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

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C O N T E N T S

Pugwash in High Gear

Perhaps jet speed (and lag) would better characterize our recent activities.

On April 10 and 11 the Executive Committee met in Warsaw to review preparations for Varna and intervening meetings, and to decide on publications policy, finances, submissions to the UN Special Session on Disarmament (see pp. 106-111). and other matters. The Committee then participated in the Symposium on Security and Cooperation in Europe (see pp.112-125). This required an overnight train ride to Zakopane where we were greeted by snow which kept us comfortably quartered (and at work) in a hillside chalet-hotel, except for a morning excursion to a mountain lake. Maciej Nalecz was in charge of the fine organization of both meetings.

A few days later (20-22 April) several of us were in Rabat, Morocco attending a Pugwash Workshop on the 1979 UN Conference on Science and Technology for Development (UNCSTD). The newly founded Moroccan Pugwash Group, headed by Mahdi Elmandjra, had made excellent arrangements for the meeting held at the University of Mohamed V. The resulting report, and especially the interim draft of Guidelines for International Scientific Cooperation for Development (see pp. 126-143) promise to be substantial inputs for UNCSTD. All Pugwashites are being called upon to assist in ensuring the best possible inputs of documentation, still in the process of formulation, for the 1979 Conference. In addition, your participation in the national, regional and international preparatory meetings for that Conference during the rest of this year will help greatly in disseminating Pugwash ideas and contributions to the resolution of problems of developing countries.

Action then shifted to North America. The Symposium on Dangers of a Nuclear War by the Year 2000 was held in Toronto 4-7 May. This was a very well prepared meeting, thanks to the combined efforts of the co-chairmen John Polanyi and Frank Griffiths, assisted by their efficient staff. The papers covering the topic headings were of a very high quality and were distributed well in advance of the meeting. They will be published along with resumés of the discussion in a volume which it is hoped will be issued within several months. The Symposium was joined by Prime Minister Pierre Trudeau for a stimulating afternoon and evening of frank discussion of political aspects of the nuclear problem.

From Toronto, on to Salt Lake City (May 8 and 9) and Kansas City (May 10-12) for the 6th Pugwash Workshop on Chemical Warfare. We had been invited by United States Army authorities to visit their new facility for destruction of aged stores of highly toxic nerve gas munitions at the nearby Army depot in Tooele, Utah. We were the first group of foreign nationals to visit the plant, and we had the novel experience of being greeted and briefed by a general, several colonels and other ranks, and civilian specialists. The visit was arranged as a confidence-building measure to assist efforts in achieving a complete ban on chemical weapons, a goal that Pugwash has been pursuing for many years. In Kansas City local arrangements were in the capable hands of Bob Roberts, a veteran participant in our CW Workshops, and the hospitable Midwest Research Institute. We visited a pesticide production plant of the Chemagro Corporation. This was a continuation of the exercise carried out by the 5th Workshop in Cologne, August 1977, for studying the problems of verification of non-production of chemical warfare agents - for many years a major obstacle in negotiations for a treaty at the UN Conference of the Committee for Disarmament in Geneva.

See the next Newsletter for further details and reports.

M. M. Kaplan

(The next three documents were submitted by the Pugwash Executive Committee to the UN Special Session on Disarmament)

(a) OUTLINE OF A CONVENTION FOR THE RENUNCIATION OF NUCLEAR WEAPONS

Preamble

Article I.1. The Contracting Parties undertake not to possess, manufacture, acquire or use nuclear weapons, and therefore to prohibit in their territories:

(a) the testing, use, manufacture, production or acquisition by any means whatsoever of any nuclear weapons or other nuclear explosive device by the Parties themselves, directly or indirectly, on behalf of anyone else or in any other way,

(b) the receipt, storage, installation, deployment and any form of possession of any nuclear weapons or other nuclear explosive device, directly or indirectly, by the Parties themselves, by anyone on their behalf or in any other way, and

(c) the transit, through the national territories, air space or waterways under the recognized jurisdiction of the Parties, of any nuclear weapon or other nuclear explosive device, except that this provision shall not affect the right of transit through or over straits used for international navigation.

2. The Contracting Parties also undertake to refrain from engaging in encouraging or authorizing, directly or indirectly, or in any way participating in the testing, use, manufacture, production, possession, or control of any nuclear weapon or other nuclear explosive device anywhere.

Article II

For the purposes of this Convention, the territory of a party State shall include all the land, sea and air space over which it exercises sovereignty according to international law.

Article III

For the purposes of this Convention, a nuclear weapon or other nuclear explosive device is any device capable, as a consequence of a nuclear chain reaction, of producing the release in explosive fashion of the energy stored in atomic nuclei in an amount sufficient to cause significant damage to people and/or structures, and includes such devices whether in an assembled or disassembled state.

Article IV

(a) All the Parties to the Convention have the right to participate in the exchange of equipment, materials and scientific and technical information for the peaceful uses of nuclear energy, in accordance with this Convention and under appropriate international supervision and through appropriate international agencies and procedures as provided in the NPT.

(b) Peaceful nuclear explosions, if any, shall be performed only with devices provided by states signatory to the protocol of this Convention, and shall be subject to international supervision and inspection in a manner to be determined by the Parties to the Convention, provided however that the Contracting Parties undertake that they will not, in any way, contribute to the development or maintenance of nuclear weapons production by any state not a Party to this Convention or its protocol, or to abet any such contribution by any third party. Nothing in this treaty shall override any provisions to the contrary in any treaty or agreement limiting the testing of nuclear explosive devices.

Article V

There shall be provision for verifying

compliance with the obligations of this Convention in accordance with the following general principles:

1. To the extent suitable, inspection and verification services shall be performed by the IAEA.

2. Reports of verification activities including inspections shall be circulated to the Parties to the Convention and its Protocol.

3. At the request of any Party a conference of the Parties shall be convened to consider any such report.

4. In addition to routine verification activities, special inspections shall be conducted

(a) with the consent of the Party concerned, at the request of any Party which suspects that some activity prohibited by this Convention has been carried out or is about to be carried out, or

(b) at the request of any Party which is suspected of carrying out some activity prohibited by this Convention.

Article VI

Any dispute concerning the interpretation or application of this Convention which may arise among the Parties to the Convention or its Protocol and which is not otherwise settled shall be referred to a Conciliation Commission.

Each Party to the dispute shall designate one member and the Secretary-General of the United Nations shall nominate the President of the Conciliation Commission.

The Conciliation Commission shall attempt to bring the Parties to the dispute to an agreement. If the dispute is not settled, the Commission shall issue a Report stating its conclusions and shall transmit its Report to the Parties to this Convention and its Protocol.

Article VII

In the case of the threat or use of a nuclear weapon against any Party to this Convention, such Party may call upon the other Parties to provide aid and support to the Party under threat or attack, including non nuclear military assistance, in accordance with the inherent right of collective self defence as recognized in Art. 51 of the UN Charter, and such other Parties may provide such assistance in accordance with their constitutional processes.

Article VIII

Parties to this Convention further pledge that they will strive in good faith for the elimination of nuclear weapons from the arsenals of all states and for the establishment of conditions that will facilitate the adherence of all states to this Convention.

Article IX

Final clauses. Signature, ratification, entry into force, duration, withdrawal, etc.

Protocol

Article 1

States parties to this Protocol agree:

(a) To accept and respect the status of the Parties created by the Convention.

(b) Not to interfere with any Party in carrying out its obligations under the Convention.

(c) Not to use or threaten to use a nuclear weapon against any Party to the Convention.

(d) To forbid and prevent the use, or threat of use of nuclear weapons under its control or on its territory against a Party to the Convention.

(e) Not to contribute directly or indirectly to the development or maintenance of nuclear weapons production by any state not a party to this Convention or its Protocol,

or to abet any such contribution by any third party.

(f) To give priority consideration to the Parties to this Convention in their programmes of assistance for the peaceful applications of nuclear energy.

Article 2

States parties to this Protocol shall cooperate, when so requested, in the verification procedures provided for by Article V of the Convention.

Article 3

States parties to this Protocol accept and shall have access to the conciliation procedure provided for by Article VI of the Convention.

Article 4

In the case of the threat or use of a nuclear weapon against any Party to the Convention, the Parties to this Protocol when so requested by the State under threat or attack, shall consider providing such State aid and support in accordance with the right of collective self defence as recognized in Article 51 of the UN Charter.

Article 5

States parties to this Protocol shall have the right to be present as observers and address any Conference of the Parties to the Convention.

Article 6

States parties to this Protocol pledge that they will strive in good faith for the elimination of nuclear weapons from the arsenals of all states and for the establishment of conditions that will facilitate the adherence of all states to the Convention.

Article 7

Final clauses. Signature, ratification, entry into force, withdrawal, etc.

(b) STATEMENT ON CHEMICAL WEAPONS

BY THE PUGWASH CONFERENCES ON SCIENCE AND WORLD AFFAIRS

The Fifth Pugwash Conference held in 1959 was devoted to ways and means to outlaw microbiological and chemical warfare. Since that relatively early date, Pugwash has worked continually to obtain a complete ban on the development, production, stockpiling and use of this class of dreadful weapons of mass destruction. Pugwash Workshops and other activities contributed to the reinforcement by additional signatories of the Geneva Protocol of 1925, and to the achievement of the Convention on Biological (Bacteriological) Weapons which was submitted for governmental ratification in 1972 and came into effect in 1975. This Convention also called upon the signatory states to intensify their efforts towards achieving a similar treaty with respect to chemical weapons. Since 1972 Pugwash has held six Workshops specially devoted to assisting this process, and has repeatedly at its annual conferences called the attention of governments, the world's community of scientists and the general public to the dangers of delay in achieving a total chemical weapons ban.

The present situation on CW weapons remains highly disturbing. Despite many years of negotiations at the CCD level,

aimed at arriving at a comprehensive treaty banning the development, production and stockpiling of chemical weapons, large stocks of highly lethal nerve gases are now emplaced in, for example, Europe ready for military operational use. Apart from the potential danger of their actual use in warfare, in particular the risk that they may serve as an escalating factor to the use of nuclear weapons, there exists the fact that, with the passage of time, these stocks (already many years old) deteriorate and may expose military personnel and even civilian populations to environmental contamination. It is urgent, therefore, that steps be taken in the nearest future to remove these stocks and destroy them.

These weapons are highly questionable even from a purely military point of view. The many disadvantages they possess, including the fostering of continuing mistrust and tension and the risk of proliferation to other countries and areas of the world, thus reinforce the justification for their immediate and permanent removal from the already troubled European scene.

The many years of CW-treaty negotiations have also witnessed the development of binary munitions - a new generation of nerve-gas weapons that represent a marked qualitative improvement in terms of military logistics. Binary weapons, if introduced into the military arsenals, would greatly increase the difficulties of achieving an effective CW treaty. We strongly urge, therefore, that all possible steps be taken to prevent a transition to the military deployment of binary weapons.

The slow pace until now of progress of official negotiations for a comprehensive CW treaty leaves the way open for the emergence of still more dangerous chemical weapons, There are other dangers as well. Thus, the existence must be noted of a growing chemical manufacturing capacity throughout the world which could with, or even in some cases without, plant changes be used for the production of CW agents, their intermediates, or binary precursors. Also the problem which CW weapons present to the smaller countries and to countries in the Third World need more attention, particularly the relationships between a possible proliferation of CW weapons and of other weapons of mass destruction in areas of local conflict.

The two main preoccupations of recent Pugwash Workshops on CW have been with the scope of a CW disarmament convention, and with its verification. As to the former, it is apparent from the course of recent discussions in the CCD that the comprehensiveness of scope which has always been advocated by the Workshops, particularly as regards incapacitants, is now finding general acceptance among the participating governments. The question of scope is thus no longer the impediment to a treaty that it once was. Verification, on the other hand, remains a difficult issue. The Workshop group has been searching continuously for means of reconciling the differences of view that exist on the need for intrusive regimes of observation and information gathering, and there is now a significantly increased international understanding of the main concerns. Especially fruitful has been the appreciation of the need for confidence-building measures; for it is clear that demands for intrusive means of verification are rooted in feelings of mistrust which, if they could be alleviated, would greatly simplify the verification provisions that are a necessary part of a CW convention.

On this and many other technical and political aspects of a CW treaty, Pugwash Workshops have made many specific proposals. These include the clear understanding, now accepted by the major signatory states to the BW Convention, that genetic engineering technology aimed at using DNA recombin-

ants for weapons purposes would fall under the prohibition of the BW Convention. Also, reciprocal visits between Eastern and Western countries for exercises on verification of non-production of nerve gases, and an exchange of information on the technology of destruction of nerve gas weapons have been partially implemented under Pugwash auspices as important confidence-building measures.

However, all indications point to a protracted period, perhaps lasting years, of negotiation on the details of a CW treaty. Because of the dangers associated with such a delay, we call upon people everywhere to insist that their nations consummate with all speed a comprehensive CW treaty which will forever remove this dangerous class of weapons of mass destruction as a menace to mankind and will help guarantee that our rapidly expanding knowledge of life processes will be used for peaceful purposes only. Pending the formal ratification of such a treaty by all, we urge individual nations to declare unilaterally and unequivocally their renunciation of development, production, and stockpiling of chemical weapons, and their use under any circumstances in international conflicts.

(c) STATEMENT ON THE SOCIAL RESPONSIBILITY OF SCIENTISTS FOR DISARMAMENT

Scientists share with their fellow citizens a vital interest in efforts being made to bring security and lasting peace to all parts of the world. In their professional capacities they also have an additional responsibility for effective arms control and disarmament. Nearly four hundred thousand scientists and engineers are today engaged in the development and production of both conventional and nuclear weapons. The very existence of these weapons is due to their efforts. A drastic reduction of the arms industry would not only cut off the supply of new weapons but also release scientific skill and energy that are essential to the well-being of present and future generations.

The moral, social and political dilemmas facing scientists today were posed most clearly by the discovery of nuclear energy and its use as nuclear weapons. Their responsibility for the future was most forcefully stated in the Russell-Einstein Manifesto of 1955 which called on scientists, in face of the terrible danger to mankind as a whole, to work for the abolition of war and to find peaceful means for settling all disputes between nations.

In response to the Manifesto, the Pugwash Movement has brought together over the last two decades some fifteen hundred scientists from all disciplines and all parts of the world - leading experts in fields of research both connected and unconnected with the production of weapons. We have met in small and large meetings, essentially private and informal in character, to discuss possible means of arms control, unbound by doctrine or tradition and uninhibited by apparent obstacles arising from unresolved political questions. In spite of many differences between us we have found it possible to agree on a number of measures designed to stem the drift towards the refinement and multiplication of weapons of mass destruction. Two such measures are the subjects of papers we have submitted to this session, one on a draft treaty for the renunciation of nuclear weapons and one on the complete banning of chemical weapons. Other proposals with which we

have been concerned are the technical aspects of non-proliferation of nuclear weapons, the partial nuclear test ban and its extension to cover all tests, arms race control in both strategic (offensive) and ABM defensive systems, the elimination of biological warfare and the possible use of genetic engineering for war purposes, and the limitation of trade in conventional arms. Our deliberations and the resultant specific proposals have contributed to international agreements on several of these major problems.

We scientists realize that we need to consider not only the control of weapons but also the solution of those problems which give rise to the deployment and use of weapons. We have sought ways in our meetings to exploit the wide international contacts of scientists to help to resolve conflicts and particularly to reduce tension between East and West from the period of the cold war onwards. We realize that very much more research needs to be done at every level to reduce the misunderstandings that occur between individuals and groups and to increase the efficiency of non-military means of settling international disputes.

It is also important to recognize that conflicts and tensions are bound to interfere with international efforts towards peace so long as the widening gap in living standards persists between industrialized and developing nations. Science has made enormous contributions towards the conquest of poverty and malnutrition in the affluent nations of today. If properly harnessed to specific local needs and conditions, science will do the same for the underprivileged nations of the third world.

We believe that these are the problems to which scientists and technologists of the world should devote their efforts, not on the development and production of armaments.

We respectfully submit these considerations to the UN Special Session on Disarmament in the hope that they may contribute to significant progress towards general and complete disarmament.

Twenty-Ninth Pugwash Symposium

SECURITY AND COOPERATION IN EUROPE:
PROBLEMS AND PROSPECTS AFTER BELGRADE

Zakopane, Poland, 12-15 April 1978

Agenda

I. Disarmament in Europe in the Context of International Détente and the UN Special Session:
   1. Military détente in Europe: premises and obstacles.
   2. Vienna MFR negotiations: impact on disarmament agreements.

II. Topical Problems Relating to All-European Cooperation:
   1. East-West economic and scientific technological cooperation in Europe (CMEA-EEC relations, protection of the environment, health, energy, transport, etc.).
   2. European cooperation in culture and other fields.
   3. Economic cooperation in Europe and the New International Economic Order.

Participants

H. Agnew (USA)
N. Behar (Bulgaria)
P. Blau (Austria)
R.A. Bogdanov (USSR)
R. Botzian (FRG)
P. Bozyk (Poland)
A. Burzynski (Poland)
F. Calogero (Italy)
E.M. Chossudovsky (UNITAR)
M. Dobrosielski (Poland)
C. Dominice (Switzerland)
V.S. Emelyanov (USSR)
B.T. Feld (USA)
E.E. Galal (Egypt)
K. Gottstein (FRG)
W.F. Gutteridge (UK)
J. Handler (Switzerland)
Dorothy Hodgkin (President)
B. Jasinski (Poland)
Z. Kaczmarek (Poland)
M.M. Kaplan (Director-General)
J.K. Miettinen (Finland)
W. Multan (Poland)
M. Nalecz (Poland)
J. Nowak (Poland)
M. Perczynski (Poland)
R. Petkovic (Yugoslavia)
R. Reford (Canada)
J. Rotblat (UK)
A.D. Rotfeld (Poland)
R. Vukadinovic (Yugoslavia)
M.S. Wionczek (Mexico)

List of papers

N. Behar -- East-West Economic Co-operation in Europe: Real Premises and Military Obstacles.

R. Bogdanov -- Disarmament in Europe: Aspects of International Détente. Military Détente in Europe.

R. E. Botzian -- European Cooperation in the Area of Electric Power.

P. Bozyk -- East-West Cooperation: Factors Restricting Development.

F. Calogero -- How to Improve Scientific Collaboration in Europe.

M. Dobrosielski -- Europe after Belgrade: Problems and Prospects.

V. S. Emelyanov -- On the USSR's Economic, Scientific and Technical Cooperation in Europe.

B. T. Feld -- A Splendid Opportunity.

W. F. Gutteridge -- Further Confidence-Building Measures: The Reduction of the Military Threat to Peace.

B. Jasinksi -- Economic and Scientific-Technological Cooperation between East and West in Europe.

M. M. Kaplan -- European Collaboration in Science and Technology after Helsinki.

J. K. Miettinen -- The Neutron Bomb and Nuclear Disarmament in Europe.

W. Multan -- Premises and Obstacles to Military Détente in Europe.

M. Perczynski -- New International Economic Order in the Context of East-West Relations.

N. Tsarevski -- Economic Cooperation between the EEC and the CMEA.

W. Wieczorek -- Impact of Arms Limitation Agreements on the Vienna Talks.

Report on the Symposium

INTRODUCTION

The 29th Pugwash Symposium was held in Zakopane, Poland, 12-15 April 1978. Thirty-two participants from fourteen countries attended, as guests of the Polish Academy of Sciences.

Both subjects on the agenda of the Symposium - Security and Cooperation in Europe - were first examined together in view of the close interconnection between them. Drawing fully upon the series of papers that had been submitted to the Symposium participants sought to identify those aspects which merited special attention in the light of the outcome of the Belgrade meeting, an assessment of which was reviewed by the participants.

Thereafter, consideration of the two themes was pursued in two separate working groups.

A. POLITICAL AND MILITARY DÉTENTE

The Group discussed a range of problems relating to political and military détente and their close interrelation and complementarity as well as prospects for their further development. Difficulties and obstacles were analysed and some new ideas to overcome them suggested. Special attention was given to disarmament problems.

It was agreed that progress towards limitation of the arms race is very far from being satisfactory and the development of new weapon systems goes on more quickly

than negotiations on curbing them. This relates first of all to the qualitative aspect of the arms race, which if unrestricted greatly increases the possibility of nuclear war. This is of prime concern to Europe, where the concentration of modern armaments is greatest. The problem of stopping the arms race and concluding concrete disarmament agreements is the most urgent and vital problem facing mankind.

1. The following main factors obstructing progress towards disarmament were particularly emphasized:

1.1. Relatively low level of mutual trust between states and existing misperceptions of the other side's intention in Europe and on a global basis;

1.2. Reliance on military forces as the main element safeguarding the security of states;

1.3. The dynamic nature of weapons developments.

2. While general and complete disarmament remains the ultimate objective the following measures might be undertaken now to pave the way for further development of military détente, especially in Europe:

2.1. Everything possible should be done to strengthen mutual trust between nations, as the growth of confidence is the main prerequisite for further progress in arms limitation. This process might be initiated by freezing the present level of armaments and armed forces both in quantity and quality in anticipation of rapid progress in the Vienna MFR negotiations. This might be done by unilateral declarations by states concerned. Step by step the real infrastructure of mutual confidence should be built up, to eliminate the ground for suspicions and misperceptions. The mass media could and should contribute substantially to this.

2.2. The growing gap between the increasing speed of technological development and slow progress in arms limitations requires new kinds of political initiative. A complete ban on new weapon systems would cut at the root of the arms race; public understanding and awareness of the role of new weapons and their implications for disarmament would be a step in the right direction. In this context the possibility of deployment of the neutron bomb in Europe has been strongly opposed as working contrary to military détente. The decision not now to produce this weapon was appreciated and should thus provide an opportunity for new progress towards arms control and disarmament in Europe. There are other weapons in the pipe-line on both sides whose non-deployment would further improve such prospects.

3. The possibility of nuclear weapon-free zones in the various regions of the world including Central Europe should be urgently reconsidered. In particular a proposal was made for the Reduction of Nuclear Arms in Europe. This was in effect an updated version of a suggestion brought up at an earlier Pugwash Symposium and subsequently discussed several times at symposia and conferences. This proposal, which requires for its successful implementation an atmosphere of developing détente, is intended to stimulate and complement a substantial and simultaneous reduction of conventional armed forces and armaments and to reinforce the Vienna negotiations. The essential elements in the proposal are as follows:

a) The denuclearization of Europe from the eastern border of France to the western border of the Soviet Union.

b) The limitation of United Kingdom and French nuclear weapons to the national nuclear weapons now deployed.

c) Soviet MRBMs and IRBMs which are located so as to be capable of striking Europe should be limited to a number equal to the total of British and French weapons deployed.

d) The implementation and terms of the Nuclear Non-Proliferation Treaty should be reinforced and the Partial Nuclear Test Ban Treaty be upgraded to an effective Comprehensive Test Ban Treaty and help to prevent any further spread of nuclear arms in Europe. It was emphasized that any development towards the acquisiton of independent nuclear weapon capability by any European states not now possessing it would make the situation in Europe much more dangerous than it is now.

The proposal could lead to substantial disarmament and an improved political situation in Europe.

It should also be understood that many particular items which have been ignored or overlooked here will become of importance during possible actual negotiations. These include the disposition of nuclear-capable naval forces and other similar questions. But it is hoped such further details could be readily solved if the negotiations are in the spirit and scope of the items set out above.

It was felt that this radical approach may have a better chance of working than the traditional piecemeal attempts to ensure precise balance in every field each time a small disarmament proposal is made. Bold actions seemed to be the only practical way out of the present impasse.

4. It was strongly recommended that further study in Pugwash Working Groups or Symposia should be made of a number of ideas designed to create greater confidence between the countries of the two main political and military groupings of states. These included the following:

4.1. Establishment of a direct line of communication ("hot-line") between the WTO and NATO headquarters.

4.2. To avoid misinterpretation of each other's intentions the USA and the USSR should establish a system of regular meetings between experts for the exchange of information concerning unexplained major construction projects.

4.3. The drafting of a code of conduct concerning the provision of military assistance and arms sales to foreign countries and the terms on which military support to such countries might be internationally tolerated, on the basis of information and explanation provided to the UN.

5. The importance of using the opportunity provided by the forthcoming Special Session of the UN General Assembly for major new initiatives leading to a comprehensive programme of disarmament was stressed. In this connection the informing and education of public opinion on the issues involved is a vital task for the mass media.

B. TOPICAL PROBLEMS RELATING TO ALL-EUROPEAN COOPERATION

While it was recognized that, particularly at the present juncture, advances of major significance in all-European cooperation are increasingly linked to progress in political and military détente, it was strongly felt that meanwhile efforts at the unilateral, bilateral and multilateral levels should continue with renewed vigour to carry forward existing

types, forms and methods of cooperation. Also new initiatives should be launched in specific fields which hold out promise of fruitful results and seek to overcome existing obstacles and difficulties. Even what seem to be "small steps" can, when taken in their aggregate, appreciably strengthen all-European economic and related cooperation and exert a wholesome influence on other facets of global détente.

The assessment and proposals for action by Governments and the scientific community which are briefly set out below are deliberately focussed only on those subject areas which in the view of the participants are of particular relevance after Belgrade and on which the Symposium felt competent to give a collective opinion.

1. Ongoing cooperative programmes and policies

1.1. Policies to increase the volume, to widen the range and to diversify the pattern of East-West trade should be supported. The development potential and inherent dynamism of this trade flow remains considerable.

1.2. Industrial cooperation should be further developed with the aim of advancing the maximum coverage of possible links, and of proceeding, wherever feasible, to higher forms such as co-production, involving joint investment, marketing and research.

1.3. Work already started in Europe on projects of common interest in the fields of energy resources, exploitation of materials and transport and communications (such as the Trans-European North-South Motorway and the recent Austrian-Polish agreement on Electric Power Exchanges) appears promising. Efforts directed towards identifying further projects of this kind should therefore be accelerated and be combined with the necessary studies of suitable institutional mechanisms and methods of financing.

1.4. As regards technological cooperation, greater emphasis should be placed on technologies designed to reduce waste of natural resources.

1.5. The information-base of all-European cooperation should be further strengthened. In this connection the attention of the scientific community is drawn to the work undertaken in the UN Economic Commission for Europe (ECE) on the Overall Economic Perspective for the ECE Region up to 1990, intended to provide Governments with overall views on the economic development of the region in the context of the world economy, and to aid them to identify long-term economic problems of common interest.

1.6. In the light of the results of Belgrade, progress in the work underway in the ECE on the holding in the near future of a high-level meeting on environment and the preparation of similar conferences or meetings on energy and transport is of exceptional importance. It is therefore the earnest hope of the Symposium that positive decisions on the matters will be taken at the current plenary session of the ECE. Only carefully prepared high-level meetings in these major fields of region-wide concern can ensure that the necessary action is taken at the national and international levels by the participating States, signatories of the Final Act.

2. Relations between the European Economic Community (EEC) and the Council for Mutual Economic Assistance (CMEA).

The Final Act envisages that European cooperation on a region-wide basis should be combined with cooperation at a sub-regional level. This implies the need for normalizing and developing official relations between EEC and CMEA both in terms of direct contacts between the two bodies and of clarifying the trading relationships of their respective member countries. It was felt at the Symposium that in the forthcoming EEC-CMEA negotiations a multi-plane model of relations should be worked out which would take account of both the requirements of EEC's trade policy rules and of the institutional characteristics of Eastern economic integration and trading systems.

3. Economic Cooperation in Europe and the New International Economic Order.

Economic cooperation in Europe must be geared to, and dovetailed with, action going forward at the global level to establish a New International Economic Order (NIEO). Peace and security in the region are vital preconditions for peace and security of the developing countries. All-European economic cooperation must go hand in hand with efforts of the CSCE Governments to narrow the income and welfare gap between developed and developing nations and thus remove the tensions which it engenders. Experience shows that a mere extrapolation of present trends in technology and economic growth cannot lead to this goal, and even less so a simple transfer of these methods to developing nations. Drastic changes will prove unavoidable, but despite these expected changes and different concepts of how to achieve them in order to restructure world economic relations, common action of CSCE countries in relation to third world countries should be encouraged: for instance, tripartite industrial cooperation, involving enterprises from Eastern, Western and developing countries; provisions to ensure that East-West economic links are combined with appropriate policies of trade with and assistance to Third World countries; participation in international schemes for an integrated international commodity policy; and collective efforts to work towards the enunciation of an agreed global development strategy to give effect to NIEO. In the areas of technological and scientific cooperation the CSCE countries should work also on problems of concern to the developing countries, related in particular to their need for indigenous Science and Technology capability. The forthcoming UN Conference on Science and Technology for Development could be a useful forum to consider this matter in greater detail.

The close link between Disarmament and Development was reiterated. Military détente and disarmament could liberate and mobilize enormous resources not otherwise available, for speeding the closing of the income and welfare gap between the developed countries and the third world.

4. Multilateral meetings within the framework of the follow-up of the CSCE on particular subjects which it was decided to convene at Belgrade:

4.1. Meeting of experts to prepare a "Scientific Forum" (Bonn, July 1978).

It was felt that the Scientific Forum should become a recurrent consultation between leading personalities in science having as its main task to give continuing guidance on major scientific problems of an interrelated character and international concern, including problems of the countries of the third world. More particularly, focus should be on issues which can be expected to arise in the future, and on ways and means of improving channels of comm-

unications; encouraging direct contacts and coordination of research activities; increasing the number of scientific exchanges in balanced fashion; and promoting collective and joint research, wherever feasible. Appropriate liaison arrangements should be made with ECE, UNESCO and other appropriate international bodies.

The Scientific Forum might, in particular, wish to foster studies on the feasibility of a number of desirable collaborative undertakings involving large investments of funds and manpower normally beyond the resources of any one country, such as:

a. High energy facility of greater than 1000 GeV (1 million million electron volts) for fundamental research in particle physics .

b. Centres for joint research on fusion, solar and other non-conventional sources of energy. (Suggested locations in both Eastern and Western Europe).

c. Joint research in molecular biology, especially genetic engineering, in already existing institutions (e.g. European Molecular Biology Laboratory at Heidelberg) and in new ones, if indicated.

d. A large complex of health research institutes in cooperation with WHO for both clinical and laboratory, fundamental and applied research in such fields as cancer, cardiovascular disease, chemical toxicology (environmental pollutants and medicants), biomedical instrumentation. (Suggested location in Eastern Europe).

e. The Forum should also stimulate the establishment of centres of joint research in "brain-intensive" and internationally integrated fields such as theoretical physics, chemistry, and mathematics, as a means to provide ample and expanding opportunities for the exchange of high-level scientific personnel.

In the field of the social and behavioural sciences consideration might be given to the convening of a group to consider possibilities of promoting studies in depth of processes of interaction and cooperation between CSCE countries, especially those having different economic, social and political systems, by scholars drawn from the different countries of the region, and analysing common approaches to promoting collaborative links and overcoming tensions and difficulties.

5. Meeting of experts to consider procedures for the peaceful settlement of disputes (Montreux, October 1978)

The hope was epxressed that the experts will give due emphasis to the elaboration not only of legal procedures but also to devising appropriate machinery for negotiation and consultation aimed at removing difficulties and misunderstandings as they arise so as to prevent the eruption of major disputes.

6. Meeting of experts on cooperation in the Mediterranean (La Valetta, February 1979)

This meeting was welcomed as a concrete example of giving effect to the provision in the Final Act to take into account the interests of the developing countries throughout the world, including those among the participating States. This meeting could also serve as a concrete manifestation of the need to extend positive developments in Europe to other regions of the world.

7. Other measures which should be taken after Belgrade to strengthen détente and cooperation

There is still need for more regular contacts and consultations at different levels to improve the political climate and to provide a firm political framework for détente and cooperation. Governments should therefore proceed in systematic fashion to a series of bilateral consultations on the follow-up process in the light of the outcome of Belgrade and bearing in mind the many constructive proposals in the field of cooperation tabled at that meeting. Such a purposeful strengthening of bilateral relations would help to prepare the ground for the meeting to be held in Madrid in 1980 and thus strengthen détente. To facilitate contacts and communications at the bilateral level with this end in view it would be helpful that focal points for matters relating to the follow-up of the CSCE be established, as necessary, in the Ministries for Foreign Affairs of all participating States.

The question of human rights was discussed in the context of the whole Declaration on Principles of the Final Act. It was agreed at the Symposium that efforts for the achievement of peace, security and cooperation through détente will assist in the consolidation and extension of such rights for all peoples, not only in Europe but throughout the world.

Among other measures which were discussed under this heading was a suggestion that consideration might be given to the holding of brief meetings of Heads of States or Governments of the signatories of the Final Act. Such meetings might be convened for instance mid-way between two follow-up meetings. They would last no longer than, say, 2-3 days and be held in camera. The summit meetings would not be expected to adopt decisions but should provide an opportunity to receive reports from the Heads of State or Government presented in a manner found suitable by them on the implementation of the Final Act in their countries; and thereafter to offer facilities for contacts, discussions and consultations among themselves of an informal nature.

Abstracts of papers

N. Behar (Bulgaria)

East-West Economic Cooperation in Europe: Real Premises and Military Obstacles

Political and military relations between the separate states have a considerable influence on their economic relations. In Europe exist all objective economic, natural and dynamic reasons for economic cooperation and S and T collaboration. Among the more important are: necessity of complementarity connected with the international division of labour, development of integrated communities (EEC and CMEA), energy and raw material shortages, ecological factors, and others. Here exist also a number of needs requiring projects on an all-European scale (energy, new technologies not wasting resources, antipollution measures etc.)

Existing East-West economic relations in Europe, however, do not correspond to the potentialities of the countries. The main obstacle here is the military factor. The growing military budgets and new qualitative arms race affect the base of economic cooperation by creating mutual distrust, by taking away huge resources which could be

utilized for the solution of some European programmes, by limiting the international exchange of scientific and technical information in some main sectors (connected with arms industry) by complicating the ecological crisis, and so on.

Pugwash should give greater attention to searching for and developing the set of common goals and projects of common interest as a base for all-European cooperation. The urgent political and moral task of scientists is to prove that the main premise for further development and cooperation, according to the spirit of Helsinki and Belgrade, is the process of political and military détente, opening the way for social and economic progress in Europe.

R. Bogdanov (USSR)

Disarmament in Europe: Aspects of International Détente. Military Détente in Europe

Without the implementation of measures of military détente and steps to curb the arms race there can be no successful progress of international détente.

Many tasks lie ahead. The curtailment of and then a stop to the arms race should be effected, progress along the road leading to universal and complete disarmament achieved, military confrontation on the European soil lessened, and the division of Europe into opposing military blocs overcome.

Examining the problems of military détente we should take into account a number of objective difficulties standing in its way and connected with the complex character of the very process of détente, for the long period of the cold war has engendered a host of harmful traditions and ideas, and first and foremost a lack of mutual trust, the elimination of which requires time and effort. There is also a multitude of complex factors of military-technical and political nature (the absence of criteria for comparing different types and systems of weapons, questions of inspection and control, etc.), which also exert a negative influence on the process of disarmament and the limitation of the arms race.

These problems are discussed in the paper.

R. E. Botzian (FRG)

European Cooperation in the Area of Electric Power

Exchange of electrical power as an example for all-European cooperation in the field of making most effective use of energy resources has been proposed for a long time. Plans have been studied within the ECE to connect the CMEA and West-European grids by a powerful intercontinental transmission line. But doubts were raised whether such an enlarged grid would be stable enough against blackouts and could - facing the different monetary systems in East and West - allow for a proper clearing of all power deliveries. Only recently the agreement concluded by

Poland and Austria indicated new ways of departure. The connection between the grids is effected by the very modern technique of "high voltage zero length direct current coupling", based on thyristor semi-conductors, and avoids the above-mentioned difficulties. If similar plans - already under discussion - to establish additional East-West connections in Northern Germany and Yugoslavia would be realized, this would be an important step in the direction of an all-European electrical power management. It is therefore recommended that the ECE in collaboration with the other European organizations concerned with electricity pursue this matter beyond mere studies. In the light of the new situation, that has considerably changed compared to the early seventies, the governments should give a political endorsement to the ECE activities.

P. Bozyk (Poland)

East-West Cooperation : Factors Restricting Development

A central thesis of this paper is that the development of economic cooperation between the East and the West reflects objective trends to internationalize socio-economic activities. This cooperation helps to speed up scientific-technological progress, improves economic effectiveness and, in consequence, helps to achieve a faster rate of their social and economic development.

The development of socio-economic cooperation between the East and the West is limited by three groups of restrictions, discussed in the paper, depending on both Western and Eastern countries.

The first group of such restrictions includes the differences between the structures of the economies of the Eastern and Western countries and the material structure of their mutual cooperation. The second group is represented by restrictions depending on differences in the Eastern and the Western socio-economic systems. The third group includes institutional restrictions.

The conclusion of the paper is that elimination of these restrictions will speed cooperation between both sides. Therefore, the development of East-West economic cooperation requires, first of all, that both sides should transcend their immediate interests and look ahead to their long-range interests.

F. Calogero (Italy)

How to Improve Scientific Collaboration in Europe

The correct way to establish and develop scientific exchanges that are really fruitful is through direct contacts between researchers; indeed the involvement of official bodies in such exchanges, necessary as it may be to provide funds and/or the required political framework, is often a liability rather than an asset, due to the associated, inevitable red tape.

Especially in those cases in which détente has allowed the development of sufficiently extended scientific links, the

main goal to be now pursued is the establishment of conditions allowing scientists to carry out their tasks in collaboration, without being hampered by geopolitical boundary conditions, or by such (scientifically irrelevent) details as the fact that two scholars have different nationalities or reside in different countries.

Considerable progress towards this goal has occurred in Europe over the last two decades. One of the main obstacles is the difficulty by individual scientists to accept invitations to visit other countries, due to the opposition of their authorities, or to the reluctance of the authorities from the other side, to grant speedily the necessary authorisation. These difficulties (especially those of the first kind) are more acute in some countries than in others. They are of course related to the differences in the socio-political makeup of the different states that coexist in Europe although they are often rooted in bureaucratic inertia more than in anything else. Realistic ways and means should be explored and pursued to eliminate such impediments to scientific collaboration, thereby fostering the full flourishing of détente of which such collaboration is an important component.

M. Dobrosielski (Poland)

Europe after Belgrade. Problems and Prospects

The Belgrade Meeting and its results should be viewed in the context of the current state of East-West relations, and especially between the United States and the Soviet Union. It should be also considered as one of many elements on the multilateral level of the process initiated by the CSCE.

"Belgrade 77" fulfilled basically the tasks set by the Final Act. It stressed the political importance of the CSCE. It reaffirmed the resolve of the participating States to implement all the provisions of the Final Act unilaterally, bilaterally and multilaterally - thus continuing and developing the process of détente. Despite the one-sided, progagandistic and ideological approach of the U. S. and some other western delegates the thorough exchange of views and information concerning the implementation in the past and future of all the provisions of the Final Act was ultimately a valuable contribution towards the achievement of the aims set by the CSCE. Many realistic proposals, which were put forward by socialist, non-aligned and neutral, and some western delegations can be further discussed in bilateral and multilateral international fora - such as the UN, ECE or UNESCO. "Belgrade 77" was a valuable lesson in political realism. It showed clearly that any attempt to force through proposals which run counter to the Final Act, to the rights inherent in sovereignty, or which aim at sanctioning interference in the internal affairs are and will be in vain.

In spite of differences a common programme for the development of the multilateral process of cooperation initiated by the CSCE was worked out, which indicates that all participants see no rational alternative to détente.

V.S. Emelyanov (USSR)

On the USSR's Economic, Scientific and Technical Cooperation in Europe

The Soviet Union's cooperation in Europe has deep roots going back to the period immediately after the state was established.

The importance of and pressing need for cooperation cannot be denied, for our civilization can only develop in a planned way given rational cooperation, not only on a bilateral, but also on a multilateral basis. This is particularly true today, when mankind is faced with several serious global problems that urgently need to be solved.

In recent years the importance of cooperation has been particularly stressed by Leonid Brezhnev in his report to the 25th Congress of the CPSU and his speech at the Conference of Communist and Workers' Parties in Berlin in June, 1976.

These and other related questions are reviewed in the paper.

B.T. Feld (USA)

A Splendid Opportunity

President Carter's decision that the United States will not now produce the neutron bomb should be welcomed. This decision, which is arousing strong opposition in the US, resulted from the President's strong conviction of the need for ending the arms race. It was made in spite of the growing imbalance of conventional forces in Europe. The President's decision was a firm endorsement of the principles of détente. There now exists a splendid opportunity for application of the concept of disarmament by mutual example. If the Soviet Union would quickly grasp this opportunity it might start a process of mutual, reciprocated arms control and disarmament measures of incalculable importance. For purposes of illustration a possible scenario is outlined that might once again put us on the road to nuclear disarmament. The Soviet Union could postpone the deployment of its new mobile missile, the SS-20. Such a move would relieve fears that a new generation of concealable missiles is being introduced into the Soviet strategic arsenal. The Americans could respond by cancellation of the new MX-missile or the abandonment of testing of a new generation of highly accurate ICBMs. This, in turn, could lead the Soviet Union to cancel increases in the SS-18 and SS-19 rocket forces, which would facilitate a SALT-III agreement at greatly reduced levels.

Each step of restraint, starting with the recent rejection of the neutron bomb, if it is followed by a freely chosen restraint by the other side, can lead naturally to the unwinding of the deadly nuclear spiral. In this sense President Carter's decision represents a splendid opportunity. It would be a tragedy if this opportunity were missed.

W. F. Gutteridge (UK)

Further Confidence-Building Measures : The Reduction of the Military Threat to Peace

Armed conflict may arise from misunderstanding or miscalculation of military activities and intentions. The Final Act of the Helsinki Agreement dealt with the pre-notification of military manoeuvres and the exchange of observers. In order to improve mutual trust at the more popular level the principle of providing information and explanation could profitably be extended to the field of actual military deployment and the transfer of arms.

Deployment of military and naval forces not only in Europe but outside it and in the seas around other continents generates suspicion. Notification of substantial movements even after the event might help to allay fears about ulterior motives.

With regard to external military intervention by forces from Europe and America in the less developed parts of the world, a code of conduct for military aid and support, including the notification to the UN of the extent of and reasons for such action, would in itself be a form of restraint.

Both these aspects are linked to fears about national and individual survival arising from competition for scarce mineral and energy resources. Cooperation on a pan-European basis with the aim of pooling resources and their rational allocation would be an important step towards eliminating the causes of conflict and diminishing perceptions of threat.

M. M. Kaplan (Switzerland)

European Collaboration in Science and Technology after Helsinki

An assessment of increased S and T collaborative activities of Eastern and Western European countries after Helsinki does not give much satisfaction to the high expectations at the time of the 1975 agreement. General recommendations, outlined in the paper, were made in Helsinki for exchange of information in fundamental science, the creation of a "Scientific Forum" of wise scientist statesmen to forward activities and exchange of information, increased collaboration in the humanities and social sciences, and in education (history, geography, foreign languages and civilization, etc.).

Suggestions are given for greatly intensified east-west collaborative efforts for research in agriculture, energy, medicine and public health. An increase in the magnitude required would necessitate a corresponding increase in funds and manpower by the governments concerned in addition to mere expressions of goodwill on both sides.

The Symposium was asked also to discuss the vexing question of human rights raised at Helsinki and Belgrade, the repercussions of which threaten scientific collaboration in Europe and elsewhere.

J.K. Miettinen (Finland)

The Neutron Bomb and Nuclear Disarmament in Europe

The main arguments against the deployment of the neutron bomb are:

1. Its deployment would be against the commitment the nuclear weapon powers made in the NPT, "to progress towards nuclear disarmament".
2. It would also make the proposal for a ban on radiological weapons seem hypocritical, since neutrons are vastly more toxic than the beta- and gamma-emitting fission products of radiological weapons.
3. The neutron bomb is also inherently a legally dubious weapon on the basis of its delayed effects and its potential to cause "unnecessary suffering".
4. Being "small and clean" the neutron bomb would facilitate the use of nuclear weapons, i.e. lower the nuclear "threshold".
5. Its "advantages" in offensive use are at least equal to those in defensive use. It is not primarily a defensive weapon.
6. The neutron bomb should not be deployed, but its banning alone would not bring essential improvement to the existing situation since it is intended as replacement for much bigger and dirtier fission warheads. More efficient measures of nuclear disarmament are therefore necessary.
7. The present fervent modernization of the nuclear arsenals of both military alliances is at least partly due to worsened political relations between the United States and the Soviet Union. Realization of SALT II soon is of primary importance. Furthermore, the nations of Europe ought to work more efficiently for removal of all nuclear forces from Europe.

W. Multan (Poland)

Premises and Obstacles to Military Détente in Europe

The paper considers the main groups of activities encompassed in the term "Military Détente" in Europe, as follows:

1. Activities arising from agreements on quantitative and qualitative ceilings of arms and armaments.
2. Political, organizational and technical measures undertaken to minimize the risk of an outbreak of unintended or unauthorized military conflict between the countries of NATO and of the Warsaw Treaty.
3. Prohibition of research work, tests, production or obtaining in any other way defined kinds of armaments.
4. Creation of partly or totally demilitarized zones.
5. Agreements on total or partial withdrawal of arms and armaments from agreed areas.
6. Realization of obligations as defined in the CSCE Final Act by all countries as confidence building measures.
7. Commitments to limit military expenditures.

Positive and negative influences - European and global - on the above are reviewed.

PUGWASH WORKSHOP ON 1979 UNITED NATIONS CONFERENCE ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT

Rabat, Morocco, 20-22 April 1978

Agenda

1. Major issues of the 1979 Conference and their resolution.
2. The Pugwash role in:
   a. national, regional and inter-regional preparations;
   b. contributions of international organizations, e.g., ICSU, NGO's.
3. Specific Pugwash inputs into Conference:
   a. Comments on draft of Guidelines for International Scientific Co-operation for Development and background document.
   b. Possibilities of Delphi type inquiry of Pugwash scientists on possibilities of scientific breakthroughs of major significance to developing countries if intensive international collaborative research and development efforts could be mounted.
   c. Other possibilities, including disarmament and development.

List of Participants

I. Ahmad (Pakistan)
A. Alaoui (Morocco)
M. Innas Ali (Bangladesh)
J. Bahraoui (Morocco)
A. Benabdeljalil (Morocco)
D. Bensari (Morocco)
L. Berlinguet (Canada)
W.K. Chagula (Tanzania)
S. Cherkaoui (Morocco)
M. Elmandjra (Morocco)
E.E. Galal (Egypt)
K. Gottstein (FRG)
O. Hoffmann-Ostenhof (Austria)
M.M. Kaplan (Director-General)
I. Khalil (Morocco)
A. Lemma (UNCSTD)
M. Najim (Morocco)
M. Nalecz (Poland)
A. Parthasarathi (India)
V. Rabinowitch (USA)
G. Starushenko (USSR)
B.M. Udgaonkar (India)
M.S. Wionczek (Mexico)
A. Zhiri (Morocco)

Report from the Workshop

The Workshop was held in the Faculty of Science, University of Mohammed V, Rabat. Twenty-four participants from 14 countries attended as guests of the University and the Moroccan Pugwash Group. The meeting was facilitated by the kind financial assistance for travel of some of the participants by the International Development Research Centre (IDRC) of Canada, and by the United Nations Conference on Science and Technology for Development (UNCSTD) with respect to some members of the United Nations Advisory Committee on the Application of Science and Technology for Develop-

ment.

The principal aim of the Workshop was to discuss possible contributions by scientists of the Pugwash Movement in preparations for the UN Conference on Science and Technology for Development to be held in August 1979, and at the Conference itself.

A. Guidelines on International Scientific Cooperation for Development

A major item on the agenda was the draft Pugwash Guidelines on International Scientific Cooperation for Development. Discussions on this subject within the Pugwash Movement have been underway since the 25th Pugwash Conference held in Madras in January 1976. Based on those discussions, an international Pugwash Workshop was organized by the Indian Pugwash Society at Badkal Lake, Haryana, India between January 11 and 14, 1978, to draft such a set of Guidelines. The Rabat Workshop reviewed the draft Guidelines as they came out of the Badkal meeting and expressed its broad support to them. It was noted that the Steering Committee appointed at Badkal would amend the Guidelines in the light of the observations made on the draft at the present Workshop. Thereafter, the Guidelines would be presented to the Pugwash Council at its meeting to be held at Varna in September 1978, for approval and official submission to the UNCSTD. However, the Workshop felt that the Guidelines would be a valuable input not only to the UNCSTD in August 1979, but more particularly into the series of national, regional and inter-regional preparatory meetings for UNCSTD scheduled to be held during the next few months. It was, therefore, recommended that the Guidelines as revised by the Steering Committee in the light of discussions in Rabat be forwarded urgently by the Director-General of Pugwash to the Secretary-General of the UNCSTD as an interim document (pending Pugwash Council approval). While doing so the Director would request that the UNCSTD Secretariat give the document wide circulation at the forthcoming preparatory meetings, and also to the national and regional focal points, in view of the high importance and relevance of the Guidelines to problems associated with the aims of UNCSTD.

B. Some Issues of Possible Conflict between LDCs and DCs at 1979 UNCSTD

The Workshop considered that a useful exercise would be to formulate some of the major issues of possible conflict between LDCs and DCs at the UNCSTD itself in order to clarify such issues and thereby perhaps avoid impasses which could seriously compromise the success of the Conference. These are given in an annexe to this report.

C. Disarmament and Development

The Workshop noted that the arms race has now contaminated the developing countries whose meagre resources are being spent on arms purchased from the developed countries to the detriment of their economic and social development.

Disarmament would liberate financial resources and manpower in the long run that could be redeployed to assist the development efforts of Third World countries. The political and socio-economic transformation of the international system which such a process would bring about could be most conducive to the establishment of a new international economic order. It was also felt that such a new order would itself help in facilitating the process of disarmament.

The scope of disarmament envisaged by the Workshop in this context was a comprehensive one covering all types of arms and all countries, regardless of the level of their economic development.

The link between disarmament and development was emphasized and it was recommended that this subject ought to be

highlighted in the Pugwash input to the 1979 UNCSTD. It was felt, however, that such a complex subject required a study in depth and a thorough analysis which would represent a long term undertaking. Pugwash should nevertheless prepare an overview statement on this important issue before the convening of the 1979 UN Conference, pending the results of the aforementioned study.

It was decided to establish a temporary Steering Committee on "Disarmament and Development" to continue work on this problem. The Steering Committee will be composed of: Prof. M. Elmandjra (Convener), Prof. E.E. Galal, Prof. O. Hoffmann-Ostenhof, and Prof. G. Starushenko.

The terms of reference of the Steering Committee are:

(1) to prepare a preliminary draft statement by mid-July 1978 to be presented to the Pugwash Council during the Annual Pugwash Conference in Varna (September 1978), and
(2) to prepare a preliminary outline of the in-depth study for consideration by the Council.

The Workshop also recommended that the Council should at its next meeting in Varna appoint a larger Committee which would finalize the Pugwash statement on Disarmament and Development for presentation to the UNCSTD in August 1979.

D. Possibilities of Delphi-type inquiry of Pugwash scientists on possibilities of scientific breakthroughs of major significance to developing countries if intensive international collaborative research and development efforts could be mounted

The group discussed whether an inquiry should be made within the Pugwash Movement on the above topic. It was agreed that a comprehensive Delphi-type inquiry of consecutive stages would not be possible within the time-frame desired for an input to the 1979 Conference. Also, the group was informed that the Pugwash secretariat facilities and resources did not permit such an extensive study to be undertaken. It was felt highly desirable, however, to obtain preliminary information from Pugwash scientific participants relevant to the aim of the inquiry which might be useful as a contribution to agenda item 1d of the Conference (New science and technology for overcoming obstacles to development). The group therefore recommended that a simple questionnaire be prepared by a sub-committee (Mr. Parthasarathi, Prof. Gottstein, Dr. Rabinowitch) for circulation to Pugwash scientists to obtain such preliminary information for an input into preparations for the Conference. This should be accompanied by a check-list of urgent problems in LDCs which could be resolved or greatly reduced by S and T as indicated in the title of this section.

Should the results from this preliminary inquiry warrant proceeding more in depth with the study, the group recommends that this matter be reconsidered for action by the Pugwash organization.

E. Assessment and Evaluation of Past Experience in Cooperation

A suggestion was made that an inquiry into the positive and negative experiences encountered in scientific-technological cooperation between DCs and LDCs, and a survey of observations made by scientists engaged in such cooperation projects, would be useful. It was decided, however, that such an undertaking would be beyond the capacities of Pugwash. Moreover, material of this nature was already available in the files of the United Nations and other international organizations.

F. Science and Technology and the Future

The Workshop emphasized the importance which Group 5 of the Munich Conference attached to item 4 of the agenda of the 1979 UNCSTD dealing with "Science and Technology and the Future". It was felt that this item was a vital one, particularly to the developing countries who are seeking accelerated change but who should have a long term view of the social and cultural implications of science and technology. It was agreed that this question, insofar as it did not raise immediate economic and political issues, could lead to common visions of future societies preoccupied mainly with improving the wellbeing of humanity at large. The Workshop recommended that the Pugwash input to the 1979 UNCSDT accord an adequate place to the issues connected with "Science and Technology and the Future".

Annex

SOME ISSUES OF POSSIBLE CONFLICT AT THE 1979 UNCSTD BETWEEN DEVELOPING (LDCs) AND DEVELOPED COUNTRIES (DCs)

Introduction

The issues considered below are already the subjects of wide debate which will no doubt be reflected at the Conference itself in 1979. The following formulation is intended primarily to highlight some problems and points of disagreement, and not to attempt their resolution. Further study and documentation on these issues, in preparation for the Conference, would serve a useful purpose.

Another complication to be kept in mind with the generalizations involved in the use of the terms "LDCs" and "DCs" is the wide spectrum of political systems, socio-economic levels, and the cultural diversity of both groups. For example, it is quite clear that the approach to some of these problems by the developed and less industrialized socialist countries will be quite different from those of capitalist economies. Thus the qualifications "some", "many", or "most" LDCs or DCs will have to be kept in mind in the following presentation.

1. The central issue of the Conference

LDCs are very likely to take the position that this issue should be the building up of their indigenous S and T capabilities on a self-reliant basis, i.e., the attainment of a capacity for autonomous policy-making and decision-taking on their technological development. They will try to get the Conference to agree that all measures for promoting S and T for development should be directed at this objective and that all other objectives should be subordinated to this prime goal.

The DCs may accept this view, although with the argument that self-reliance is inconsistent with cooperation between DCs and LDCs on S and T for development. Some of them may question the legitimacy of self-reliance itself (both national and collectively among the LDCs) and argue that emphasis should be placed instead on a drive to enable LDCs to benefit from a transfer of "readily available" S and T from DCs to LDCs. Moreover, even those DCs which accept the concept of self-reliance may also argue that an important aspect of this issue are the

measures for a self-reliant development as a whole, including the application of S and T for such a development.

2. Basic Needs vis-a-vis Growth Maximization through Industrialization Utilizing Modern Technology

The DCs are likely to point to the relatively more recent concern of the LDCs (essentially in the '70s) with a basic needs oriented Development Strategy as being in conflict with the LDCs earlier concern for rapid industrialization and maximization of short run economic growth, and hence argue that they (the DCs) are consequently confused about the ways in which they could help LDCs in the S and T area. The LDCs will probably point out that this was a false dilemma: that while some basic needs required advanced technologies for their attainment, others did not; and that industrialization was itself an important means for enabling LDCs to achieve a need-oriented development strategy.

3. New International Scientific and Technological Order (NISTO)

LDCs will insist on the establishment of a "New S and T Order" without spelling out clearly what this encompasses in addition to the Code of Conduct on Trans-National Corporations, the Code of Conduct on the Transfer of Technology, the revision of the international patent system, and measures to build up the technological capacity of the LDCs.

DCs will insist on a piece by piece approach and prefer to tackle specific problems.

4. Institutional Models for the Application of Science and Technology for Development and their Implications for International/Bilateral Cooperation for S and T.

This concerns the well-known debate on "centres of excellence" and their effects on "external" and "internal" brain drain; the setting up of new institutions versus upgrading/renovating existing ones; and to what extent should the structures chosen by DCs be "models" for the LDCs. DCs are likely to argue that "proven" solutions exist, while LDCs will probably respond that this is not always so, and that there is a need to accept, indeed encourage, diversity and innovation in institutional forms. Moreover, DCs are likely to highlight (particularly in their national papers) that "twinning" of a DC and an LDC R and D institute/university is a "proven" mechanism, while LDCs may point out some of the shortcomings of such a mechanism and argue for a more pluralistic approach. LDCs will also call for non-insistence (by DCs) on the "expert-equipment-training package" of science aid or technical assistance.

5. R and D in DCs Adversely Affecting LDC Economies Particularly in the Area of Primary Commodities

A major concern will be synthetics replacing natural products, e.g. leather, jute, and sweeteners replacing sugar.

6. Disparities among LDCs

The DCs will be ready and willing to help the poorer countries, but be more hesitant and reluctant with more advanced and dynamic LDCs which could become competitors to the DCs in the world markets.

7. What is Appropriate Technology?

DCs will argue that, by the assessment of the LDCs themselves, much of modern (i.e. "Northern") technology is not suited to be used in LDCs, and that therefore the LDCs should not demand access to such modern technologies themselves and/or provide incentives to private industry in the DCs to develop and transfer such technologies to LDCs.

LDCs will point out that this is a complete misunderstanding of the concept of Appropriate Technology (AT) by the DCs. Replacing AT by "Intermediate Technology" only makes the misunderstanding worse, and what they mean by AT is the generation and/or acquisition by an LDC of a mix of technologies deemed appropriate by that LDC to meet its own needs, rather than single isolated techniques, and that therefore no technologies should be denied to them.

8. What Does "Access to Technology" Mean?

DCs feel that when LDCs argue that the present international technological order hampers the free flow of technology, and puts obstacles in the path of their securing access to technology (patented or otherwise), what the LDCs are demanding is the DCs providing them all available technologies free.

The LDCs will note that what they mean by "free access to technology" in respect of proprietory technologies is basically not being prohibited (by political and economic barriers) to purchase technologies from the DCs at a negotiated price.

9. What Does "Transfer" of Technology Imply?

The DCs will argue that much of "Development" in the LDCs in the last 30 years has been due to technology transferred by them or by private companies operating from their territories) to the LDCs, and that therefore the LDCs should provide the 'incentives' needed for this transfer to continue.

The LDCs will argue that the mere physical establishment of plants is not "genuine transfer", i.e., much of this has been a pseudo-transfer in that it has not led to the rooting of those productive capacities in their soil, let alone to the building up of an autonomous technological capacity of their own, and that often all that has happened is a physical shift of the point of production from a DC to an LDC.

10. Role of Trans-National Corporations (TNCs)

The LDCs will cite a long list of problems (if not instances of mala fide acts, including political de-stabilization) they have had with TNCs. They will want definitive endorsement by UNCSTD of the need for a Code of Conduct regulating the activities of TNCs which DCs would be asked to join with them in enforcing.

The DCs will argue that the TNCs are a fact of life and that they have benefited many LDCs. What the LDCs should strive to do is to arrive at a modus vivendi with the TNCs in a way which will enable the LDCs to use the TNCs to build up their own technological capabilities. Furthermore, some DCs will argue that TNCs are private industries on which governments have only indirect controls (which is the essence of their political system).

GUIDELINES FOR INTERNATIONAL SCIENTIFIC COOPERATION FOR DEVELOPMENT

(Interim Draft)

Note: It is realized that the following interim draft needs further revision and editing. We are reproducing the draft at this time for the purpose indicated under "Background", and to elicit suggestions which will be taken into account by the Steering Committee charged with preparing a final draft for submission to the Pugwash Council in Varna. Please send your comments to the Central Office.

M.M.K.

Background

The Guidelines for International Scientific Cooperation for Development were drafted at an international Pugwash Workshop on this subject held at Badkal Lake, Haryana, India, 11-14 January 1978. Participants in the Workshop are listed below. The resulting draft was the responsibility of a Steering Committee (indicated in the list with an asterisk) entrusted to continue work on the document until a final draft would be achieved which would ultimately be submitted to the Pugwash Council for transmission to the United Nations Conference on Science and Technology for Development (UNCSTD) scheduled to be held in Vienna, 20-31 August 1979. The Badkal draft was reviewed by a Pugwash Workshop on the 1979 UNCSTD held in Rabat, Morocco, 20-22 April 1978 (see list below), and broadly supported. Comments from participants at the Rabat Workshop were incorporated by the Steering Committee, with the present document as a result. The Rabat Workshop recommended that this document be widely circulated as a background for discussions and active preparations for UNCSTD 1979 which are now underway at nations, regional and international levels. The present draft should be considered as an interim one pending further modification, final approval and official submission by the Pugwash Council to UNCSTD 1979.

Participants in Pugwash Workshop, Badkal Lake, India, 11-14 January 1978

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I. PREAMBLE

1.1 Science provides special opportunities for exploitation as an instrument of global solidarity. Moreover, science now offers us the tools that could help to banish poverty, ignorance and destitution from the face of the earth. This potential could be appreciably enhanced by concrete steps towards disarmament - the problem which along with that of development are the major concerns of Pugwash.

1.2 At the time of the UN Conference on Science and Technology for the Benefit of Less Developed Areas, held in Geneva in 1963, it was widely believed that a massive transfer of science and technology from the industrialized North could substantially reduce poverty, hunger and disease in the lesser developed countries of the South. This view has proved to be false.

1.3 Access to the technology of the North was found to be much more difficult than had been envisaged at that time. There is now a growing awareness of the constraints arising from a divergence of interests, whether real or apparent, of the parties, and from the structural and operational imcompatibilities in the international system. Enormous gaps separate many of the less developed countries (LDCs) from the developed countries (DCs), and in fact most LDCs have no scientific and technological infrastructure of their own to speak of. Thus the countries of the South have been unable to generate advanced technologies of their own, and have even found it difficult to assess and select suitable technologies for import, or to adapt and assimilate such technologies as they do acquire from the North. As a result of the unfulfilled expectations of the developing countries and the continuing state of dependence, there has been widespread disillusionment with past efforts at cooperation among scientists from these countries. It is now recognized that a prerequisite for successful cooperation between LDCs and DCs is the creation within the LDCs of capabilities that would enable them to face the complexities of international cooperation in science and technology (S and T) on an equal footing with the DCs.

1.4 As the close of the Second Development Decade approaches and we move toward the UN Conference on Science and Technology for Development (UNCSTD) in 1979, the prevailing view of the problem is that countries of the South must build up an autonomous capability for problem solving, decision-making and implementation in all matters relating science and technology to development. This notion includes development of capabilities to generate, adapt, utilize, and diffuse scientific and technological knowledge relevant to indigenous objectives. This is the essence of self-reliance in S and T. Since the achievement of self-reliance at the national level may not be feasible for many LDCs, measures to achieve collective self-reliance in the developing world will also be needed.

1.5 The industrially advanced countries of the North can assist this proces in a number of ways. One of these is through collaborative S and T projects with countries of the South. In the past such projects have often been fragmentary in character, uncoordinated with other projects, or not integrated with overall development efforts or with the S and

T priorities of the developing country concerned. Thus, while such endeavours have helped in the creation or strengthening of S and T institutions in the South, in the training of S and T manpower, in the generation of new knowledge and the application of existing knowledge to certain developmental problems, they have not by and large contributed significantly to the strengthening or building of local scientific and technological capabilities for problem solving. They even appear at times to have benefited the interests of the countries in the North rather than those of the South, and have also occasionally led to misunderstandings and abuses.

1.6 An important sector - almost one half - of the scientific and technological manpower among DCs is involved in research and development (R and D) for the military and for trans-national corporations (TNCs). There is deep concern among the LDCs that their national development could be adversely affected by international collaboration involving these scientists and technologists, who may be biased by their ties. Furthermore, the increasing concentration of scientific and technological manpower and resources in military R and D and in the TNCs, with their built-in constraints, severely limits the scope of international S and T cooperation for development. It also distorts the conditions under which such cooperation takes place.

1.7 As the world seeks ways to move from a period of confrontation between the North and the South to one of positive forms of cooperation with the objective of a New International Economic Order, it is likely that many more collaborative projects will be proposed. In order that these may contribute in the most effective manner to the aspirations and developmental objectives of the South and to avoid the worst of previous misunderstandings and abuses, a set of Guidelines for scientific collaboration projects has been prepared. These are conceived as complementary to the Code of Conduct for Transfer of Technology - an earlier Pugwash initiative (1974) - which is now evolving at the inter-governmental level within the framework of UNCTAD. These Guidelines are addressed to the governments and funding agencies of both the North and the South, to international organizations, and to scientists who will be involved in these collaborative ventures.

2. NEW APPROACHES TO DEVELOPMENT AND INTERNATIONAL SCIENTIFIC CO-OPERATION

2.1 International scientific cooperation for development must be based on a proper understanding of the character and objectives of the development process, as well as of the limitations of development strategies pursued in the past several decades. It is now widely recognized that these strategies need to be drastically revised. New strategies of development should take into account the following premises and principles:

(a) Economic growth alone does not lead to balanced social development. The principal focus now is explicitly on the satisfaction of basic human needs (adquate food, shelter, health, education and employment, in particular), especially of the lowest social and economic strata of the population.

(b) Meaningful development involved participation of the people themselves in the shaping of economic and social change.

(c) Development is not a linear process, and should not involve simply a replication in the LDCs of the structures and policies of the DCs. There are many roads to development - socialist, capitalist and all the possible variations; thus in its application the concept of development

should respect the cultural patterns of the society concerned, so that the life style of that society may not become an indiscriminate copy of the experience of the industrialized North.

(d) Mere transfer of technology is not enough. Even if technology is freely available, a nation cannot develop unless it has an S and T infrastructure of indigenous resources of manpower, knowledge, technology and productive capacity, and the imported technology is absorbed into that base. It is therefore necessary for LDCs to be self-reliant, individually wherever possible, and collectively as well so that the slender S and T resources of most LDCs may be pooled to maximum effect.

(e) Industrialization, whether for export, for exploitation of mineral or other resources, or for production of wage goods, should not be merely a graft of certain industries onto a country or a region; such an approach does not necessarily lead to development. Industrialization should be conceived primarily as a means for meeting the basic needs of the population, and should maintain a priority for spreading the benefits to the poorest segment of the society.

(f) One cannot have two types of science, one for the LDCs and the other for the DCs; LDCs should not be satisfied with a derived science which is continually dependent on that of the DCs. For this reason, a national capability for basic research is as important for the LDCs as for the DCs, although the problems dealt with and the criteria of choice will no doubt be different.

2.2 International Scientific Cooperation for Development

International scientific cooperation for development should involve:

(i) the promotion of values and a motivation system conducive to such cooperation;

(ii) the assumption by the LDCs and the DCs of the responsibility - individually and collectively - to promote conditions which will enable LDCs to follow a self-reliant strategy in science and technology;

(iii) ensuring that the security of LDCs (political, military, economic, etc.) is not jeopardized; and

(iv) further strengthening of mutual trust and confidence between DC and LDC scientists.

With these considerations in mind the following Guidelines for International Scientific Cooperation for Development have been set forth.

3. GUIDELINES FOR LDC GOVERNMENTS AND SCIENTISTS, AND WITH REGARD TO COOPERATION AMONG LDCs

The success of international scientific and technological cooperation depends as much, if not more, on the developing countries as on the advanced countries and international organizations. To the extent that the LDCs identify their own S and T needs and priorities, build up their science and technology capability, and expand their capacity to assimilate, adapt and improve imported scientific and technological knowledge, their cooperation in this field with the outside world will become effective.

3.1 Guidelines for LDC Governments

(a) A prerequisite for the buildup of indigenous S and T capability is the realization at the highest government policy level that:

(i) such a buildup is a long-term process, to be nurtured patiently;

(ii) it requires the establishment of effective interaction on a durable basis between the S and T community,

the educational system, the productive system, and the political system - links which are often missing the LDCs;

(iii) it cannot be achieved only by training manpower and establishing research centres at random, or by the uncoordinated use of technical assistance programmes. Rather it implies the careful construction of a broad-based and viable scientific and technological infrastructure, including managerial capability to organize and use it;

(iv) it involves the preparation of a long-term science and technology plan, integrated with the general socio-economic plan, and mechanisms for implementation;

(v) S and T policy is not just one of the many sectors of government policy; it is a decisive one for the future of the entire country;

(vi) it is unrealistic and unproductive to base development strategies on the availability of massive foreign aid, whether financial, scientific or technological. Local resources and structural and operational mechanisms must be committed to ensure an integrated and balanced development through an S and T plan linked with the socio-economic plan.

(b) The scientific community, higher education institutions and major science and technology users both in the public and private sector should be actively involved with government policy makers in the construction of national policies, and in the preparation of the S and T plan in particular.

(c) This plan should define the S and T tasks in each socio-economic sector, and the general priorities and options for intensive domestic effort in S and T. It should also indicate appropriate areas for collaboration, and the possible inputs from DCs consistent with the priorities and commitments of the overall plan.

(d) The plan should include the implications of a strategy to diversify the economy of the country so that it does not depend on a few primary products (agricultural or mineral) only.

(e) The S and T planning process should also address itself to problems of possible conflicts between the proposed S and T policy instruments and specific economic and social policies in force (e.g., fiscal, industrial, labour, agricultural, foreign investment, technology import), before decision to implement indigenous science and technology capability as a major national objective is taken at the highest level.

(f) Proposals for S and T cooperation should be scrutinized with a view to ensuring that dependence of the LDC in the area concerned is not perpetuated. The objective should be always in the direction of developing indigenous capabilities and self-reliance. Such proposals should not promote participation of foreign experts or advisers but rather give preference to national advisers and experts alone, or in conjunction with temporarily needed foreign counterparts.

(g) In any collaborative undertaking the formulation of the project and the decision-taking, managerial and evaluation function should always be retained in the hands of LDC personnel, even if there is need for initial training.

(h) Cooperative projects should not be conceived of as replacing indigenous endeavours. If such projects are inadequate

in scope or quality, collaboration should be directed towards strengthening and upgrading, rather than to eliminating them.

(i) LDC governments should also consider the implications for their policies and actions of the Guidelines suggested for DC governments and international agencies (section 4) and accordingly establish suitable modal groups for scrutiny of collaborative projects.

(j) S and T policy formulation and implementation must be supported by an appropriate educational and training system, by R and D institutions of high quality in tune with the demands of a developing society, and by an adequate information and documentation system. Where this cannot be done nationally, a regional approach could be adopted. *

(k) Non-governmental scientific bodies should be supported so as to enable them to play an effective role in building an S and T community.

3.2 Guidelines for LDC Scientists and Technologists

To prepare themselves for the challenges of development and for fruitful participation in cooperative projects, scientists and technologists from LDCs should:

(a) Organize themselves into an effective scientific community in each country that can determine its own standards of relevance and excellence in S and T work, and is known and respected for these standards.

(b) Engage not only in scientific research and communication, but also in efforts to maintain support for science as a public policy.

(c) Emphasize the intellectual challenge in the application of existing knowledge to neglected areas of development and recognize outstanding work of this nature when considering appointments,

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* The educational system must emphasize not only knowledge and skills but also attitudes conducive to full participation of the educated (scientists in particular) in the developmental tasks. It has to train high level specialists as well as auxiliary personnel such as technicians, librarians, computer personnel, etc. The production of indigenous books, journals and teaching aids should be promoted to develop self-confidence. Programmes for international cooperation in education and training should derive from national priorities, and be revised with a view to minimizing the risk of alientating scientists, and to reducing their dependence on foreign sponsors.

Existing R and D institutions should be strengthened and new ones created. They should have: proper organization, adequate administrative support, and institutional autonomy; critical size inputs in areas of finance, research and technical staff and equipment to encourage the emergence of viable groups; computation and data processing facilities; facilities for economic and feasibility studies; and pilot plants to scale up laboratory processes. These institutions should be linked with production and service sectors. Both short-term and long-term programmes should be supported. LDC governments should avoid purchase of foreign technology when indigenous development is about to bear fruit. Local R and D institutions and design engineering organizations should be associated with any decision to acquire foreign technology.

The physical infrastructure and organization of national information and documentation must also be strengthened. Planning in LDCs is often handicapped for want of a reliable data base.

career advancement and awards.

(d) Accept direct service to society and the economy as a necessary part of their professional activities and as a social obligation.

(e) Take responsibility, individually and collectively, to promote conditions which will ensure the self-reliant development of the LDCs.

(f) Involve themselves in the public debate on development issues in general and the role of S and T in particular, to build up credibility for S and T as an instrument of development within their countries.

(g) Press national policy makers to prepare an S and T plan as an integral part of the plan for socio-economic development, according to which scientific and technical manpower as well as natural and financial resources may be mobilized for a sustained attack on those S and T problems that bear on basic human needs such as food, shelter, health and education.

(h) Be alert to possible social, economic and political implications of advances in science and technology, and undertake to assess these implications.

(i) Take an active interest in problems relating to the improvement of the human condition in their own country and other countries, and in current global issues related to the dangers inherent in the energy situation and the rapid depletion of non-renewable resources.

3.3 Guidelines for Collaboration among LDCs

The LDCs cover a wide spectrum of development needs and S and T infrastructure and capabilities. Provided the necessary political will can be generated, LDCs can learn much from each other's experience in the application of S and T to development. It is therefore important for LDCs to take steps to enhance their S and T cooperation. With this in view LDCs should consider action to:

(a) Promote the systematic exchange of information concerning their experience in science policy and planning, building S and T infrastructure, and the acquisition, development and application of S and T knowledge. In this regard regional and sub-regional information centres could be set up.

(b) Establish machinery to facilitate the dissemination and exchange of S and T knowledge and experience originating in the LDCs so that the comparative advantages and specializations of various countries or sectors can be fully utilized.

(c) Make appropriate institutional arrangements for the training and exchange of S and T personnel.

(d) Establish associations of research councils and joint R and D centres in areas of common interest, and machinery for exchange of recently developed S and T knowledge.

(e) Promote S and T projects between LDCs with common S and T requirements arising from similarities in natural endowments, sectoral structures of production, or other factors.

(f) Endeavour to coordinate their S and T policies.

(g) Pool their S and T resources and capabilities for collective self-reliance in S and T for development.

To facilitate such action, focal points specifically charged with these responsibilities should be established within LDC governments and international agencies.

3.4 Cooperation Arrangements between LDCs and TNCs

3.4.1 The presence of Transnational Corporations (TNCs) in today's world is as real as the presence of national States. Not only is the economic, scientific and technological capability of many TNCs much greater than that of most LDCs, but TNCs also control a large part of available modern technology and thus represent a major potential channel for technology transfer. LDCs must search for ways to meet the challenge of TNCs and to use these corporations as effectively as possible to increase the indigenous, scientific and technological capability of the LDCs. Contrary to conventional wisdom, the traditional technology transfer mechanism of TNCs which consists of a transfer of technical knowledge from a parent TNC in a DC to its subsidiary in an LDC does not necessarily increase the S and T capability of the LDC. It might even inhibit its growth, for example, by attracting to the TNC subsidiary the best local scientific, technological and managerial talents, and using them to further the objectives of the TNC's global system which could stand in conflict with the objectives of the State, particularly in a LDC.

3.4.2 The existence of government mechanisms for regulating the activities of TNC affiliates, particularly their technological activities in the host country, is essential for any successful scientific and technological arrangement between a LDC and a TNC. Such arrangements should aim specifically at: (a) increasing the affiliates' contributions to indigenous scientific and technological education; (b) increasing the technological capacity of domestic firms that produce intermediate inputs for the affiliates' production of the final products; and (c) increasing the level of technological knowledge of distributors and users of the capital goods and major consumer durables produced locally by TNC affiliates. Since these objectives cannot be achieved by training activities of LDC personnel undertaken by TNC affiliates, the LDC governments should consider that these affiliates should:

(i) contract a part of their own R and D needs with local R and D centres;

(ii) permit their personnel to engage in part-time R and D work in local higher-level educational and research institutions;

(iii) make available their own R and D facilities for training of scientists and technologists from outside the affiliates; and

(iv) organize technical training programmes for personnel of local sub-contracting firms and local distributors of their products.

Any such contribution of TNC affiliates to local R and D or training programmes in the host country should, however, be consistent with the self-reliant S and T of the LDC concerned, and should not distort national S and T priorities as advanced in the country's S and T plan. Many considerations regarding cooperation between LDCs and DCs (section 4) apply similarly to cooperation between LDCs and TNCs.

4. GUIDELINES FOR DEVELOPED COUNTRY GOVERNMENTS, FUNDING AGENCIES AND SCIENTISTS

4.1 Collaboration between a DC and an LDC may generate new knowledge relevant to development, may lead to the increase of local scientific and technological capabilities in the developing country, or to the application of existing knowledge to development objectives. Guidelines for commercial transactions in technology are excluded below as they are covered by the Code of Conduct for Transfer of Technology being negotiated in UNCTAD.

4.2 Guidelines to Governments and Funding

Agencies

(a) Priority should be given to projects which contribute most to the building up of local scientific and technological capabilities in developing countries.

(b) The choice and mode of implementation of collaborative projects should accord with the development priorities that have been determined by the developing countries themselves and reflected in the commitment of their own resources. DC governments and agencies should therefore channel their funds for cooperative projects through the national authorities of LDCs.

(c) Training programmes for LDC nationals should be provided in those areas and disciplines for which there is a clear need in the developing countries as determined by LDCs themselves.

(d) The leader of a project undertaken in a developing country should be a national of that country and responsible for its management and technical control. When this is not possible, the first phase of the project should include the training of managerial and technical directors.

(e) The choice of any foreign consultant required by the LDC partner in the collaboration should be made by the country itself and not be imposed by the DC partner.

(f) Sponsoring agencies in DCs should stipulate that any S and T cooperative project in LDCs should be undertaken jointly with local institutions where they exist.

(g) Collaborative projects carried out in DC laboratories or institutions should involve scientists from the participating LDC, and they should ensure that the results of such projects flow to, and are applied in, the LDC concerned on a preferential basis.

(h) When the results of collaborative research can be commercially exploited the LDC partner should have the priority in patenting and use of these results.

(i) The dissemination of raw data collected in a developing country in the course of a collaborative projects should be at the discretion of the developing country partner.

(j) A collaborative projects should be viewed and integrated within the framework of a long-term development programme as defined by the developing country.

(k) Collaborative programmes should not be used to exploit LDCs as testing grounds for new scientific concepts or technical innovation where such work cannot be carried out in the DCs.

(l) Whenever a collaborative project involves research in drugs, chemosterilants, pesticides, etc., in an LDC, these trials should conform not only to the current regulations and ethical requirements in the LDC but also to the regulations of the DC and/or those accepted internationally (unless an explicit decision to the contrary is taken by the developing country partner - as was the case with DDT in some countries).

(m) Identification and assessment of the ecological implications of collaborative programmes should be a part of the programme itself. Collaborative research conducted in an LDC should be not only in accordance with the LDC's own environmental standards, but with international environmental standards as well.

(n) Collaborative programmes should allow for mechanisms other than the "expert-equipment-training" package, especially when the "expert" component is unnecessary.

(o) S and T cooperation should not be used to impose any particular political or economic system on an LDC

4.3 Guidelines for Scientists and Technologists from Developed Countries

Scientists and technologists from the developed countries who participate in collaborative projects in developing countries should:

(a) Ensure that their work is for the benefit of the developing countries, and not for other purposes which might conflict with that goal.

(b) Do their utmost to contribute to building up the local scientific and technological capabilities in the developing countries so that they may conduct their own programmes as soon as possible without having continuous recourse to foreign inputs.

(c) Draw the attention of LDC agencies or governments to the existence of local expertise in the speciality of the DC scientists of which the agencies may not be aware.

(d) Refrain from operating under the guise of a collaborative project with an LDC in order to use their scientists to collect data and conduct surveys primarily for the benefit of DC research, rather than for that of the LDC.

(e) Be continuously aware of the operative political and economic constraints on their freedom, arising from the fact that DC scientists often depend on government and industry liaison for their work.

(f) Be alert to the possible social, economic and political implications for developing countries of advances in S and T, and undertake detailed assessments of such implications in collaboration with LDC scientists.

5. GUIDELINES FOR INTERNATIONAL COOPERATION UNDER THE AUSPICES OF INTERNATIONAL AND REGIONAL ORGANIZATIONS

5.1 The part played by international organizations in scientific cooperation for development is being debated. There is an urgent need for restructuring the UN system and other international organizations dealing with S and T cooperation for development in order to remedy their many shortcomings, and especially to meet the requirements of the New International Economic Order.*

5.2 The success of all international scientific cooperation endeavours should be judged by the extent to which the indigenous scientific and technological capabilities of LDCs have been enhanced and expanded.

5.3 To achieve this end, the following Guidelines are suggested for S and T cooperation under the auspices of international organizations (UN and others). These are complementary to those recommended for DC scientists and governments in section 4.

5.4 International Agencies

(a) Cooperative projects undertaken with

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* Some of the factors that determine the success or failure of such international cooperation relate to: correct goal setting; proper identification and formulation of projects to be dovetailed with national plans; the extent to which the fragmented agency-based approach within the UN system can be overcome; choice of experts and their competence; operational delays due to local administrative procedures and lack of proper counterparts in LDCs; and the quality and relevance of the project managment methods used.

the involvement of international agencies should be derived from the national plans and/or priorities of the LDCs, and provide for flexibility in regard to changing conditions.

(b) Cooperation under UN auspices and with other international organizations should ensure upgrading of the policy-making and managerial capabilities, and of the infrastructure necessary for the proper growth of S and T.

(c) Such projects should have a substantial component aimed at enhancing internal S and T capabilities and self-reliance of LDCs, and for rectifying their technological dependence on foreign entities.

(d) Inputs of organizations of the UN system should be coordinated so as to have greater impact on the overall national development programmes of LDCs - vertically with other projects of the same organization, and horizontally with relevant projects of other UN organizations.

(e) International organizations should provide all possible support to LDCs to ensure that local scientific personnel take over as soon as possible responsibility for continued functioning of a project launched through international cooperation.

(f) Greater use should be made by international organizations of the expertise in the LDCs, including consultancy organizations of all kinds.

(g) Training is best accomplished within the milieux of the developing countries themselves. Where outside S and T training is needed, regional facilities and capabilities should be exploited first. In the case of training in DCs, adequate steps should be taken to ensure that the scientist returns to his own country, unless political persecution may be involved.

(h) S and T cooperation programmes of international organizations should not lend themselves to the commercial promotion of industrial products or processes.

(i) International organizations should not depend on TNCs for major funding of any part of their activities. Wherever contribution is made by TNCs it should be entirely without strings, and the nature and scope of the contribution should be made public.

(j) International organizations should not act as proxy for research projects at the instance of a third party. In such cases complete information about the interest of the third party should be made available.

5.5 Regional and Inter-regional Organizations

Exchange of experience and cooperative projects between and among LDCs should be fostered with a view to building up collective self-reliance. Regional centres are valuable instruments for pooling resources, talents and facilities and for working out problems of mutual regional interest through a network of collaborating institutions from all participating countries. This is particularly pertinent where facilities would prove to be expensive and difficult to establish in any single country.

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The issues relating to development are essentially global ones, and they have to do with the well-being of all mankind. Meaningful international cooperation in relation to the challenges of development necessitates a rational and collaborative approach. Its appeal is to the social responsibility of scientists, and it calls for

scientific humanism of a high order. The Guidelines presented here should not only help strengthen international scientific cooperation in this sensitive area and help in surmounting the problems of poverty and dependence of the LDCs, but they should also help build bridges between societies with different social, economic and political systems.

INTERNATIONAL SCHOOL ON DISARMAMENT AND RESEARCH ON CONFLICTS

The Seventh ISODARCO Course, organized by the Italian Pugwash Group, will be held in Ariccia, near Rome, from the 18th to 28th August, 1978. The main topics of this year's Course are: Energy and Related Conflicts, and Violence at Sub-State Level.

This course is intended for people who either already have a professional interest in these problems or who would like to play a more active and technically competent role in this field. It will have an interdisciplinary character, and extend its subject matter from the technical and scientific side of the problem to its sociological and political implications.

More information can be obtained from Professor Carlo Schaerf, Istituto di Fisica, Universita degli Studi di Roma, Piazzale delle Scienze 5, I-00185 Roma, Italy.

ARMS CONTROL AND TECHNOLOGICAL INNOVATION

This book, edited by David Carlton and Carlo Schaerf, contains the papers presented at the Sixth ISODARCO Course which was held in June/July 1976.

The book was published by Croom Helm, London, and it costs £8.95.

OBITUARIES

PROFESSOR FRIGYES CSAKI, of Hungary, died on the 29th August 1977 at the age of 57. He was a distinguished scientist who made important contributions to various fields of technical science, particularly of cybernetics. He was also greatly involved in formulating educational policies in Hungary. He was Vice-President of the Hungarian Academy of Sciences and Rector of the Technical University of Budapest.

Professor Csaki was a very active member of the Pugwash Movement. He was Chairman of the Hungarian Pugwash Group and organized many activities including the 23rd Symposium which was held in Budapest in April 1975. He participated in the 20th, 22nd, 23rd and 24th Pugwash Conferences and intended to come to the Quinquennial Conference in Munich but his illness prevented this and he died on the last day of the Conference.

PROFESSOR BERNARD PAUL GREGORY, of France, died on the 25th December 1977 at the age of 58.

Professor Gregory was a nuclear physicist of international renown. He was Professor of Physics at the Ecole Polytechnique in Paris. He played an important role in the European Centre for Nuclear Research in Geneva (CERN) of which he was the Director-General from 1966 to 1970.

He was one of the earliest Pugwashites, having participated in the 2nd Pugwash Conference in Lac Beauport in 1958. He also participated in the 3rd, 6th and 10th Conferences. While Director-General of CERN he encouraged scientists of the Centre to take an interest in Pugwash.

PROFESSOR LAJOS JANOSSY, of Hungary, died on the 2nd of March 1978 at the age of 66. He was Professor of Physics at the University of Budapest, and Director of the Central Research Institute of Physics. Professor Janossy was world renowned for his work on cosmic rays. He played an important role in the organization of scientific research in Hungary and was the Vice-President of the Hungarian Academy of Sciences from 1958-1973.

He participated in the 3rd Pugwash Conference in Kitzbühel.

ACADEMICIAN REM VICTOROVICH KHOKHLOV, of the Soviet Union, died in August 1977 at the age of 51, following an accident on a mountain expedition.

Academician Khokhlov was a physicist who became famous for his contributions to radiophysics, acoustics and quantum electronics. He was Rector of the University of Moscow, and played a prominent role in the USSR Academy of Sciences.

He participated in the 19th Pugwash Conference in Sochi.

DR. CHAUNCEY D. LEAKE, of the USA, died on the 11th January 1978 at the age of 81.

Dr. Leake, an internationally known pharmacologist, medical historian and administrator died in San Francisco, where he taught at the University of California Medical School. He was a former president of the American Association for the Advancement of Science and a leader in many other professional organizations.

Dr. Leake retained an active and continuing interest in Pugwash activities. He attended the 5th, 7th and 17th Conferences.

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