari, Richard L. Garwin, George Ignatieff, Lord Zuckerman | 280 |
| Chapter 12. | A Forecast. Franklyn Griffiths | 327 |
| Chapter 13. | The Dangers of Nuclear War. John C. Polanyi | 354 |
| | Glossary | |
| | Contributors | |
| | Index | |



CALENDAR OF FUTURE MEETINGS

(please note revised dates)

1979

13-17 June 7th Pugwash Workshop on Chemical Warfare,
to be held jointly with SIPRI, Stockholm.
(for agenda see p. 58, October 1978 issue of Newsletter).

18-23 July 29th Pugwash Conference, Mexico City
(for agenda see p. 59, October 1978 issue of Newsletter).
(The Council will meet on 16, 17, and 24 July).

December Symposium on the Arms Control International Satellite,
France. (tentative)

1980

28 Jan. - 1 Feb. Symposium on the Nuclear Situation in the South Pacific,
Auckland, New Zealand.

Feb. or March 8th Pugwash Workshop on Chemical Warfare, G.D.R.

Spring Symposium on New Directions in Disarmament,
Wingspread, Wisconsin.

20-25 August 30th Pugwash Conference, Netherlands.

September Symposium on New Weapons Systems and Criteria for
(tentative) Evaluating their Dangers, U.K.

1981

26-31 August 31st Pugwash Conference, Banff, Canada (tentative),

1982

August 32nd Pugwash Conference, Warsaw, Poland.

OBITUARIES

DR. MARGARET MEAD, 1901-1978

The death of Dr. Margaret Mead on 15 November 1978 ended the long and busy career of a remarkable woman who was loved and respected throughout the world. She was a distinguished anthropologist whose early work on Samoan and Balinese cultures are widely known. In later years she dealt with more immediate social and ethnic problems of her own society in the United States, and with the western world in general whose technological changes she early recognized as posing many dangers. Dr. Mead was deeply committed to the cause of peace and followed the activities of Pugwash with great interest. She attended the 10th Pugwash Conference in London, 1962.

As we go to press news has been received of the death of Cyrus Eaton. The following cable was despatched to Anne Eaton:

"Have just learned with great sadness of death of Cyrus. His great imagination, foresight and generosity are embodied in the Pugwash Movement. We can best honour his memory by continuing our struggle for the vision we all shared of peace and justice for all people.

Martin Kaplan
Director-General Pugwash."

We have also just learned of the death of Professor Talcott Parsons, a distinguished sociologist. He attended the 17th and 18th Pugwash Conferences.

Obituaries of Mr. Eaton and Professor Parsons will be published in the next issue of the Newsletter.

PUGWASH CONFERENCES ON SCIENCE AND WORLD AFFAIRS

President : Professor Dorothy Hodgkin
Director-General : Dr. Martin M. Kaplan

PUGWASH COUNCIL

Chairman : Professor M. Nalecz (Poland)
Members : Academician A.T. Balevski (Bulgaria)
Professor F. Calogero (Italy)
Professor A. Chayes (USA)
Professor B.T. Feld (USA)
Professor Sir Charles Frank (UK)
Mr. S. Freier (Israel)
Professor E.E. Galal (Egypt)
Professor H. Glubrecht (FRG)
Professor L.K.H. Goma (Zambia)
Professor W.F. Gutteridge (UK)
Professor G.B. Kistiakowsky (USA)
Professor E. Leibnitz (GDR)
Academician M.A. Markov (USSR)
Professor J.K. Miettinen (Finland)
Mr. A. Parthasarathi (India)
Academician O.A. Reutov (USSR)
Professor A. Rich (USA)
Professor M. Roche (Venezuela)
Professor J. Rotblat (UK)
Professor T. Toyoda (Japan)
Professor V.G. Trukhanovsky (USSR)
Dr. M.S. Wionczek (Mexico)

PUGWASH EXECUTIVE COMMITTEE

Chairman : Professor B.T. Feld
Members : Professor F. Calogero
Professor A. Chayes
Professor E.E. Galal
Dr. M.M. Kaplan
Academician M.A. Markov
Professor M. Nalecz
Professor J. Rotblat
Dr. M.S. Wionczek

CENTRAL OFFICE

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

EXECUTIVE OFFICE

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

