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THE INTERNATIONAL CENTRE OF INSECT PHYSIOLOGY AND ECOLOGY (ICIPE)

BY THOMAS R. ODHIAMBO

HISTORICAL BACKGROUND

The genesis of the idea to establish the International Centre of Insect Physiology and Ecology (ICIPE), in Nairobi, Kenya is to be found in an article that the present author published in the November 1967 issue of Science. In the course of reviewing the condition of science in East Africa and its impact on long-term development of the region, a model was developed as to the manner in which fundamental and basic research can be nurtured and harnessed in the less developed countries (LDCs) of the world for the betterment of this segment of mankind.(1) It was argued that the long-term solution to the problems of the inadequacy of scientific manpower, seeming lack of scientific challenges, the isolation of the dedicated scientist, the increasing brain drain, and the restricted availability of research facilities of a high calibre, was to concentrate research effort in a few very large centres, where multi-disciplinary teams of young scientists from the LDCs and experienced scientists from the

developed countries can work together on a few carefully selected problems of urgent relevance to the country. In such "centres of excellence" expensive equipment could be put to best advantage. A specific instance was given on the question of establishing a centre of this sort in the field of insect biology, the review having indicated that tropical pests (insects, ticks, and related organisms) were a major priority in the tropical world. It was then suggested that a centre of excellence in insect biology should be planned along the following lines·

> 'It would have a small permanent staff, but would draw a large number of postgraduate students and other researchers from many countries representing many disciplines (ecology, taxonomy, physiology, biochemistry, toxicology, and others). The institute's programme would be such that it would concentrate all its resources on a few particular problems over a period, thus ensuring immediate returns from the funds invested in it."

As a happy coincidence, Professor Carl Djerassi, of Stanford University, U.S.A., had at about that time put forward a strategic proposal for the building up of a scientific community in the LDCs during the Pugwash Conference at Ronneby in

Sweden.(2) In his proposal, he suggested that young postdoctoral scientists be sent for short periods to the LDCs to develop new research units manned by young graduate scientists from the region. Under the supervision of senior scientists, the catalytic effect of working shoulder - to - shoulder on frontiers of science relevant to the country would be self-regenerating.

Exchange of correspondence between the present author and Professor Djerassi led to the proposal to establish a centre of excellence in tropical insect science; and a small one-day meeting of eight people to test this idea was held at the American Academy of Arts and Sciences in Boston in December 1968. The meeting, attended largely by senior insect scientists in the U.S.A., approved in principle the setting up of such an institute, but left all the questions regarding planning for a subsequent international planning conference, to be attended by a cross-section of senior scientists of insect science from many countries, science policy makers, science administrators, heads of applied research institutes in Eastern Africa, and potential donors.

The Planning Conference was held in October 1969 in Nairobi. It was this international meeting that finally decided that the ICIPE should be created, and that it should be located in Nairobi as an independent institute but in close proximity to the University of Nairobi. In the week of intense discussion that went on then the meeting could not take decisions on the form, content, people, facilities. programmes, organizational arrangements and financial

planning for the ICIPE. But it was nevertheless a most exciting moment for it brought forth a novel instrument for the practice of scientific research in Africa and for establishing an indigenous, vitally involved scientific community.

Events followed each other in rapid succession after this Nairobi Planning Conference. In January 1970, at an organizational meeting in Wageningen, in The Netherlands, it was decided to formally establish the ICIPE as a non-profit-making company, limited by guarantee and having no share capital, under the laws of Kenya; an international Board of Governors was selected; a research strategy was agreed upon; and a programme of fund raising initiated. In April 1970, the ICIPE was actually legally constituted in Kenya.

OBJECTIVES AND GOALS

From its inception, the promoters of the ICIPE have always recognized that this institute has a dual role to play in tropical Africa (and in the LDCs as a whole): firstly, to conduct concentrated research on crucial areas vital to long-term pest management, and secondly, to offer special opportunities for developing a vigorous scientific community in tropical Africa that is dedicated to fundamental oriented research and that is able to tackle the many development problems which need new scientific and technological knowledge. This dual role has been translated in further detail as follows:

1. To promote and carry on advanced research into

insect biology, including fundamental questions in insect physiology, endocrinology, genetics, biochemistry, organic chemistry, biophysics, ecology and other related disciplines, with a view to discovering new methods for the control of major insect pests but without too great ecological deleterious effects.

2. To provide advanced training in research methods and techniques for young scientists and technicians, especially from the LDCs.
3. To provide an international forum for the discussion and exchange of knowledge among scientists through seminars, symposia, workshops, and conferences on the results of the most recent research relating to insect science in general.
4. To foster and promote, by its activities and by special relationships with university and research institutions, the growth of the scientific community in tropical Africa.

These objectives are far-reaching when viewed through the back-cloth of a continent just awakening to the immense cultural value of science and its critical role in the development process. And the objectives have more than a modicum of success only if the ICIPE enterprise is supported by a distinguished team of senior scientists, who can give its programmes intellectual guidance. It is the assurance of this intellectual leadership that has given the

ICIPE one of the elements of its uniqueness.

The overall international strategy for monitoring the quality of the scientific research being carried out at the ICIPE Research Centre in Nairobi is provided by its International Committee, whose members represent a number of academies of science (or similar institutions), who have provided the major global umbrella for the activities of the ICIPE. The first such institutional representatives come from:

Africa : East African Academy

Asia : Japan Science Council

Europe : Centre Nationale de la Recherche Scientifique (CNRS)

Office de la Recherche Scientifique et Technique Outre - Mer (ORSTOM)

Max Planck Society of the Federal Republic of Germany

Royal Society of London

Royal Netherlands Academy of Sciences and Letters

Royal Swedish Academy of Sciences

Royal Swedish Academy of Engineering Sciences

Swiss Academy of Natural Sciences

Royal Danish Academy of Letters and Science

Royal Norwegian Academy of Letters and Science

Middle East: Israel Academy of Sciences and Humanities

North America: American Academy of Arts and Sciences
National Academy of Sciences (USA)
Oceania: Australian Academy of Sciences

Members meet formally at least once a year and review the research programmes and progress of the ICIPE and associated matters. The ICIPE has established its research programmes only in the last two years or so; but already the International Committee has initiated action to have the ICIPE programmes thoroughly evaluated during next year. An independent and international Visiting Group, consisting of six senior scientists of world-wide repute in their own disciplines within insect science and who are not themselves involved in the day-to-day affairs of the ICIPE, led by a senior non-entomological scientist, will be making a deep review of ICIPE programmes early next year. It is expected that this evaluation exercise will prove an important turning point in the affairs of the ICIPE. It is part of a wide-ranging review of the ICIPE to (a) establish it on a long-term basis as on-going research institute; (b) to confirm its strategy for fundamental research in insect science and pre-project studies in pest management; (c) to greatly accelerate its training programmes; and (d) to assure it of long-term financing from stable sources of funds.

STRATEGY FOR RESEARCH

An early consideration by the promoters of the ICIPE was the need to focus the research attention of the scientific staff on sharply defined programmes. The research activities were to be

directed towards a few selected target insects, whose economic or public health importance was paramount, and to use multi-disciplinary expertise (in population studies, natural products chemistry, fine structural studies, electrophysiological analysis, experimental biology, biochemistry, immunological techniques, and others) in tackling these problems. These first choices are the following:

(a) Mosquitoes. Investigations have been concentrated on Aedes aegypti , which is a vector of Yellow Fever and several major human diseases throughout the tropics. It is an especially difficult pest to deal with because of its ability to breed around and within human habitations. ICIPE research has concentrated on elucidating the population dynamics of the mosquito in a number of typical villages along the East African sea-coast. These ecological studies are preliminary to attempts to control the mosquito through the release of genetically incompatible males, whose progeny is therefore sterile. First field attempts at this method of control are now being made. The knowledge gained from these investigations will be invaluable for similar studies in pest control through genetic engineering.

(b) Ticks. These arthropods are the vectors of several major diseases of livestock throughout the world.

The physiology and ecology of this group has not hitherto been intensively studied; and current work at the ICIPE includes the population dynamics in the field of two species of major economic importance, the reproductive pysiology of the ticks, their basic endocrinology (especially in relation to development, maturation, and reproduction), and their pheromones. ICIPE progress in this field includes the recent identification and characterization of an assembly pheromone, not previously known in ticks, which could be useful in population sampling and even perhaps in tick control.

(c) Tsetse Flies. These blood-sucking flies have been a major historical and economic factor throughout the savannah zones of Africa. They are vectors of trypanosome diseases of cattle and human populations, and previous methods of its control (by bush clearing, the destruction of wildhost reservoirs, and insecticidal treatment) have met with only limited success. The ICIPE is carrying on research on their reproductive physiology and behaviour (which is unique in insects, being based on uterine development and the bearing of full-grown larvae), and the intimate physiological and immunological relationships between the tsetse salivary glands and the parasitic trypanosomes.

(d) Armyworm. The species under investigation, Spodoptera exempta , ranges widely from West Africa to East Africa through Asia to as far as Hawaii; related caterpillar species, with similar pestiferous habits, occur in most parts of the world destroying both crops and pasture. The ICIPE is concentrating on the study of the migratory behaviour, population dynamics, flight physiology, reproductive biology, and the selective feeding behaviour and sensory physiology of this international pest.

(e) Stem - borers of Cereals. These moths, during their caterpillar phase, are major pests of maize, sorghum, rice, sugarcane and other graminaceous crops throughout the world. The research work is being concentrated on the phenomenon of diapause under equatorial conditions: the state of quiescence permits these insects to survive dry periods, so it is of global significance.

(f) Termites. Termites are pests of crops, grassland and forest products throughout the tropics and subtropics. The ICIPE is especially concerned about the so-called higher termites, which form a major portion of the total insect biomass in the tropics, and which possess a highly complex social structure. Studies on chemical

communication and caste differentiation of these insects may lead to new knowledge of insect biology and of highly specific techniques in pest control.

(g) The Sorghum Shootfly. This is the most important pest of sorghum wherever it is grown in the world. Little is known of the biology of this pest, and why certain sorghum cultivars are resistant to it. This is a newly adopted research programme of the ICIPE, which will direct its efforts to elucidating the life style of the insect, its development and reproduction, and its larval biology in relation to its host.

Each of these programmes (and the specialised disciplines that support them) is led by at least one distinguished scientist, who acts as its Director of Research. They are senior scientists in their own home-based laboratories, globally recognized as leaders in their own field of research, who accept the responsibility of visiting the Centre two or more times a year for on-the-spot consultations and to pursue collaborative studies. The scientific staff itself consist of young postdoctoral scientists selected from Africa and anywhere else in the world, the choice being guided by their academic achievements and a demonstrated research potential, and several graduate Experimental Officers, all from Africa, who have a potential as research workers and who, furthermore, have a decided leaning for high-level technical work (in analytical

chemistry, electron microscopy, electrophysiology, and so on). The interaction of these Directors of research with the younger scientific cadre at the Centre, and the interaction of investigators from various disciplines working together (or in association) on phenomena relating to the same insect species, has generated an invigorating intellectual environment unparalleled in the developing world.

Perhaps it may be opportune to recall here some of the words that were written in March 1970 in the ICIPE's original brochure:(3)

> "The single most severe constraint affecting technical advancement within the less developed countries is their shortage of highly trained manpower and institutions. A cadre of first-class scientists is needed but their service in their own countries is hindered by at least two formidable obstacles: first, the difficulty of finding scientific frontier fields which relate at all closely to the problems facing developing countries; and second, the difficulty of attracting leading scientists from developed countries to work in a developing nation. The ICIPE holds powerful attractions to some of the world's leading scientists in the fields related to biological pesticides, developmental biology, insect physiology, insect behaviour, ecology and the chemistry of natural products. The ingredients exist for creating joint projects involving

scientists from both developed and developing countries on topics which are scientifically exciting and are, at the same time, urgently relevant to meeting insect control needs in Africa and the rest of the world."

No assurances can be extended that the Centre will achieve early breakthroughs in the problem of pest management; but the combined talents of such an international group of distinguished scientists and that of a young, motivated, and gifted scientific staff, whose interests and objectives are relevant to insect control, offers great promise. A sense of anticipation is also experienced in the area of fundamental research itself; indeed, advances already made in insect reproductive physiology, chemical communication, natural products chemistry, and genetic engineering are such as to inspire confidence in the ICIPE helping to push back the frontiers of knowledge in insect science.

INFLUENCE STRUCTURE

From the very beginning, a deliberate and conscious effort was made to make the ICIPE a truly international enterprise. In this respect, therefore, the ICIPE has developed and adopted the following instruments as a basic requirement to achieve this milieu:

(a) Its policy and management are controlled by a Governing Board, whose membership is drawn from the international community of scientists, science policy

makers, science administrators, and institutional building entrepreneurs. At present, its membership (of 10 personalities) is drawn from Kenya, Tanzania, Senegal, the U.S.A., Britain, Sweden, West Germany, and Japan.

(b) Its principal advisory committee on scientific research is drawn from several academies of science.

(c) Its directorship of research is manned by senior scientists whose leadership in insect science is recognized the world over.

(d) The ICIPE has two other advisory committees - the African Committee to advise it on high-level training and on the relevance of ICIPE research to African pest problems; and the Policy Advisory Committee, whose members come from the United Nations Development Programme, some of the specialised UN agencies (WHO, FAO, and IAEA), and several of the international agricultural research centres (viz. CIMMYT, IITA, IRRI, CIAT, ICRISAT, ILCA, and ILRAD), whose major function is to discuss the role of the ICIPE in maximising agricultural production by the control of insect pests. Both Committees have expanded the horizons of ICIPE's commitments.

(e) The scientific staff is recruited on a world-wide basis on international standards of excellence.

(f) The ICIPE funding is international in character. It comes from private foundations, national aid agencies, certain academies of science and universities, and from the United Nations Development Programme. This multi-national and multi-source funding has given the ICIPE the freedom to choose its objectives and strategies according to its own cherished criteria. However, this strategy also creates its own problems, particularly that of long-range and guaranteed financing. The balance between fundamental research and goal-oriented research is a difficult one to maintain; and donors do not always find it easy to accept.

The influence structure that the ICIPE has fashioned out of its various elements of international involvement has provided the ICIPE with the characteristics that has made it unique in institutional building.(4) Consequently, apart from the success it might achieve in fundamental research in insect science or technological advance in pest management, the ICIPE is an important experiment in international scientific cooperation and in how to stabilise and develop a self-generating scientific community in the LDCs.

In this respect, one can already point to some significant

indicators in the area of what some have termed, inelegantly, as "brain drain." The tendency of aspiring postdoctoral scientists in Africa is to take their sabbatical or study leave in Europe or North America. From 1973, the ICIPE, with very little funds and facilities at its disposal, decided to offer to young scientists in Africa the possibility of taking a year's Research Associateship at the ICIPE Research Centre and to work on a specifically important problem in association with the resident staff. One such appointment was made in mid-1973, by selecting a young and competent Nigerian entomologist to work at the Centre for a period of 6 months on the salivation behaviour of tsetse flies, a problem quite important in the vector biology of this insect and so far little investigated. The Nigerian selected was given study leave from his University; and administrative arrangements were made such that he was able to start on his research within a week of his arrival in Nairobi. Not only was he able to make a significance study of the problem he was set, but he gave several seminars of his work in West Africa which has stimulated others to make enquiries as to the possibility of their having similar appointments in Nairobi.

We are now examining a Research Associateship scheme for young postdoctoral scientists with university or research appointments in their home country (in any LDCs) which would give each one, over a three-year period, an opportunity to work at the Centre for 3 - 6 months each year on specific projects within the broadly

agreed research programmes of the ICIPE. A scheme such as this will provide a practical alternative to the problem of brain drain. The challenge of tropical insect science is immense; we believe that the facilities that the ICIPE offers must be equally immense in terms of quality and relevance to the work at hand.

LOOKING AT THE FUTURE

The cost of planning activities of the ICIPE, up to March 1970, has been estimated at U.S.$ 60,645. The approximate expenditures - both capital and recurrent - from April 1970 to June 1974 is estimated at about U.S.$ 1,904,400:

ESTIMATED BUDGET AND COSTS OF THE ICIPE DURING ITS FIRST FOUR YEARS OF EXISTENCE

(IN U.S. $)

Year	Estimate	Actual Expenditure
Up to June 1970	60,000	8,750
1970/71	822,000	57,260
1971/72	810,000	163,520
1972/73	996,000	519,750
1973/74	1,143,000	1,155,120
	3,831,000	1,904,400

The actual expenditure has been well below the estimated budget that was thought to be needed to provide a comprehensive range of physical facilities for research and administration, adequate to

support a staff of about 30 postdoctoral scientists at the ICIPE Research Centre. It has not been easy to have ICIPE, an unusual institution without earlier precedents, and located in a developing country, accepted by donors. The sponsors of the ICIPE therefore took the bold step to decide that the research programme must be launched immediately, and that physical facilities will be built around people and programmes.

The research programme was therefore launched vigorously in 1972; and 30 scientists are now working at the ICIPE on the various research programmes already outlined; and physical facilities are only just being established. It will take another three years to raise the required funds and establish the necessary buildings, equipment, and services adequate for the goal set in developing the ICIPE as a concentrated research centre for insect science.

One of the serious problems of an ICIPE-type research institution is the question of an assured and long-range financing. It has several things against it:

- It is established in an LDC, poor by definition, yet it purports to be an international enterprise.
- It is not a national body, or even a regional institution, and so it does not have a natural foster parent to sustain it.
- Being established as a private institution, supported by

the international community, it does not have a coherent and recognizable international foster parent to sustain it.

- There are now few fund-giving bodies that allocate substantial grants for fundamental research; certainly it is regarded as unthinkable for an LDC to be engaged seriously in basic research; yet many of the critical problems for the LDCs need the background of relevant basic research before an approach can be selected to solve them.

All these elements jointly conspire to make it almost impossible to obtain substantial funding over a long period for the type of research activities that ICIPE is engaged in.

We have been fortunate in receiving fairly large grants from the UNDP and a few national aid agencies which have given us a real chance to establish the ICIPE as an on-going research institution, at least until the end of 1976. The main task before the ICIPE Governing Board now is to seek funds which will (a) assure the ICIPE's recurrent costs for a reasonably long time, and (b) provide the ICIPE with the physical facilities and supporting services that it sorely needs.

It seems to me that there are several areas of activities in which the ICIPE needs to concentrate if it is to fulfil its dual role in the world.

These are:

(a) It must continue with its original research objective of carrying on fundamental research in insect science while keeping firmly in view its relevance to development problems in the tropical world.

(b) It will need to boost considerably its effort in high-level training - for technical staff (for equipment maintenance, technical procedures, etc.) and young scientific staff.

(c) It must establish a Research Associateship plan for postdoctoral scientists from the LDCs, so as to permit a significant South-to-South exchange of scientists and to enable the LDC scientists to do exciting frontier research at their very doorstep.

(d) It must establish a social sciences research unit to consider the social and environmental consequences, in a broad manner, of any important technological breakthroughs in pest management. Programmes of research in the natural sciences almost always neglect this aspect of social accountability until it is almost too late.

(e) It must provide a significant forum for discussing new advances in insect science and for publishing these results in the very theatre of its activities (that is, in the developing world). In this way, it can accelerate the development in the tropical region of the new science of "insect science."

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V.G. Trukhanovsky (USSR) XXIV-43

THE PRESENT STATE OF AFFAIRS AT THE CONFERENCE ON SECURITY AND CO-OPERATION IN EUROPE

Considerable progress in the area of detente and economic co-operation among countries with different social systems has been achieved in Europe in recent years. Positive changes are taking place in international relations and detente is the prevailing trend in Europe and in the world. The idea of peaceful coexistence of states with different social systems is winning increasing recognition in international relations. These developments have been brought about by two factors: Firstly the Soviet Union, actively supported by other socialist countries, is consistenly implementing the Peace Programme approved in 1971 by the 24th CPSU Congress which provides for a series of measures for the preservation and consolidation of peace. Secondly, a number of leading Western statesmen arrived at a realistic conclusion that in present-day conditions there is no alternative to the policy of peaceful coexistence.

No-one doubts any longer that the Conference on Security and Co-operation in Europe is a major stage in the development of international relations. It is a natural consequence of the current international detente.

The task of the Conference on Security and Co-operation in Europe is to consolidate the atmosphere of political detente on the continent and the opportunities opened by it, to build a solid foundation for a lasting co-operation among the European states in the fields of peaceful policy, economy, science and culture.

The agenda of the All-European Conference embraces a broad range of issues: political and international-legal, military, economic, humanitarian. In view of the vast scope and complexity of the problems which are being discussed and are to be resolved, the participating countries agreed to hold the Conference in three stages.

It is known that the first stage of the Conference was held in Helsinki, early in July 1973. At that time, the participants approved recommendations which determined the

political principles and the organizational framework of the Conference. The main task of the second stage which is now being held in Geneva is to prepare and reach agreement on the drafts of the final documents. The second stage should produce draft documents on all the items of the Conference. The third stage is to conclude the work of the Conference. Precisely at that time the decisions and documents will be adopted mapping Europe's development toward peace and co-operation in the coming years and decades. The Soviet Union and many other participants advocate the holding of the third stage at the summit level. This would lend the decisions of the Conference the greatest authority and prestige.

The second stage of the Conference adjourned for a month on July 29, 1974 because of the traditional season of summer holidays and the need for delegations to consult their governments. This recess is unfortunately being accompanied by numerous pessimistic forecasts circulated by the Western press about the progress of the Conference. However, before leaving for the holidays until September 2, the participants had made considerable progress.

During the final days before the recess, they formulated fundamental principles of co-operation among states in culture, education, information and contacts and found solutions to important and difficult problems which faced the Conference. The solution is a package agreement which stipulates that co-operation in the above areas should be developed in line with the principles regulating relations among member-states. These include principles of sovereign equality and non-interference in internal affairs. The Conference approved the preamble of the document on humanitarian questions -- an area where co-operation should promote peace and understanding among nations. The Conference also agreed on a provision that the participating states respect each other's rights to establish their own laws and administrative regulations.

The First Committee dealt with the most important questions, i.e. formulating the fundamental principles of European security. These principles are the inviolability of frontiers, non-interference in internal affairs, sovereign equality of states, refraining from the use of force or threat

of force, territorial integrity of states, peaceful settlement of disputes, respect for human rights and fundamental freedoms, equality and right of nations to be masters of their destinies, international co-operation, conscientious observance of obligations under international law. The way to agreement on the formulations of individual principles is complex and difficult and not as rapid as one would wish it to be. However, progress in this field is obvious too.

By the time of the recess, the representatives of the 35 states had agreed on six of the ten provisions of the main political document. These are the basic principles of Europe's peaceful development, such as the principle of sovereign equality, refraining from the use of force or threat of force, territorial integrity of states, peaceful settlement of disputes. The all-important principle of inviolability of the existing frontiers has been also agreed upon.

Another achievement of the First Committee is the progress made in formulating the principle of respect for human rights and fundamental freedoms. The text on the exchange of observers, upon invitation, at military manoeuvres has also been agreed upon.

Consequently, there is obvious and essential progress in the most important area of the Conference work -- the establishment of a political basis for relations among the participating states.

The Second Committee discusses co-operation in economy, science and technology, protection of the environment.
This Committee completed formulating the texts on such important issues as promotion of trade, the pooling of efforts to implement large-scale, long-term projects including the utilization of energy and mineral resources, the development of trans-European road networks and navigable systems, promotion of industrial co-operation among competent organizations, enterprises and firms.

The Committee prepared the texts on questions of scientific and technological co-operation including such promising areas as high energy physics and plasma physics, the exploration of outer space and the study of natural resources including those of the biosphere, control of cardiovascular, oncological and viral diseases.

The Second Committee of the European Conference has to its credit one completely prepared document. It concerns co-operation in the areas of trade, environmental protection,and envisages quite concrete joint measures.

Unfortunately, the work of the Committee is hampered by some Western countries which refuse to apply most favoured-nation treatment in trade with Socialist countries and obstruct the inclusion of appropriate provisions in the documents of the European Conference.

The work of the Third Committee is taking place in extremely complex conditions. Some participants are using the discussion on questions of co-operation in culture, education, contacts and information to advance proposals which in essence are tantamount to interference in internal affairs of Socialist states and verge on demanding a change of their social systems. The impracticability of such demands becomes obvious, if we put the question in the following way: What if the other side, on the basis of reciprocity, raises the question about changing the internal system of its partners; what would it lead to?

The USSR and the other Socialist countries are in favour of cultural exchanges, exchanges of information or contacts of people. Not long ago the meetings of the Warsaw Treaty Political Consultative Committee pointed out in connection with the European Security Conference that its decisions may create "favourable opportunities for long-term economic, scientific and technological, and cultural co-operation, exchange of information, contacts among establishments, organisations and individuals..."

In the Third Committee, the Soviet Union demonstrated repeatedly its determination to work for a mutually acceptable agreement. One should not forget, however, that the foundation of Europe's peace and security is not "traffic of people" or sale of newspapers, far from it; it is primarily respect by all states for the principles of sovereignty, refraining from the use of force or threat of force in relations among countries, inviolability of frontiers, territorial integrity of states, peaceful settlement of disputes, etc., i.e. those principles which have either been approved or are being

discussed in the First Committee and the adoption of which has been favoured by the Soviet Union from the very beginning.

Thanks to the efforts of those interested in the success of the European Conference, one of the most important questions, related to the work of the Third Committee, was settled in the days before the recess. The Committee formulated the basic principles of co-operation in culture, education, contacts and information. Precisely this approach has been insisted upon by the Soviet Union and the other Socialist countries participating in the Conference. It seems that a realistic concept of common sense has prevailed in this question.

The fourth point of the agenda - the follow-up measures upon the completion of the European Conference - is discussed more and more actively in Geneva. It appears that most of the delegations support continuity of efforts centred on ensuring security and co-operation in Europe. Those delegations regard positively the idea of establishing a consultative body for this purpose on a permanent basis.

The situation in Geneva may be appraised in the following way. During the first and the second stages of the Conference, important progress has been made. The Conference formulated a number of valuable provisions which will be incorporated in its final documents. Besides this, participants have stated their positions on all the problems under discussion and have studied the positions of other sides to such an extent as to see the outline of mutually acceptable decisions. While some Committees could have achieved more they did not do so not because the participants still fail to understand some of the questions on the agenda. Some participants are complicating the situation by introducing unacceptable or irrelevant proposals and at the same time are trying to place the responsibility for the delay upon others.

Naturally, documents in Geneva should be prepared thoroughly, and mutually acceptable solutions should be sought. However, one should not overlook the fact that a conference based on the principle of consensus cannot accept decisions which run counter to legitimate interests of some of its members or which are tantamount to

interference in their internal affairs. "Those who engage in the tactic of delays and procrastination should ask themselves, what alternative they can suggest to a successful completion of the Conference" stressed L. I. Brezhnev, General Secretary of the CPSU Central Committee on June 14, 1974. "To return to tensions in relations of states that European people became tired of in the Cold War years? Are these people aware of the responsibility which will rest upon them following this turn of affairs?"

The present state of the Conference on Security and Co-operation in Europe is such that every participating state should appraise the work completed so far, and take responsible decisions which would open up the road for the earliest completion of the Conference. Satisfactory solutions to all questions may be found, provided the Conference participants do not lose the sense of reality and show real care for Europe's peaceful future.

The Conference will resume its work in September. Within a short period of time it is to complete the preparation of the final documents. This will be followed by the third stage. It is in the interests of European peace and co-operation that the Conference should accelerate its work and that its third stage should be held at the top level.

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N.C. Manganyi (S. Africa)

SOUTH AFRICA : THE TRIUMPH OF TYRANNY

Anyone who has a more than casual interest in human affairs is often forced to come to grips with the realization that there is very little room for rationality in human conduct. There are certain questions which cannot be raised in an atmosphere of calm thoughtfulness. Such, for example, is the case with respect to the question of Israel and the Arab world as the polemicist Berrigan was soon to discover (1). One can neither talk openly about South African apartheid, the Namibia question or Rhodesia's rebel and settler regime without the special risk of losing one's freedom, getting killed or being forced into exile. Yet, is it not true that we proclaim at every public opportunity that western civilization is founded on rationality and, at best the scientific attitude? This paper is an attempt to bring up for examination, the notion that one notable feature of the psycho-historical process in South Africa has been the triumph of tyranny - the rapid ascendency of a process which Erikson describes as pseudospeciation (2). I have followed this idea wherever it has led me and have explored it more fully in another context (3). Here it should suffice to present it in its primary outline.

HISTORICAL TRUSTEESHIP AND THE EURO-AFRICANS

If we study situations of racial conflict closely, we begin to appreciate just how powerful the spoken word can become in the making of history. (4) Here I need to get right to the heart of the matter and say that white South Africans are Euro-Africans and await the consequences. A possible objection is to the effect that the term Euro-Africans has no tradition, no history as South African whites could be expected to under-

stand it. Such an objection can be understood to mean that the designation Euro-Africans has no emotional appeal and apart from being a compound word it can have no reference to a secure, well established group identity. People familiar with the South African situation will remember how the current white identity emerged out of the events which followed the landing in the mid-seventeenth century of Dutch subjects who turned into settlers. A little historical evidence would have come in handy at this point. It is omitted here only for reasons of brevity of exposition. Suffice it to say that the upshot of the unfolding of South African history has been the ascendency of the now dominant tribe, sometimes described as the Afrikaner nation (5). These are people of Dutch extraction who discovered the power of words a little early in the history of South Africa.

Through word and deed they effectively cut themselves afloat from main-stream Europe and identified themselves as Afrikaners (Africans) and, in the name calling which followed, developed a socio-political vocabulary to cover all the other groups which were considered marginal to the Afrikaner identity. It is well known that the native peoples who were described variously as 'Kaffirs' or 'Bantu' have been compelled to live with these designations until very recently.

The dominant white tribe identified itself with a designation which though language based was primarily geo-political (Afrikaner). By 1910, the occupation of South Africa was not only geo-politically complete but psycho-historically as well. Other tribes, notably the indigenous people who were invested with a purely linguistic identity were psycho-historically excluded from the geo-political identity. There were, therefore, two identities which were cultivated in the South African situation, namely: the

geo-political and linguistic identifies. The first was reserved, initially at least, for Afrikaners but was later grudgingly extended to other white tribes. The linguistic, non-geopolitical identity of the various oppressed groups has been maintained with essentially unimportant modifications (6).

When we keep all this in mind, it is interesting to note that at the beginning of the present decade another storm around words and identity emerged on the South African scene. Following close on developments in the United States, the South African Student Organization (SASO) embraced the philosophy of black consciousness and solidarity. Part of the public debate which followed in the white mass media revolved around the word 'black' used by the exponents of black consciousness to embrace Africans, Indians and Coloreds. Although the debate was essentially superficial, it was clear that its irrational substratum was powerful yet unexplored. It is not difficult to see that the introduction of black consciouness was subverting the established and preferred geo-political and linguistic identities. What the movement was doing, in fact, was to introduce a third identity dimension on the basis of a mutuality of under-dog status. Such an identity can hardly be welcome in South Africa for several reasons. First, and most important, it reopens the question of the status of whites in South Africa and thereby poses a direct challenge not only to the preferred identies, but also to the whole categorical interpretation of South African history. Second, black consciousness as a basis for an alternative identity could heighten the awareness of blacks with respect to their lumpen status in South African society.

Although the white reaction has been strong, it has emerged primarily out of habit and impulse. In fact, once whites will have recovered from the hysterical participation which they have been indulging in, they will discover

that apart from anything else, the word black is not as potent as the word African in challenging the established identities. It will be accepted because in the South African context, unlike in the United States, it may be seen as a formless word around which it may be difficult to establish an identity. Although it can do havoc to the linguistic identity, it can hardly be expected, except in a roundabout way to pose a mortal psychological threat to the geo-political identity of white South Africans. Yet, it is the white identity which is false at various levels and must be changed before South Africa can be liberated from its occupation.

This liberation, the destruction of the psycho-historically false identities cannot be achieved without a dispassionate reopening of the question of the occupation of South Africa. When one begins to talk in this vein, one can expect an almost instinctive response to the effect that one thinks or feels that white South Africans should migrate to nobody knows where. But that is certainly not the point. The issue that is crucial is a full recognition of the fact that whatever the indigenous people were doing when the Dutch settlers landed on our shores in 1652, they came in the name and interest of the -isms of the times. Writing about the question of occupation, it should be emphasized that it has become very problematic to talk in ways which are seen and understood as responsible within a framework outside the distortions created by the development of the white geo-political identity.

It seems legitimate to assume that the founders of the white geo-political identity knew that they were, as is usually suggested, custodians of a kind of historical trusteeship. That trusteeship was part of what is sometimes condescendingly described as the white people's 'civilizing mission". But the inheritors, late generations of white South Africans, were to develop ways

of violating that trusteeship by moving in the present direction of racial domination. Historical trusteeship was violated primarily by a pretendership achieved when the Euro-Africans naturalized themselves as South Africans. The development of the geo-political and linguistic identities created a situation in which nationality and citizenship became matters of investiture.

The triumph of tyranny in South Africa has meant, interalia, the transvaluation of historical trusteeship into a continued occupation of the country. Historical trusteeship must end with the initial acceptance by the inheritors of that trusteeship of their identity as Euro-Africans. Whites on the African continent, irrespective of the length of their presence cannot legitimately consider themselves Africans as long as their interests are still essentially counterpoised against the development of the African identity in the broadest possible sense. In everything, (culture, religion, etc.) they are European or white first, and it is only when they are hard-pressed with respect to the historical question of occupation that they become "African" first and European second. So indeed, the identity which they should carry until history hands down a different judgment should reflect this ambivalence without being entirely misleading. Their being European is not only historically true, but something which the Western Caucasian identity takes for granted.

I want to move beyond the statement that there have been two broad historical frameworks for the development of identity within the South African psycho-historical context to a brief formulation of what I see as having been the most active factors in the ascending and triumph of tyranny.

HISTORICAL MARGINALITY AND THE PSEUDOSPECIES

Weakness and power, however defined, are the basic categories for thinking about the process of pseudospeciation. The child in the beginning is weak and dependent. He became the universal pseudospecies. Other mythologies emerged which supported a pseudospecies status for women and men of color. Although pseudospeciation appears to be a universal phenomenon, racism is its most dramatic manifestation. Here the historical marginality of the black man in Southern Africa immediately suggests itself as something requiring thought and action.

The development of the 'South African' identity, by which concept I mean Euro-African identity has important psychological, if not historical parallels with the development of the 'wider identity' in America as described by Erikson (7), while it is not necessary, in this context to consider such parallels and differences in any detail, it should be adequate to make the following observations.

Once the Euro-Africans in South Africa had cut the links that attached them to European imperialism and colonialism, it was inevitable that they should experience greater psychological pressures to develop a new identity. The notion of the 'self-made man' of the American identity assumed the form of the self-made nation. Not only self-made but chosen since the Euro-Africans have not been inclined to abdicate the grip of the dominant religions of the 'Old World'. In the process of self-definition, South African whites exposed themselves to more compelling psychological pressures for pseudospeciation since a greater measure of positive self-regard and identity requires, psychologically, an equally large measure of denegration of the scapegoated

group. The psychological economy involved in this process is to enable the dominant group (in this case the Euro-Africans) to exteriorize all that is experienced as negative in their own identity. The Euro-Africans, having no vital links with Africa and maintaining dubious ones with Europe, are bound to be preoccupied with the issue of an elaborate and never-ending self-definition. The preceding observations should provide us with some clues regarding the Afrikaner's preoccupation with the word 'culture' which has become and Afrikaner totem.

The Euro-Africans in South Africa, in their preoccupation with the expansion and maintenance of their inauthentic positive identity, have brought the policy of apartheid (separate development) into being. As propagated, the policy is intended to achieve the complete separation of blacks from whites through the creation of new satellite colonies or homelands consisting of about 13 percent of the land area of South Africa divided ethnically between various African groups (8). But this policy, in its present form and application undermines important developments prior to the Sharpville massacre of 1960.

Prior to Sharpville, the Treason Trials and the repressive government activities which followed, there was a feeling of South Africanism. That South Africanism was a developing and widening identity which captured the very spirit of African nationalism. Throughout South African history, the emerging white identity 'created' the black people in the image of the white people's negative identity. With the rise of African nationalism, this negative identity was threatened with collapse together with the false positive white identity. Indeed, it is not surprising that the uses of tyranny increased remarkably after Sharpville(9).

The process of pseudospeciation expresses the collective solution of the problem of the existence in the collective psyche of both positive and negative identity constellations. Neumann was convinced that pseudospeciation was "in every case" symptomatic of "a split in the structure of the collective psyche" and proceeded to say (10):

> In the economy of the psyche, the outcast role of the alien is immensely important as an object for the projection of the shadow - that part of our personality which is 'alien' to the ego, our own unconscious counterposition, which is subversive of our conscious attitude and security - can be exteriorized and subsequently destroyed (p. 52).

Erikson expresses similar concerns in another context (11):

> But, alas, as we also emphasized, man always needs somebody who is below him, who will be kept in place, and on whom can be projected all that is felt to be weak, low, and dangerous in oneself. If Americans had not had the Indians and the blacks - who, far from having conquered their land could not defend it, or who, far from having wanted to come here had been forced to, the New Americans would have had to invent somebody else in their place (p. 78).

The pseudospecies is always an invention of the dominant group. Apart from the objective reality of the alien, of the group which is forced into a pseudospecies status and marginality; the negative identity of the dominant group, arising as it does from an unacknowledged fantasy structure (unconscious), always gives birth to something entirely new; a new pseudoreality related to the marginal oppressed group.

This creation of the pseudospecies is always paradoxical. The triumph of tyranny is inextricably related to this tragic paradox. The dominant group is always preoccupied with the lustre of its positive identity: culture, military capability and the generosity of its God. In its attempts to exteriorize and destroy the negative elements in its identity it is forced to kill what it is so intent on creating, namely the pseudo-species. This is the profound paradox which forms the seedbed for the triumph of tyranny. Sometimes the impulse to destroy the exteriorized negative identity is effected through institutional agents such as the police or the military as occurred in Sharpville and elsewhere. The same impulse that leads to this brutality is responsible for public policies which lead to the payment of starvation wages, high infant mortality rates and rampant deficiency diseases in situations of plenty. But above all, the impulse expresses itself as a determination to make the people who carry the negative identity marginal to human history - to limit their participation in the development of the wider human identity.

THE TRIUMPH OF TYRANNY

Public debate in South Africa and abroad has been characterized by a formless and false quality which arises from a notable lack of commitment to humanistic goals and values. Indeed, whatever values remain suffer, like the debate itself, from the problems of presentism (12). Hardly any thinking is undertaken which does not take every possible immediate interest of the white minority into account. Every conceivable obstacle against the possible emergence of a humanism on the subcontinent is created by taking refuge in cold abstractions and fears of various kinds (13). Have we not heard it proclaimed that the humanity of blacks must be sacrificed for international

geo-political reasons? Whenever a set of beliefs, values and a way of life require increased tyranny, we should believe that the creative momentum has been lost and that a new order should be brought into being. Yet is it not being said that white domination and control in South Africa is necessary to maintain the achievements of western civilization?

As we move towards the future, we can see the prospective dissolution of the false identities now extant in South Africa. Initial preparations in this direction require a historical corrective to ensure that no tribe begins that journey on the basis of an inflated identity. The historical trusteeship must end with the initial acceptance by the inheritors of that trusteeship of their identity as Euro-Africans. South Africa must be prepared for a full disclosure of the past so that the sources of gross historical errors must be identified. Only when the past is present in its fullness can we hope to see the horizons of the future in which the naturalization of the Euro-African will come to pass.

In saying all this, I do not wish to becloud the crucial issues with undue optimism. There are deadly realities to be confronted, and here I am referring to our present inheritance of terror in the South African situation and the contemporary world. More than a decade ago, Albert Camus found himself making the profound judgment that (14):

> The important thing, therefore, is not, as yet to go to the root of things, but, the world being what it is, to know how to live in it. In the age of negation, it was of some avail to examine one's position concerning suicide. In the age of ideologies, we must examine our position in relation to murder. If murder has rational foundations, then our period and we ourselves are ration-

> ally consequent. If it has no rational foundations, then we are insane, and there is no alternative but to find some justification or to avert our faces. It is incumbent upon us, at all events, to give a definite answer to the question implicit in the blood and strife of this century. For we are being put to the rack. Thirty years ago, before reaching a decision to kill, people denied themselves many things, to the point of denying themselves by suicide. God is deceitful; the whole world (myself included) is deceitful, therefore I choose to die: suicide was the problem then. Ideology today is concerned only with the denial of other human beings, who alone bear the responsibility of deceit. It is then that we kill (p. 4).

It is no longer sufficient, nor even possible to be merely metaphysical, to ask questions and ultimately to deny everything including one's life. What is of paramount importance, as Camus tells us, is "to know how to live" in the twentieth century. That means, to know how to live with, and sometimes through, terror. It is a basic fact of contemporary life that to survive one needs to know that we live in the age of both institutional and revolutionary terror. The former, as is well known, represents the triumph of tyranny.

It is tragic but true: terror is the only reality that the international community, so adept at making wars than making peace, understands. But since terror and murder have been made implicit and explicit in some of the deceptively most productive forms of social organizations, new forms of terror have emerged on the international scene. The sensibility of the twentieth

century, its predominant ethos has lost the humane sense of tragedy. The tragic, in the Aristotelian sense, has become too refined for our crude sensibilities and we are always ready for something that comes with a bang!

As I said in paying tribute to Arthur Miller's Incident at Vichy (14): "In the end like in the beginning, all that is avoidable to a man and his Jew or Nigger - the racist and his victim is a turbulent silence - a chance to stare at each other's eyes." The battle against ignorance is lost. Instead we have an abundance of ignorance and a triumph of tyranny.

NOTES

1. In an article in the April issue of Ramparts, Paul Jacobs comments as follows on the Berrigan controversy: "Perhaps as prophecy, Berrigan had told his Arab auduence last fall, 'It is, of course, scarcely possible to open the question of Israel or Arab conduct today without exciting the most lively passion and risking the most serious charge.' But even Berrigan acknowledges now that he had no idea of the magnitude of criticism or range of critics his speech would create" (p. 11).
2. E. H. Erikson: Dimensions of a New Identity. New York: W. S. Norton and Company, Inc., 1974. Regarding the process of pseudospeciation, Erikson writes as follows: "This concept, furthermore, is meant to include some complex and even sinister themes which we must not shirk: and here we come back to pseudospeciation. The pseudo means that, far from perceiving or accepting a human identity based on a common specieshood, different tribes and nations, creeds and classes (and, perchance, political parties) consider themselves to be the one chosen species and will especially in times of crisis, sacrifice to this claim much of the knowledge, the logic, and the ethics that are theirs (p. 28)."
3. N. C. Manganyi: The Body, Alienation and Racism. New York: Nok Publishers, Fall 1974. The theme of pseudospeciation is referred to in a number of essays in my collection: Between the Snake-pit and the Twilight Zone (forthcoming).
4. See R. J. Lifton: Thought Reform and the Psychology of Totalism. Penguin Books, 1961 for a discussion of the uses of language in totalitarian communities.

5. Today the Afrikaners are the most powerful group in South African politics. Although their economic power has generally lagged behind the rise of Afrikaner nationalism, it is now growing at a phenomenal rate.
6. The separate development policy of the Nationalist government is the practical culmination of the linguistic identity. It is intended to stem the tide of African nationalism which is seen as potentially disruptive of the white geo-political identity.
7. E. H. Erikson: Ibid. The most important parallel here is that both the early Americans and the white settlers in South Africa moved in search of new identities - the creation of new nations (geo-political identities).
8. The colonial model involved in the separate development policy is that described as 'internal colonialism'. See R. Blauner: "Internal Colonialism and Ghetto Revolt". In M. Wertheimer (ed.), Confrontation: Psychology and the Problems of Today. Glenview, Illinois: Scott, Foreman and Company, 1970, 125-129.
9. Very controversial legislation violating the rights and freedoms of individuals was passed through the 1960's.
10. E. Neumann: Depth Psychology and a New Ethic. New York: Harper Torchbooks, 1973 (first English translation, 1969).
11. E. Erikson, Ibid.
12. 'Presentation' is intended to capture the sense of urgency which usually accompanies discussions of extreme historical situations. I am indebted to D. B. Davis for this term. See: "Slavery and the Post-World War II Historians", Daedalus, Spring, 1974, 1-16.
13. See for example: R. Stokes: "Racism vs Modernity," Worldview, April, 1974.
14. A. Camus: The Rebel. New York: Vintage Books, 1956.

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V. G. Solodovnikov (USSR) XXIV-44

DISARMAMENT AND THE NATIONAL LIBERATION STRUGGLE IN AFRICA

1. The present arms race is hindering the economic and cultural progress of all countries, including the developing countries. In the conditions of the arms race, the achievements of scientific and technological progress are closely related to military purposes. The arms race leads to squandering of human and economic resources and may result in an outbreak of war. Constructive forces of nature released by science may turn into forces of mass destruction. Therefore, all peoples are interested in solving the disarmament problem. The struggle for the discontinuation of all forms of the arms race, for a world disarmament conference, is a priority task for all progressive forces, including the national liberation movement in Africa.

2. The history of the epoch of imperialism and colonial domination is concurrently the history of wars and aggression which brought great disasters and suffering to nations. Weapons in the hands of imperialists and racists are tools of piracy and suppression of freedom of Asian, African and Latin American peoples, tools of suppression of the national liberation movement.

The problem of disarmament in areas where colonial rule and racist regimes which endanger peace and the well-being of peoples are still in existence should be solved in a different way, taking into account the necessity of doing away with colonialism and racism.

Disarmament in Africa should begin with the disarmament of colonial racist regimes. Its first stage is the stringent observance of the embargo on the supply of arms to the Republic of South Africa, and measures to prevent the manufacture of nuclear weapons by this racist state. During this stage, all foreign military bases in Africa and in other countries of the Third World should be liquidated.

3. The arms race in developing countries intensifies contradictions among them, aggravates their border and other disputes, produces distrust and enmity, weakens these countries and retards their economic progress. All this necessitates further activization of the struggle waged by African, Asian and Latin American countries against the arms race, for the relaxation of international tension, for general and complete disarmament.

4. The vital problem of disarmament can be solved. African and other developing countries can improve the standards of life and culture of their peoples, do away with age-old backwardness, attain the modern level of scientific and technological development only in conditions of peaceful co-existence, only in conditions of world peace. The achievement of full disarmament, however, is impossible without liquidating colonialism and racism in Africa which maintain their domination by violence. The decisions of the United Nations Organization on the liquidation of the remaining colonial regimes, on prohibiting racism and apartheid should be fully implemented.

Independent countries of Africa are contributing to disarmament and peace on the African continent by intensifying their struggle against colonial and racist regimes, by giving greater support to the national liberation movement in the South of Africa.

These actions are carried out within the framework of international law, in accordance with the UN resolutions on the liquidation of colonialism and racism, and the decisions of the OAU Independent African states have the right to place a part of their national armed forces at the disposal of the OAU. Actions of the joint armed forces of the OAU against colonial and racist regimes should be regarded by all civilized states as legitimate and fully in line with the interests of world peace and security.

Colonialism and racism have been outlawed by mankind and have no right to exist. Therefore, all civilized nations should also regard as legitimate international action in support of the national liberation movement in Africa with the aim of doing away with the

vestiges of colonialism and the evils of racism.

5. General and full disarmament may become an effective means of improving the well-being of masses and accelerating social progress of developing countries, provided imperialist forces are neutralized by the activity of international organizations (United Nations, etc.) and the progressive international opinion. The accelerated progress of national economies could be a reliable guarantee of political independence for the majority of African countries. Disarmament, and, as the first step to its implementation, the reduction of military budgets, could make possible the re-orientation of huge funds and resources for peaceful purposes, for comprehensive assistance to the developing countries in Asia, Africa and Latin America, and would place human society's productive forces at the service of peace and man. The Soviet proposal for a ten per cent reduction of military budgets of UN Security Council Permanent Members is one step in this direction.

6. The disarmament problem is inseparable from securing the implementation of UN resolutions on refraining from the use of force in international relations, on prohibiting the settlement of disputes by aggression. One of the conditions for disarmament in Africa and in the Middle East should be the complete observance of Resolution No. 242 of November 22, 1967, on the liquidation of the consequences of Israel's aggression in the Middle East.

African states are already making a considerable contribution to the co-ordination and implementation of specific partial measures aimed at arms race limitation. These measures include the 1963 Moscow Treaty prohibiting nuclear weapon tests in the atmosphere, in outer space and under water (the Treaty has been signed by 35 and ratified by 29 African states), the Treaty on non-proliferation of nuclear weapons (28 and 24 African states, respectively), the Treaty banning the placing of nuclear weapons and other weapons of mass destruction on the bottom of seas and the ocean bed (24 and 9 African states, respectively), the Convention prohibiting the development, manufacture and stockpiling of bacteriological and toxic weapons and providing for their

destruction (signed by 20 African states). The participation of African states in these international agreements is of considerable importance in the context of their universality and effectiveness.

7.African countries can play an essential part in the elaboration and implementation of other measures in this field - prohibition of chemical weapons, a ten per cent reduction of military budgets of the Security Council Permanent Members, etc.· African countries can also contribute to the preparation and holding of a world disarmament conference.

African countries are called upon to promote the formulation and implementation of measures for the limitation of armaments on a regional basis, such as the proclamation of Africa as a nuclear-free zone (an appropriate appeal was adopted by the OAU in 1963), the implementation of the embargo on the supply of arms to colonial regimes, abolition of foreign bases in Africa, etc.

It may be noted that partial measures for arms race limitation also facilitate the development of the national liberation movement in Africa.

8. The most dangerous element obstructing the solution of the disarmament problem and the prohibition of nuclear weapons is the policy of the People's Republic of China. The Government of the People's Republic of China is stepping up the missile nuclear weapons race and opposes all constructive proposals in the United Nations which may bring disarmament closer.

9. It is untrue that disarmament cannot be attained in the conditions of the existence of two socio-economic systems. The joint efforts of all forces which uphold peace can do away with colonialism and racism, stop the arms race and take real steps on the way to general and full disarmament. This constitutes a most important objective of our Pugwash Movement.

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M. A. Markov (USSR) XXIV-45

SCIENCE AND RESPONSIBILITIES OF SCIENTISTS

There appear to be many and varied aspects - ethical, legal, social, etc. - to the topic of this paper. As an integral part of society, scientists operate in different legal and social media and their positions and beliefs place them in different classes and social group. Just as the abstract concept of "scientist", a product of his time and posture in society, is non-existent, so the generally recognized ethical bylaws of an abstract "human society", of which the Kantian categorical imperative is but an example, are ineffective if applied to the problem above, i.e. the problem of the scientist's responsibilities. Indeed, the universally accepted abstract ethical rules may be meaningful if only within some preponderantly homogeneous social entity.

There is a certain ethical value attributed to the Hippocratic oath that medics pronounce before entering their immediate occupation as practitioners. But a similar analogous Hippocratic oath* for the whole of the world-wide scientific community, for the scholars in the Hitler empire as well as the anti-Hitler coalition countries, would have been something worse than merely a futile utopia.

At this juncture, one particular development of the time would be worth recalling. The major A-bomb involvement of the progressive-thinking scientists congregating in those days in America, particularly of Albert Einstein, is well-known. It was scientists, progressive both scientifically and socially, who initiated the effort to produce the horrid weapon.

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* Professor R. Furth suggested twenty years ago, speaking before the World Scientific Conference in London (1955) the following language for such an oath: "Realizing that my scientific knowledge provides me with increased power over the forces of nature I pledge myself to use this knowledge and power solely to what in my judgment I consider to be for the benefit of mankind, and to abstain from any scientific activity known to me to be intended for harmful purposes."

At that time, the planet was overhung by the deadly menace of takeover by the fascists. Physicists were keenly and painfully aware of the grim consequences for humanity should fascist Germany gain possession of atomic weapons. The scientists' initiative was prompted by the awareness of the scientists' responsibility to mankind and motivated by the desire to forestall Hitler's Germany in the development of the atom bomb. (But the creation of the atomic weapon in fascist Germany itself could only have been possible through the efforts of scientists.) The US-based scientific task force refused to be put off by the delusion that abstract ethical considerations (which, incidentally, had been formulated in Germany by Kant, among others), would erect an impregnable barrier to the implementation of an A-bomb project in fascist Germany. Thus, the atomic weapon came into being. Regrettably, its first use was to destroy the civilian population of Japanese cities, an act for which there was no war-time necessity at that time. But what had become of the best intentions of the scientists involved? Or is it, indeed, true that the way to hell is paved with good intentions?

It is worthwhile to look back from time to time to those very instructive lessons of our recent history. On ships, I believe, there used to be, and perhaps there still is, a special sailor's duty to look ahead along the ship's course (the sailor who has this job is called a "look-out") to give early warning of a possible oncoming threat or danger. It is this role of "look-out" that is assigned, most naturally, to scientists in modern society. To forewarn humanity of these dangers, the "look-out" function, that is to discern far ahead along the path of future human history, provides the greatest single responsibility of scientists.

One other responsibility placed on the scientist is to make it universally understood that the capability of science to forestall dangers, such as the ones above, is heavily restricted. Scientific foresight goes no farther than identifying some of the dangers lying in wait for humanity and, admittedly, as likely as not their lesser part.

Of course, there is a concept of scientific foresight, but it is only relevant and effective within the terms of reference of scientifically well-established regularities. With reliance on the regularities science has helped to lay open, one can anticipate a lot of things in the evolution of society - some specific developments and even the general outlines of technological progress.

However, the tell-tale characteristic of the progress of science and the latter's applications, coupled with technological progress, lies in the unpredictability of its future, sometimes with not too close but vitally essential results. Historic experience provides irrefutable evidence that our technical and scientific imagination is able to perceive only a not-too-distant future.

Any subsequent progression of science shows demonstrably how primitive are the technological fantasies of the past, how a lot more fantastic than these fantasies are the technological advances that follow them. Not only our science-based imaginative concept of the future and the not-too-close potentialities of the technological progress is often helpless to foretell the more crucial and manifest moves of progress, but also, the non-scientific imagination of a science-fiction novelist does not carry him very far ahead either from the historical period in which he lives.

If I remember correctly, John Milton, in that world-famed formidable creation of his, Paradise Lost and Regained, offered a story of the battle between the Forces of Heaven and the Forces of Satan, obviously seeking to give a poetic and extremely fantastic description of the battle unanchored to any realistic portrayal of facts as they occur on the Earth. It gives you the impression that the author would like to present a maximally fantastic view of the battle and to show truly Satanic artifice in devising unheard-of weaponry. In essence, all he really succeeded in devising was heavy firearms, for even John Milton could not foresee the atom bomb. But neither did scientists in the not so distant past, for that matter. Rutherford is known to have held the view that anyone who expects to receive energy from the transformation of atoms indulges in nonsense. He said this in an address to a Convention of the British Association for the Advancement of Science of September 11, 1933.

Now, for a few remarks about history. World War I began with rifles, guns and side-arms - and ended (which no one was able to predict) with tanks and war gases. World War II began with broad use of automatic arms, tanks and aircraft, and towards the end (which no one was able to predict) the atomic weapon was brought into the picture. If World War III occurs (even given a ban on nuclear arms) it is distinctly impossible to predict what new types of weaponry will be developed when the enormously increased material and intellectual capabilities on all continents have been thrown into the search for new means for the mass-destruction of all things alive on our planet. And, although we are unable to foretell what specific types of armaments will be devised, it can still be safely asserted, based on the belief in the limitless possibilities of science and the latter's growing momentum, that they will be incomparably more formidable than anything we have ever known.

It is pertinent to ask: what can be more formidable than the atom bomb? Our future history failing to furnish the answer, we shall be the happiest of men. To caution humanity against the dangers lurking in the unknown, should world conflicts break loose, is the immediate and highly aspiring calling of the scientists. True, even predictable aftermaths of probable world conflicts spell out mortal danger for the whole of mankind.

For the moment, the confronting forces on our planet maintain the state of equilibrium of sorts, which makes sense if there is no attempt at reaching political objectives by force.

At the present time, the might of the opposing sides is such as to make them preserve, quite naturally, the balance. More precisely, when either side upsets the equilibrium at any given moment, the other side, by virtue of the material and technological resources in its possession, has every opportunity promptly to fill the gap till a new balance is achieved.

For this equilibrium to be positively established, one need not turn for advice to highly-skilled military analysts, for it is, in effect, a consequence of a peculiar kind of thermodynamics in contemporary society.

It is bad fortune that society-wise the process has thus far had the effect of keeping its average temperature continually on the rise. It is equally unfortunate that the rate of armaments in the world is steadily increasing. For the world is still thinking in terms of the old maxim, si vis pacem para bellum (if you wish for peace, prepare yourself for war). Admittedly, this motto has its measure of primitive cogency, its own philosophy and, if one may say so, its own theory, which is by no means unwelcome in some quarters. So it is up to scientists to convince public opinion of its falsity, but, most importantly, of the mortal danger this philosophy holds for society. This belligerent slogan may assume a pseudo-pacifist aspect, with the pacifist make-up leavened, by the ideas of deterrence through mutual intimidation.

It is an uphill task to balance on the tightrope of a "deterrence through mutual intimidation" policy, because it takes a high degree of perfection in political tightrope-walking. But even the most experienced of tightrope-walkers makes fatal errors.

What is there to back the assurance that interminable sabre-rattling can guarantee peace? What is there to back the assurance that the people at the key-board of the atomic organ will at all times show good sense and that the Doomsday Symphony, the Requiem of the Planet, will never be aired as a result of their demented outburst? So long as the situation in the world scene is such as to make it easier to arm rather than to go through the motions of disarmament, the si vis pacem para bellum ideas will continue to draw from this power supply to stay viable.

It is argued by some that the long-drawn history of previous abortive attempts to push through the idea of disarmament leaves no room for optimism. (In this context, one might mention a quotation from Pliny* which sounds like a grotesque roster of today's disarmament

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* The quotation is as follows :

"We must give account of the metal known as iron, the most useful and the most fatal in the hand of mankind. For by the aid of iron we lay open the ground, we plant trees, we prepare our vineyards, and we force our vines each year to resume their youthful state, by cutting away their decayed branches. It is with the aid of iron that we construct houses, cleave rocks, and perform many other useful offices of life. But it is with iron also that wars, murders, and robberies are effected, and this not only hand to hand, but from a distance even, with the aid of missiles and winged weapons, furnished with feathery wings.

related problems, although it was written twenty centuries ago.) Whatever the lessons of past history, we can assume every measure of responsibility in saying that our future differs basically from our past, while the situation currently arising with regard to our future has no analogue in the past. Indeed, the present rate of armaments spending has no precedent in the past, and neither has the destructive potential of modern weaponry.

It has long been crystal-clear that there can be no victors in a future world war. The current scope of the arms race gives an indication of an extremely abnormal condition of our society. Most importantly, this dynamic state of society cannot last interminably unless curbs are put on the build-up of the Cheopsian pyramids of war technology. Mathematically speaking, this equation of state has no asymptotic solution.

The peoples of our Planet are facing a challenge like nothing man has ever come up against before - to find ways to cure ourselves from the craze of the arms race. At present, it has become increasingly clear that, if the problem were to be solved, it would be solely through winning general acceptance for the concept of peaceful co-existence of states with different social systems and halting the arms race in conditions of the so-called detente. This concept is rapidly gaining ground among common people and far-sighted statesmen.

Now the idea of peaceful co-existence of states with different social systems must be based on very simple general principles. In turn, the principles should be couched in a language so clear and categorical as to foreclose their different interpretations. One of

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This last I regard as the most criminal artifice that has been devised by the human mind for, as if to bring death upon man with still greater rapidity, we have given wings to iron and taught it to fly. Let us therefore acquit nature of the charges that should be preferred against man himself.

Indeed there have been some instances in which it has been proved that iron might be solely used for innocent purposes. In the treaty which Porsena granted to the Roman people, after the expulsion of the kings, we find it expressly stipulated that iron shall be only employed for the cultivation of the fields ...

There is an edict extant, published in the third consulship of Pompeius Magnus, during the tumults that ensued upon the death of Claudius, prohibiting any weapon from being retained in the City."

Pliny, XXXIY, 39

them could be, for example, the principle of inviolability of existing borders between states. The world as a whole is stronger than any aggressor. And once an effective World Accord is reached, such that would rule out war as a means of capturing foreign territories, this will make a lot of things simpler in inter-state relations as well.

Currently, many different views on the concept of detente and the setting in which to keep the process active are being aired in the West, with some of the formulations so unrealistic that they are reminiscent of the worst days of the Cold War. But aside from wanton politicking, there seems to be a way, the only way, to achieve results in this fundamental process now emerging between the West and East. It hinges for its success in some sense on the ability to discern the basics and to not meddle with the unimportant details of detente. The over-riding objective for all of us is to rule out the mere possibility of wars on Earth, and especially that of World War III.

There are many factors and viewpoints on different problems that set apart the West from the East, and which are believed by some to deter the process of detente and the advent of mutual trust in the key-issue of peaceful co-existence. We must learn to assess these factors and neglect small values by comparison with that great value which is taken as a yardstick to measure the key-problem of modern times. The scientific forces employed in precise sciences - mathematics, physics, etc. - are aware that in this one respect the negligence of small values for the sake of a great value offers, not infrequently, the only way to get positive results.

In contrast to the theory of mathematical equations, in social life one finds it hard sometimes for psychological reasons to forego even a comparatively minor value, especially when the situation associated with it is also emotionally tainted due to different concepts of legal and democratic institutions. Thus, the most we can expect to attain is to thrash out painstakingly these differences of opinion and slight off the excrescences because of poor information or deliberate misinformation in the parallel dialogues to lay the groundwork for the major East-West dialogue. Whatever the

parallel dialogues, they are not to be a bar to the principal dialogue on the peaceful co-existence of states with different social systems.

For it is not unification of different social systems but co-existence we are talking about. In the process of wide-scale business and industrial relationships, the two systems must by necessity seek to adjust themselves to each other in view of the increased rationale of inter-state relationships in technology, science and culture within the scope of norms subject to the fundamental principles of the existing social systems.

The awareness of scientists' responsibility to society has brought to life the Pugwash Movement of Scientists. It is only natural that the dangers of nuclear war and the problems of durable peace on Earth have been taking most of the time at the symposia arranged under the aegis of the Pugwash movement. Significantly, many of the issues that would previously cause a stir among the Pugwash community later became focal to many official inter-state talks.

The scientist's mental sight brings out also such other new hazards for generations to come as environmental pollution, energy crisis, etc. This fearsome future, which has become clearly discernible in the present, also lies within the range of responsibilities of scientists.

One other and essentially different duty of the scientist to society and to science itself is a scientific trend, i.e. forecasting responsibility with regard to setting priorities in the allocation of resources. The technological progress has identified new potentialities in the advance of science hitherto unheard-of for their dimension. This new development in the evolution of sciences deserves a special discourse.

There has arisen a discrepancy of some sort between the enormous developmental potential of sciences looming ahead from the technological progress, and the latter's constraints arising, in the final analysis from outlays for the arms race. Society must be kept informed of what science can achieve and why it fails to achieve its potential. It is, therefore, a duty of scientists to bring society up to date on the latest developments in this field.

One ought to believe in a better future for humanity. It is one of the blessings of human history that it accumulates spiritual values, even though unrelated at times to any practical challenges. We must rest assured that the accumulation of spiritual values would represent an ever-increasing influence on the future history of mankind. Since the early beginnings of man as a sensible being, there appeared to be two distinct aspects in his intellectual activity, namely, the pragmatic aspect to enable him to take advantage of his store of knowledge in his practical endeavours, and an aspect which we can in this context call purely cognitive. This latter aspect of intellectual activity is inherent in man's very nature as a primary need of a sensitive and thinking being, just as necessary and natural as all other needs of the living organism. This need lures us into exploring both the deep-hidden mysteries behind the laws of the macro-world and the ultra-macroscopical depths of the Universe; into seeking to produce an integral picture of the Universe, to create an artistic portrayal of the surrounding world and the various workings of human activity and to fathom the developmental laws of human society.

It is worth special mention that the situation obtaining in the natural sciences today either has never occurred in the sciences of the past times, or if it has, then probably never in such an acute form. I refer now to the fact that the imminent development of a number of sciences, like astronomy, astrophysics, high energy physics of elementary particles, and biology, along with the gains of scientific and technological progress have made it increasingly clear that the newly-emergent capabilities for the industrialization of these sciences can provide solutions to many pressing fundamental problems. Thus, creation of modern astronomical and astrophysical surveillance instrumentation holds promise of an unprecedented blossoming for these disciplines. In recent years, they have identified celestial bodies of a basically new breed, meaning here such objects as quasars, perhaps also neutron stars and "black holes". The subject of astronomy and astrophysics has been rapidly assuming greater scope and amazing variety. Clearly, further progress in these

two fields of knowledge calls for adequate observation devices. But, more important still, the observation equipment being sought (contemporary radio and optical telescopes, space laboratories, etc.) present a challenge well within the power of the technological progress to meet.

Evolution of our concepts about matter is foreshadowing the rise of new laws, as man gains further insight into the physics of the macro-world. I feel tempted to re-emphasize that our conception of matter, in a sense, has not departed very far from that of ancient Greeks. Indeed, just as the ancient Greeks held four elements - earth, air, water and fire - to be the four principal entities, although completely ignorant of their fundamental properties, so too contemporary physics is intent on the revelation of the entire content of the real world through an exceedingly complex interaction of various fields which represent, in essence, none other but the same four elements of antiquity - strong, electromagnetic, weak and gravitation fields. And, just as in antiquity, we are still light years away from a thorough understanding of the fundamental properties of these twentieth century elements.

We have long gotten used to the notion that Nature was built without architectural excesses, the notion of the union of nature. But we are still denied a perception of the union of the four elements, and of their innermost bond. So now we are being led to infer that if we are to learn yet a lot of things about this union, the physicists must be equipped with a new generation of particle accelerator, non-existent to date except in dreams, which would have a capability to realize in its gravity-centre system colliding particles with energies close to 300 billion electron volts. The present level of technological progress is able to translate this dream into reality. Technology can also produce quality apparatus for biological research, to investigate the motions and structure of living matter in whatever aspect.

In many fields of scientific knowledge there has dawned an awareness of the potentialities latent in the industrialization of science on the basis of technological progress. But in order for the industrialization effort to bear fruit, investments are a must. (And as for the investments?) This tells the story of the emergence and major expansion in depth of one more discrepancy

between the imminent development of science and the arms race.

The Soviet Union has come forward with a humanistic initiative in proposing a ten per cent limitation of military budgets and the reallocation of the means so released to subsidize development projects in the countries of the Third World.

Humanity would hail further progress in this initiative. What an enormous welcome would ensue from the world scientific community should governments in all countries agree to reducing further, by at least one or two per cent, their military appropriations and to reinvest these sums in projects aiming at further progress of sciences and arts, in addition to the funds earmarked for that purpose under the existing plans. The science referred to here is a science which does not contribute to a country's military or economic potential.

24th Pugwash Conference on Science and World Affairs
Baden, Austria, 28 August - 2 September 1974

M. A. Markov (USSR) XXIV-47

POLITICAL SITUATION IN EUROPE, ARMS RACE AND DISARMAMENT PROSPECTS

On the political map of our planet, the Old World - Europe - remains in many respects, a vital area of actual and potential world developments.

Past history tells us that the fire of both World Wars was kindled in Europe. Even today we should not forget that NATO and the Warsaw Treaty Organization are confronting each other in Europe.

However, the last few years, a number of bilateral political, economic and cultural agreements among Socialist and capitalist countries of Europe have materially changed the political climate on the continent. The Principles of Cooperation between the USSR and France approved in October 1971, the Treaties of the Soviet Union, Poland and Czechoslovakia with the Federal Republic of Germany, the agreement on West Berlin, the Treaty between the GDR and the FGR, and other developments have brought about a turning away from the cold war policy to a policy of peaceful coexistence of states with different social systems. Peace is indivisible and the improvement of Soviet-American relations, the termination of the war in Vietnam, measures toward a settlement in the Middle East are also of positive importance for detente in Europe.

Alongside the bilateral agreements on cooperation, we have seen the commencement of peaceful settlement on a European-wide scale. For the first time in Europe's history a European Conference on Security and Cooperation has been convened and is presently in its second stage. Thus, talks have started on such an important question as the reduction of armed forces and armaments in Central Europe. However, we still have a long way to go until agreements are achieved which will ensure peaceful coexistence among the European states.

We have every reason to be optimistic and to expect an optimal solution to these complex problems because there can be no other solution. The alternative is arms-race madness. Nations and far-sighted government leaders are becoming increasingly aware that there can be only one solution. To my mind one of the tasks facing scientists, and specifically the members of the Pugwash Movement is a scientific substantiation of the fact that there is but one

optimal solution to international problems, a solution which leads to peaceful coexistence of states with different social systems.

This sole solution is far from trivial; it has many aspects requiring painstaking work. In terms of mathematics, there should be different stages of approximation. We should, just as we do in solving mathematical problems, learn in our first approaches to estimate quantitatively essential progress in these talks and should neglect quantities which are insignificant compared to the fundamental ones. The basic task is the preservation of world peace. This is closely linked with efforts to halt the arms race.

We scientists, being aware of the infinite and frequently unpredictable possibilities of science, may see more clearly than others the prospects of arms-race madness. The optimism expressed earlier implies that all sides should be guided by a sense of reality stimulated by the understanding of the fact that differences in ideologies and in social and economic systems are here to stay. We should formulate simple but generally acceptable principles of coexistence of states with so vastly different social and economic systems and ideologies. These principles should be brought to such a stage of clarity and imperativeness as to prevent any ambiguity in their interpretation. They mayinclude, for example, the principles of inviolability of frontiers, non-interference in internal affairs, and others.

Unfortunately, there are still considerable forces hindering detente. The opponents of detente are striving to play up secondary issues, thus obstructing or delaying the solution of cardinal problems of our future history.

However, the trends in our planet's political climate demonstrate that the cold war is a thing of the past.

We are convinced that scientifically objective studies of the political situation in Europe and of the prospects for disarmament will support our hopes for a better future for mankind. In this way scientists and the participants of the Pugwash Movement among them, will make a valuable contribution to the understanding and solution of problems in the coming epoch - the epoch of peaceful coexistence and international detente.

24th Pugwash Conference on Science and World Affairs
Baden, Austria, 28 August - 2 September 1974

I. Beliaev (USSR) XXIV-49

PEACE IN THE MIDDLE EAST IS A VITAL NECESSITY

In the contemporary world detente has become a universally recognized fact. It is only the true incorrigible knights of the "cold war" who brought so much evil to mankind, who are trying to turn a blind eye to it. Today, after the third Soviet-USA summit meeting, even they have come to speak of the necessity for detente and normalisation of US-Soviet relations, though using the same "position-of-force" approach.

In actual fact, the opponents of an improved political climate in the world aim at taking mankind away from the main road leading toward the termination of the arms race and guaranteed prevention of a world nuclear conflict. The imposing of the notorious "position-of-force" is virtually nothing but a repetition of a road already rejected. If their idea of "peace" should be accepted, an inescapable thing might happen - it will take politicians a long time to find a by no means easy way of escape from the nightmare of a new war. It is not so much a matter of a good will, as it is of taking into account the realities that have emerged and are operating in the contemporary world. Only a thorough analysis of these realities will enable one, first, to outline the way of solving major disputes that are a matter of concern to hundreds of millions of people on earth, and next, to find a possible, and what is more important, a long-term agreement that will contribute to the establishment of detente in present-day international relations and the subsequent conversion of this most positive and in all ways useful process into an irreversible one. I think that in order to bring about so humane a task and achieve so noble an aim, scientists the world over must work with clean hands and open hearts.

One of the most urgent, and at the same time most complicated, problems facing the world's politicians, has long been the problems of a political solution to the Middle East crisis. We may assess differently the reasons for this international crisis. More often than not too many emotions are put into these assessments, although emotions are bad and unreliable advisers. However it follows from what has already been discussed by Pugwash scientists with regard to the Middle East, that there is one point common to all, or almost

all, of them. I mean the point of our discourse that might be worded in the following way:

Peace in the Middle East is a vital necessity!

I suppose that none of us will object to this way of putting it. If not, the participants of this meeting have every reason to understand what should be done in the first place to bring about this aim, with due regard to the fact that a Middle East settlement has been much talked of at different international conferences and meetings, much spoken of and extensively discussed over a long period of time. I have mentioned time above all other things, for it is time that may become our ally. We ought to have stopped wasting time long ago, since the cost is too high for those involved in the Israeli-Arab military conflict and all those who are genuinely interested in eliminating the Middle East as a source of tension.

It will hardly be a mistake if I say that a few years ago there seemed to be no end to the dangerous war in Vietnam, since the situation in South-East Asia seemed a complete deadlock. The world press of that time reported numerous facts allegedly showing the irreconcilability of the sides. Today the war in Vietnam is referred to in the past tense, although there is much still to do to secure peace in South East Asia.

As the Paris agreements on the end of the Vietnam war were signed (and the Pugwash Movement of scientists had made a sizable contribution to their achievement as an actual initiator of contacts between the hostile sides) what had been called one of the most dangerous sources of tension on earth was eliminated. The world's attention immediately switched to the Middle East. There the source of tension, or serious danger of war to be more exact, was like a volcano that had calmed down for a time, but threatened at any moment to become the epicentre of a world earthquake. The events of October 1973 proved that those assessments were not a journalistic invention. President Nixon's alert of the US armed forces, including nuclear facilities, was an outcome of the fourth Israeli-Arab war that was under way at that time.

Today we can speak of what would have happened in the Middle East if detente had been only superficial. A genuine, and not imaginary, detente, the normalisation of Soviet-US relations and finally the on-going mechanism of political consultations between the Soviet Union and the United States on issues connected with critical situations in different parts of the world, eventually resulted in

the adoption by the UN Security Council of the Soviet-US draft resolution on a ceasefire and the restoration of peace in the Middle East, based on the implementation of the Security Council Resolution No. 242 of November 22, 1967. Today we can state with satisfaction that the present-day detente has prevented the worst thing that might have happened. The reaction of the Soviet scientists to that turn of events was one of relief.

A number of measures have been taken to promote the implementation of Security Council Resolution No. 338. The first element is the disengagement of Egyptian and Israeli forces in the Sinai, and Syrian and Israeli forces on the Golan Heights. Though, frankly speaking, the tempo of concrete military agreements leaves much to be desired, the above mentioned disengagement of forces can be recognised as a positive step, though the sides have not yet started to discuss a Middle East political settlement. I must emphasise here that Soviet scientists do not regard the disengagement in Sinai and on the Golan Heights as a starting point toward a general settlement. Disengagement agreements are specific military agreements. The Middle East political settlement lies ahead!

In Moscow, we watched with keen interest the dynamic diplomacy of US Secretary of State H. Kissinger in bringing about agreements on the disengagement of forces. However, we realised very well that US efforts would have been more effective had they not been so persistently unilateral. It is relevant to mention in this connection that concerted Soviet-American efforts have already demonstrated their advantage as an example to be followed over any other efforts in the Security Council; e.g. a joint Soviet-US draft resolution (No. 338) was approved with satisfaction by other Security Council members (except China's representative!). We believe that there is no point in ignoring the experience we possess in reaching Middle East resolutions suitable to all sides, no matter how attractive other methods and means may seem.

There is another example of a fruitful Soviet-American cooperation that resulted in a decision suitable to all sides. This was the decision to convene a Geneva peace conference on the Middle East. The mere fact of this conference's opening on 18 December 1973 was more than promising. Delegations of Egypt, Jordan and Israel, the USSR and the USA took part in the conference. The United Nations was represented by the Secretary General of this

authoritative international organisation, Kurt Waldheim. He opened the conference and did a great deal to make it a success.

What tremendous efforts had been made to bring the sides at war to the negotiating table - whatever the shape! It was only in Geneva, that the delegates of Egypt, Jordan and Israel, assisted by the USSR and USA delegations, got the opportunity they longed for, to start negotiations for the goal of restoring peace in the Middle East. We think that to lose this opportunity is impermissible. Therefore, one of the most pressing problems in going ahead along another road in the search for a by no means simple political settlement of the Middle East crisis, has become the question of the speediest possible re-convocation of the Geneva conference. The USSR scientists, together with Soviet public opinion have come out in favour of an urgent and positive solution of this question.

We regard Geneva as the most suitable place for the discussion of any issue arising in connection with the Middle East settlement. Any kind of contacts ~~xxxxxx~~ among conference particpants are implied there but primarily among the belligerent sides - Egypt, Syria, Jordan and Israel. The Palestine Liberation Organisation representatives must be invited to the conference and given the same rights as all other participants. This idea has been recently emphasised in Moscow, at the end of the UN delegation's visit to the Soviet Union. We consider this stand to be a rather constructive one.

What questions might be discussed at the Geneva conference on the Middle East? Territorial problems and the Palestinian question must be first and foremost. The first question has already been discussed too much. According to Resolution No. 242, Israel must withdraw from all Arab territories occupied in June 1967.

There may be an objection to my words with reference to "different interpretations" of the corresponding provisions of the above mentioned resolution. I would like to stress in this connection that the main thing is not the interpretation of this or that clause or article of the Security Council Resolution of November 22, 1967, but the logic of the resolution itself. In order to actually eliminate the reasons for the Middle East military conflicts, it is quite necessary to liberate all Arab territories occupied by Israel in June 1967. Such a step on the part of Israel will not be merely a display of generosity. It will prove the willingness of this Middle East county to live in peace with its Arab neighbours. The latter, according to the statements made by their leaders, Sadat and King Hussain in particular, are ready to constructively discuss the

question of their relations with Israel.

Was not it peace that Israeli statesmen and politicians were speaking of for so many years? Then what is the problem? What is the stumbling point? These questions are quite relevant here. It seems to me that the establishment of the Israeli state in actual fact as well as in the eyes of the Israelis themselves, will give them an opportunity to find peace at last, the thing dreamed of when they established their state in 1948. Any other alternative has so far generated, and will generate in the years to come, uncertainty and, as its inevitable consequence, fear. There is no need to remind anyone that, for all Israel's military superiority, the four Israeli-Arab wars did not move an inch forward the decision on the problems of peace in the Middle East. We should frankly admit to each other that there can be no military settlement of the Middle East crisis at all. To insist on it means to prolong the settlement of the most complicated international crisis of the post-war period. It is by no means clear that we need a fifth confrontation between Israel and Arab countries. On the contrary, I am quite sure that it is better to avoid it!

We would be far from truthful if, having said "a", we did not say "b". After outlining the way to solve the territorial question and the liquidation of the Israeli occupation and its aftermath (and the Arabs today make it quite clear that the UN Security Council November resolution is not to their liking, but they do accept it because the very existence of the Israeli state binds them to do so), we must touch upon another important problem. This is the problem of Palestine's Arab people. It is quite clear to my colleagues and me that without a solution of this problem, there will be no stable peace in the Middle East. The contacts I have had with some Israelis have made me realise that most of them are fully aware of this.

What should be done to ensure the national rights of Palestine's Arabs?

I cannot claim to answer this question in all its aspects. It is apparent, however, that the discussion of this question at the Geneva conference should be given top priority, like all other problems related to the liquidation of the dangerous aftermath of Israel's aggression against the Arab countries. I expect my last statement will raise objections from some participants at this meeting. However, the main thing now is not whether this or that

/not

statement will be disputed. If Israel has a right to peaceful existence - and Soviet scientists like our state and political leaders have never had any doubt about it and history proves it - then the same right should be enjoyed by Arab peoples, including the Arab people of Palestine.

Let me go back to the UN General Assembly resolution of November 29, 1947. This resolution laid the basis for the establishment of Israel. The same resolution should have also laid the basis for the establishment of the independent Arab state of Palestine. Although that state never emerged, Palestine's Arabs did not lose the right to self-determination, including the right to have a state of their own - rights that the Palestinians are now raising. They have a legitimate and inalienable right to independently dtermine their own destiny. So let us help them to secure this right, guaranteed among other international norms, by the Charter of Human Rights, which was adopted by the United Nations.

What may happen if this does not occur? What if, for example, Pugwash participants voice their support of Israel's right to peaceful existence, which is quite logical and inarguable, and yet disregard the right of Palestine's Arabs to the same peaceful existence? We will have done a crying injustice, indeed, a most horrible and indefensible injustice. The rights of one people, Israelis, will have been secured at the expense of the Arab people of Palestine. History will not forgive us this injustice. Such a move would not bring about peace, but instead new conflicts in the Middle East. Conflicts so dangerous that we will be likely to face new atomic alarms and the necessity for decisions, by no means hopeful, on the part of alarmed statesmen. Why should we try mankind's patience? For what purpose should we put our conscience on trial again? Concern over peace in the Middle East binds us to do the utmost, so that such a turn of events should never happen. We must do all we can for the sake of restoring a stable and just peace in the Middle East. Not simply peace, I stress, but a just peace. Any other peace in this area will be no more than a palliative, an ersatz peace, or a fragile political compromise. The Middle East peoples, including Israelis, can hardly want such a peace.

What can Pugwash participants do to speedily restore peace in the Middle East, and to remove for good the dangerous source of tensions in this part of the world?

1. Openly and resolutely come out in support of the Geneva

peace conference on the Middle East, emphasising the vital necessity of its re-convocation as quickly as possible. The most suitable time is autumn 1974.

2. Back any steps directed at the implementation of the Security Council resolutions on the restoration of peace in the Middle East. An urgent implementation of Resolution No. 338 must be regarded as a measure of high priority.

3. Support peace forces in Israel and Arab countries who have come out in favour of the speediest possible restoration of peace in the Middle East, on the basis of the United Nations resolutions.

4. Set up groups of competent scientists, who could bring to the attention of their respective parliaments and governments the Pugwash Movement's resolutions and who will support the idea of the speediest possible restoration of a stable and just peace in the Middle East.

5. Authorise the Executive Committee of the Pugwash Conferences on Science and World Affairs to closely watch the development of events in the Middle East and to organise, if necessary, those consultations required for elaborating a joint effort to mobilise world public opinion against the danger of war in this part of the world. It must be remembered that the recent events in Crypus have shown that the Middle East continues to be a dangerous source of tension in the world.

Last year, the World Congress of Peace Forces took place in Moscow. This outstanding forum brought together representatives of different movements, trends and organisations concerned about world peace and the security of the world's peoples. This Congress established a special commission for the Middle East. More than one hundred speakers took the floor, including Arabs and the Palestinians. It is noteworthy that none of them called for the abolition of Israel. This fact was admitted by the conservative forces representative of Israeli society, who participated in the Congress and the Commission, who pointed out that the results satisfied them.

Another thing is important. The Israelis who came to Moscow declared that the establishment of peace between their country and the Arabs was a vital necessity. It is our duty to help them find what Americans who participated in the Vietnam war were deprived of: a peace that is enjoyed today by American mothers whose sons managed

to stay alive in the bloody war in South-East Asia.

In conclusion, I would like to make one remark. One should not expect the Geneva conference, however successful it might be, to solve all problems at once. Peace in the Middle East, particularly a just and stable peace, is not a result of one action. A peace treaty may be signed by Israel and the Arab states, but that will not bring real peace in that area. To make this positive process successful, it is necessary to remove the mountains of hatred and prejudice which exist between the Israelis and the Arabs.

Can this be possible? I am sure it can. But to achieve so honorable a goal, it is necessary to launch a propaganda campaign in support of a just peace. Peace must be without annexations, claims to each other's territory and suppression of people's rights. Peace in the Middle East must open people's hearts to ideas of further detente. The General Secretary of the CPSU Central Committee, L. I. Brezhnev, emphasised in one of his speeches the necessity of normalising relations between Israel and the Arab countries. Otherwise, no peace is possible in that area. This is the essence of any plan or step directed at the normalisation of the Middle East situation.

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P. Lock (FGR) XXIV-50

SOME HYPOTHESES CONCERNING THE CONSEQUENCES OF THE SO-CALLED OIL-CRISIS FOR MILITARY EXPENDITURE AND ARMS PRODUCTION IN THIRD WORLD COUNTRIES *

1.

OPEC stands for a few nouveaux-riches among the numerous nations of the Third World. They have managed successfully to secure for themselves a considerably increased share of the world's commodities and economic potential. The dimensions of this redistribution process at the level of national accouhts could lead to major disturbances in the capitalist world market and the international monetary system. It has become obvious for the first time that the absence of socio-economic development in a number of developing countries cannot be explained any longer by a lack of funds and resources. This paper will draw attention to facts and tendencies suggesting, provided present trends were to continue, that the increased oil-revenues will not lead to a rapid process of socio-economic development in oil exporting countries, but that instead the revenues will be ploughed back into metropolitan economies. One mechanism becoming increasingly important is the spending of "oil-money" for military purposes, eg. sophisticated armaments and arms production facilities. The analysis of mutually reinforcing interests at the level of nations and classes and certain economic sectors, as well between metropolitan and peripheral countries rich in raw materials, should be considered an immediate priority in peace research and related fields.

2.

Perhaps some data on current trends in Iran will suffice to demonstrate what is to be expected in a number of peripheral countries like Libya, Saudi-Arabia, Indonesia etc. Oil revenues of Iran have increased from just over 2 billion US to more than 16 billion US from fiscal years 1972 to 1973. The commercial sale of France and Britain, for example to peripheral conntries have climbed to new records in 1973. The United States is to sell its most advanced jet air-craft fighter to Iran as soon as this newly developed plane is ready for production, and the R&D of certain components will be financed by Iran. The Iranian aircraft industries constitute an example of the rapid development of arms industries in close co-operation with US companies and with the aid of more than 500 US specialists. Analysing the huge build-up of arms in Iran - some of the items being delivered by the Soviet Union

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* The paper was drafted by the following members of a research team at the research unit of the Federation of German Scientists, Hamburg (FGR): Dieter Ernst, Peter Lock and Herbert Wulf

one cannot but conclude that the Iran is trying to establish itself as a (sub-) hegemonial power not only in the Gulf area. The expansionist tendencies of the Iran are considered as a threat to security by neighbouring countries and comp eting powers such as India. The seemingly inevitable consequence are regional arms races and an increased withdraw of resources from the overall development potential of peripheral countries.

3.

Speaking of the so called oil-crisis we do not intend to deny the existance of the problem how to supply mankind with the necessary energy at reasonable monetary, social and environmental costs. In using the term so called oil-crisis we only like to draw attention to the arbitrariness which was constituant for the "crisis", its particular time, duration and intensity.

4.

Some general remarks on the causes and effect of the world wide increase of oil-prices are necessary in order to formulate some hypothesis on the interrelationship between increased oil revenues in oil-exporting developing countries and possible dramatic changes in the proliferation of sophisticated weapon-systems and arms production facilities.

5.

The changes in the price for oil have improved the balance-of-payment position of some developing countries considerably while the large majority suffered a rapidly deteriorating balance-of-payment due to the drastic increases of the oil price with the result of price increases for industrial products.

Two groups of the developing nations appear to be in the making, those being able to improve their relative foreign exchange position on the basis of increased oil revenues and those nations which are to contribute to the relative improvement of former It goes, of course, without saying that an improved balance-of-payment or additional financial resources do not automatically convert into the welfare of the people.

6.

While it would be most difficult to isolate one actor in international politics being the decicive force in provoking the so called oil-crisis one can at least describe who are the actors having reasons to condone with what had come to be called the oil-crisis. It is obvious that the oil-exporting countries are favouring price increases whenever they allow for an increased share for themselves. Whereas in the fifties most of the revenue accrued to the few metropolitan monopolies and was easily manipulated by them, more favourable conditions for the governments of oil-producing countries prevail in recent years. Just as some peripheral countries are interested in a continuation of current trends and others not there are metropolitan countries which have a relative advantage from the so called oil-crisis.

7.

It can be argued that the United States were able to solve some of their ailing balance-of-payment problems due to the fact that the United States of America are less dependent on oil-imports than their European competitors and Japan. It should be added at this point that the international oil-companies stressed very much the necessity to develop the huge reserves the United States possess' in Alaska. The necessary investments served as an justification for their soaring profits while the oil-sector was supposedly in crisis. There are indications that the oil-companies continued to move into other sectors of the economy some of which may relate to alternative supplies of energy. It never-the-less appears hardly likely that oil-profits will finance the necessary long-run development of alternative technologies supplying energy, as of now exclusively being supported by government funds.

8.

The USSR most likely welcomes the general increase in oil and energy prices since it makes the development of her own huge, but yet untapped energy resources economically feasible. A continuation of the relatively low price at the world market would have confronted the Soviet Union with a difficult alternative. Either to maintain the present low price being determined by relatively easy accessible sources of oil in the near East and elsewhere or to increase the price for oil unilaterly in order to procure the necessary funds for the development of future energy resources on Soviet territory. The <u>first</u> alternative would have reduced considerably the self-sufficiency in the energy sector of the Soviet Union and her East European partners

even in the immediate future. The second alternative appeared politically dangerous since her East European clients might have been tempted to import oil from western sources because of the price differential. It seems justified to draw firstwhile the conclusion that Europe - West and East - and Japan are being relatively more affected than the two superpowers the USSR and US.

9.

The increase in oil prices can also be viewed as a selective redistribution of wealth at the level of nations. The international monetary system, already in difficulties before, is in danger to collaps if the oil money with its newly acquired hitherto unknown dimensions were to continue the speculation at international finance markets. Just as some multi-national firms have annual transactions larger than the GNP of many nation-states it is also true that the financial capacity of some Arab territories for example could produce disturbances in the financial system of the capitalist world far beyond the controlling capacity of the central banks at least in the smaller countries.

10.

What remains on the balance sheet of the so called oil-crisis are huge international oil monopolies with increased profits and power, about a dozen oil-exporting countries with sharply increased revenues resulting in import capacities well beyond any existing non-military absorptive capacity at least as long as the rigid class structures in these few countries continue to exist. The costs of the "oil-crisis" are burdened upon the working-classes in metropolitan and peripheral countries suffering from heavy inflationary pressures caused by the redistribution at the level of the national accounts which had taken place.

11.

How do the billions of US-$ spending from the increased oil-revenue effect the structure of production at the national level as well as the natu r of international relations? How does the ruling elite spend and how does the rapidly exponding state bureaucracy administer the increased funds at their avail? The existing pattern of international economic and financial relations is being conditioned to a considerable extent by the strategies of a number US-dominated multi-national companies and the World Bank, International Monetary Fund, etc. All of them are pursuing a policy of internationalizatic of capital and labour as well. World wide sourcing, run-away industries, vertical inte-

gration of production are only a few ter[illegible]ating the present structure of the world economy which is being charact[illegible] acce-lerated process of rapid economic growth in geographically separated ind[illegible]rs and a continued increase of misery for a majority of the world population ou[illegible]de the socialist countries still growing in relative and absolute terms. As a c[illegible]cial question remains to be answered as to whether the oil-money will be moulded into the pattern of world economy and reinforce existing tendencies or whether oil-exporting countries will be able to develop successfully their economies and convert the newly acquired wealth into the well-being of their population.

12.

It can be assumed that it is quite important for the maintenance of the international monetary system that the Iran f.e. finds ways to invest the oil-money or to buy commodities in order to forstall that oil-money operates exclusively as finance capital. One approach, though theoretical, would be a big push in industrialization. But there prevail various factors limiting the process of binding all the resources available in the establishment of industries. First of all the internal market is too small and would always remain behind and could never serve as a sufficient outlet for the production which could be achieved on the basis of the oil-revenues. Attempty to supplement the national market by foreign markets would encounter potent competitors, and taking up the example of Iran it just does not appear feasable that the Iran were to capture foreign markets sufficient to absorb its potential productive capacity. On the other hand expanding the national market to the necessary le[illegible]s would imply a complete change in the existing relations of productio[illegible]. It can be established therefore that a huge industrialization programme for the national markets, apart from problems of more technical nature, would require a complete change of the political system and the class-structure existing at the moment in these countries. In this discussion we leave aside all the difficulties accruing from sanctions and conspiracy by different private and public actors on the international economic and financial scene being employed against countries who dare to plan their own and independent development as has been proved recently in the case of Chile.

13.

The establishment of large scale export oriented manufacturing requires the know-how of production and marketing which is being controlled by the large multi-national companies. Only if the multi-national companies were really interested to locate a considerable proportion of their world-wide activities in a country like Iran on the basis of joint ventures with the government would it be feasable to convert the Iran into a Free-Production-Zone of yet unknown dimensions. As before, there would exist technical difficulties in establishing such a large industrial structure and the necessary infra-structure during the relative short intervals in which the oil money becomes available. Furthermore such a concentration of productive efforts of multi-national companies at one location runs counter to the rule of diversification of political risks.

14.

One secure outlet, however, for the oil-money is the sale of arms including the most sophisticated weapon systems. It might be asked whether there exist other means to neutralize the potential economic challange deriving from the oil revenue? Of course there exist many more investment choices especially in the field of social infrastructure where the money could be located and neutralized at the same time, but there is probably no other investment opportunity having a similar powerful and effective group of lobbyists behind it. At the time of the "oil crisis" the US arms producers sufferd from over-capacities in the aftermath of the Vietnam war. The European producers in Great Britain and France lack the necessary economies of scale in order to keep up with their US-American competitors. Thus, all the major Western arms producers have a strong interest in getting their share out of the oil revenues.

15.

For the ruling elites in the oil exporting countries the military apparatus is of utmost importance. In the case of the Iran the Army serves to control and repress any popular uprising insisting in a greater share of the wealth accruing from oil for the majority of the population. The existing alliance between the middle-classes and the ruling elite is based on a nationalist ideology being symbolized by a modern and increasingly powerful army.

16.

It should be kept in mind, however, that all the arms acquisitions especially of sophisticated weapon systems are controlled by the governments of the arms exporting countries and henceforth are dependent on the hegemonial interests of the metropolitan countries.

17.

The establishment of indigeneous arms manufacturing therefore appears regularly with high priority on the agenda of governments based on nationalist ideologies. Besides the general increase - quantitatively and qualitatively - of arms transfered to the Third World being related with the oil crisis, there is evidence that oil- and raw material-rich countries are about to supplement their arms acquisition strategy with plans of autonomous arms production. As for the moment countries like Brazil, India, Iran, Israel, South Africa and Turkey could be emntioned as heading toward indigeneous arms produttion. This production of arms is not any more restricted to small arms.

18.

Apart from cases of vertical integration of arms production similar to structures to be observed in internationalized civilian production there are many joint ventures between the governments of these countries and the most important arms producers of the industrialized countries. In order to increase the proportion of indigeneous value added as fast as possible, all defence-related industries are given priority in the general development scheme.

19.

Since this type of arms production is not based upon a complex industrial structure, most of the supplementary industries won't have other than military outlets for their specialized production. The establishment of arms production results therefore in a pattern of military oriented industries practically all of them lacking reasonable economies of scale. This very fact leads up to higher procurement costs, a one-sided industrial structure which does not produce any dynamics by forward and backward linkages in civilian sectors of production, it tends to absorb continuously a major proportion of the development potential accruing from the oil revenue.

2o.

In general the production of arms and weapon systems appears to be characterized increasingly by a tendency of financial and/or technological internationalization, even in the field of related research and development. Some aircraft and electronics producers of the West are about to start joint ventures in socialist countries. Many components of military equipment(especially electronics) are being produced in developing countries taking advantage of the low cost of labour in Free Production Zones and elsewhere. Still another motive for the present proliferation of arms production into the Third World is the attempt by the arms manufacturers to evade existing or potential export restrictions on arms, especially in Germany but also in other countries.

21.

The dangers for peace involved in these arms build-ups - not being restricted to the Arab World and Iran, take for instance Nigeria in recent years - are not being considered in this paper which has focussed mainly upon the economic rationale involved in this process of arms production proliferation. The dynamics of this proliferation do not stop at the bounderies of oil-rich peripheral countries. Its spill-over contaminates neighbouring areas and leads up to regional arms and arms production races in the periphery at levels yet unknown in these poverty-stricken parts of the world.

Hamburg, August 1974

24th Pugwash Conference on Science and World Affairs
Baden, Austria, 28 August - 2 September 1974

H. Glubrecht, International Atomic Energy Agency

XXIV-51

REGIONAL COOPERATION BETWEEN DEVELOPING COUNTRIES AS A WAY TO SELFRELIANCE

Article 52 of the Charter of the United Nations is concerned with the usefulness of Regional Arrangements which "are appropriate for regional action". Such arrangements need not be considered only with regard to their political aspects but also as organizational structures which can be helpful in the development of science and technology in less-developed countries (LDC-s).

The definition of a "Region" may be difficult, but probably easier if scientific rather than political cooperation is intended. The development of science in LDC-s is a very irregular and variable process. It depends partially on individual scientists who became outstanding experts in their special fields, partially with funds which have been made available for special projects, partially due to national or local interests in special areas of science, as well as because of many other factors. As a result LDC-s normally do not have the broad spectrum of capability in all or most scientific disciplines which one expects in developed countries (DC-s) but they have potentials in distinctive fields where they often enough reach international standards. The same holds for laboratory equipment and experimental and technical facilities in LDC-s.

The idea of regional cooperation in science and technology is based on this situation. Combining the limited potentials of various LDC-s in one region may lead to a much broader spectrum of scientific strength and can contribute to an accelerated development of science either without or with reduced external support from DC-s.

Arguments for regional cooperation.

Countries in a region may often have common interests due to similarities in climate, geography and economic structure. Therefore it may be possible to define projects of practical benefit to all of them for which joint scientific efforts are necessary. The present situation is characterized by a considerable lack of information between LDC-s in the same region on their own scientific potential. E.G. in the field of Nuclear Science and Technology the experts in a LDC "X" are well informed on the work done at Oak Ridge (USA), Harwell (UK),

Saclay (France), Karlsruhe (FRGermany) etc. but not necessarily on what is going on in their neighbour country "Y" at a distance of only a few hundred miles. If an intensive exchange of information would take place they might find that the special "knowhow" they are looking for may be available much closer to home, perhaps from an expert who has been trained abroad in one of the centres mentioned above, but who has continued his work with special emphasis on regional problems.

Such regional experts may often enough be better disposed for further dissemination of their experience to neighboured countries than experts from abroad. They are aware of the problems which arise due to climatic conditions, lack of services, insufficiently trained personnel etc. Exchange of scientists might be established in a region based on mutual acceptance of hospitality. Travel costs are considerable reduced against those to far DC-s.

Expensive equipment might be much better used on a regional base and applications for new equipment to funding institutions will be better accepted if intensive use will be guaranteed by regional cooperation.

The main argument of course is the fact that this type of cooperation will lead to a higher degree of selfreliance in a region and often enough to a level of research and technology which may be competiting with DC-s.

Barriers to regional cooperation

Besides political barriers*) - sometimes conditioned by the on-going influence of former colonial powers - there are some evident psychological factors which might inhibit regional cooperation. There is the deep rooted feeling that real excellence - even in very limited areas of science - can only be found in the temples of internationally approved science in highly developed countries. This idea is connected with the belief that succesful research can only be done if a broad choice of sophisticated equipment is available. If that would be true, training of experts from LDC-s in DC-s might be senseless as long as they cannot transfer these working conditions to their home country.

*) Cf. F.G. Torto, Proc. of the XXIIIrd Pugwash Conference, Aulanko, Finland p. 399.

It is understandable that for young scientists in LDC-s contacts and visits to scientific institutions in DC-s have more appeal than travelling or staying in their own region. The reasons for this tendency are often not merely scientific. Perhaps it might be a challenge if these scientists, if they go to a DC, can represent more than a national group. This can be achieved if they have taken full note of the regional potential in their field before they go abroad.

Of course it will also be difficulte to overcome national ambition. Often neighbouring countries are competitive and are tempted to give clear proof of their superiority overone another in as many fields as possible. The best way to surmount this obstacle is specialization. It is indeed the concept of regional cooperation that every country concentrates on limited goals to the advantage of the region but also benefits from the activities of other countries in the region. This is practically the way in which scientific cooperation inside a nation works if the national potential is broad enough for a wider spectrum of disciplines.

It might be dangerous if the level of development is rather different between the countries in a region. In that case cooperation should be limited to countries of roughly comparable standard in science and technology. Guidance might be given by neutral international organizations rather than by single outstanding countries. As reasonable regional cooperation may provide a more accelerated development, differences might be levelled in course of time.

The RCA as an example.

The International Atomic Energy Agency (IAEA) has undertaken a first step in this direction through its Regional Cooperative Agreement for Research, Development and Training related to Nuclear Science and Technology in South and Southeast Asia, the Pacific and the Far East (RCA) which has been signed by six countries so far. This agreement leaves it to the member states to initiate cooperative projects. The IAEA will take steps to establish the project if at least 3 memberstates are willing to participate. The implementation of the project will be defined by negotiations with the memberstates and the IAEA will only play the role of a coordinator. Annual meetings of representatives of these countries which became parties of the RCA and of others from the region which might be interested to join the agreement provide the possibility of

continuing exchange of new ideas.

It should be mentioned that regional activities also are undertaken by means of "Coordinated Research Programs", mostly including some cooperation with DC-s. The RCA has brought the two new ideas of performing the projects exclusively by countries of the region and to take the step from coordination to cooperation through continuous and intensive exchange of information as well as of personnel. Its main idea is to aim at a reasonable division of labour between the parties and to use expensive equipment jointly. It is to be hoped that this venture will lead to an increasing degree of selfreliance inside the region concerned. If so other regions might follow the example.

24th Pugwash Conference, Baden 1974

PROVISIONAL LIST OF PARTICIPANTS

(In some cases, arrival still uncertain.)

Name	Country or Organisation
ADAMS Ruth	United States
AFHELDT Horst	G F R
AHMED Ishfaq	Pakistan
ALFVEN Hannes	Sweden
BACON Jean (Staff)	United Kingdom
BALEVSKI A.	Bulgaria
BARNABY F.	S I P R I
BARNET Richard J.	United States
BARZELATTO Jose	Chile
BAUDOUX Pierre	Belgium
BAUER E.	France
BELYAEV	Soviet Union
BERNHARD C.G.	Sweden
BINDARY	Egypt
BLAU Paul	Austria
BOGARDI J.L.	Hungary
BOSERUP A.	Denmark
BRATANOV	Bulgaria
BREITENECKER M.	Austria
BRODA Engelbert	Austria
BROMS Bengt	Finland
BRUK M. (Interpreter)	Soviet Union
BRUCKMANN Gerhart	Austria
BUDINI P.	I C T P
BURZYNSKI Andrzey	Poland
CALOGERO Francesco	Italy
CASSIN Lydia	France
CHAYES Abram	United States
CHERNILIN Y.F.	I A E A
CROWE Harry	Canada
DICULESCU Ilie	Romania
DJERASSI Carl	United States
DOBROSIELSKI M.	Poland
EATON Cyrus S.	United States
EKLUND Sigvard	I A E A
EGERTON Jean (Staff)	United Kingdom
EL BOROLOSY	Egypt
EL SOURANIE	Egypt
von EHRENSTEIN Dieter	G F R
ENGELHARDT V.A.	Soviet Union
EPSTEIN William	Canada
ERMAKOV	Soviet Union
FEDORENKO	Soviet Union
FELD Bernard T.	United Kingdom
de FOREST (Staff)	United Kingdom + ell.
FRANK F.C.	United Kingdom
FRANK Wilhelm	Austria
FRIEDLANDER Saul	Israel
GALAL E.E.	Egypt
GIGLIARELLI-FIUMI Marcello	Italy
GUTTERIDGE W.F.	United Kingdom
HÄFELE W.	I I A S A
HAMMOND George S.	United States
HARRISON James	UNESCO
HOFFMANN-OSTENHOF Otto	Austria
HOFNUNG Maurice	France
HOLDREN John P.	United States
HOWARD Michael	United Kingdom
HUNTER Robert E.	United States

Name	Country or Organisation	Name	Country or Organisation
JIVANJEE	I C I P E	NADJAKOV Georgi	Bulgaria
		NAŁECZ Maciej	Poland
KALDOR Mary	United Kingdom	NEMEC T.	S I P R I
KAPITZA P.L.	Soviet Union		
KAPLAN M.M.	W H O	ODHIAMBO Thomas R.	Kenya
KASHIRIN	Soviet Union	ØLGAARD Povl Lebeck	Denmark
KESSLER Alexander	W H O		
KEYNAN Alex + Mrs (Reuter)	Israel	PARTHASARATHI Ashok	India
KHAN Munir Ahmad	Pakistan	PASCOLINI Alessandro	Italy
KISTIAKOWSKY G.B.	United States	PAVLICHENKO V.P.(Interpreter)	Soviet Union
KNAPP Vladimir	Yugoslavia	PENESCU Corneliu	Romania
KOHLER Friedrich	Austria	PETRESCU Mircea	Romania
KORHONEN Keijo Tero	Finland	POLLIART A.J.	I A E A
KRISHNA M.G.	India	PRAWITZ Jan	Sweden
KRÖGER Herbert	G D R	PRINGLE	I C I P E
KULESHOV V.F.	Soviet Union		
		RADEVA Rumiana (Interpreter)	Bulgaria
LANE J.A.	I A E A	RAIFFA Howard	I I A S A
LEIBNITZ Eberhard	G D R	RATHJENS George	United States
LLOYD O.E.S.	I A E A	REUTOV O.	Soviet Union
LOCK Peter	G F R	RIPKA Georges	France
LOHS Karlheinz	G D R	ROBINSON J.P.Perry	United Kingdom
LONG T. Dixon	United States	ROSENQVIST I.Th.	Norway
LÖTSCH Bernd	Austria	ROTBLAT Joe	United Kingdom
LUNDIN Johan	Sweden		
		SAFRAN Nadav	United States
MAALØE Ole	Denmark	SALAM Abdus	Pakistan
MADL Ferenc	Hungary	SALT Edith (Staff)	United Kingdom
MAKI Ziro	Japan	SANDERS B.	I A E A
MANGANYI Noel Chabani	South Africa	SCHMETTERER Georg (Staff)	Austria
MARKL Peter	Austria	SCHMETTERER Leopold	Austria
MÄRZ Eduard	Austria	SHROFF R.	I A E A
MATES Leo	Yugoslavia	SMITH Philip B.	Netherlands
MIETTINEN Jorma	Finland	SOKOLOV I.A.	Soviet Union
MINCZEWSKI Jerzy	Poland	SPRINGER-LEDERER Helmuth	Austria
MOCH Jules	France	STANDLEY C.C.	W H O
MULTAN W.	Poland	STEIN Gabriel	Israel
MUNGER Edwin S.	United States	SUAREZ Carlos Enrique	Argentina

Name	Country or Organisation	Name	Country or Organisation
SWARTZ William M.	United States		
SZILARD Gertrud	United States		
THEE Marek	Norway		
THOMAS Konrad	G F R		
TOLHOEK H.A.	Netherlands		
TORTO F.G.	Ghana		
TOYODA Toshiyuki	Japan		
TRUKHANOVSKY V.G.	Soviet Union		
TSIPIS Kosta	S I P R I		
VINOGRADOV A.P.	Soviet Union		
WEINZIERL Peter	Austria		
WEISSKOPF V.F.	United States		
de WILDE Jan	Netherlands		
WILSON	I C I P E		
van der WOUDE A.	Netherlands		
YORK Herbert	United States		
YOUNG Easter (Staff)	United Kingdom		
YUROSHEVSKI (Interpreter)	Soviet Union		
ZHURKIN	Soviet Union		

Herta Firnberg
Frau Wodak
I. Tellman
Rii. Leodolter

Kreislauf inflation
econ. - psychol.
hidden persuaders

24th Pugwash Conference on Science and World Affairs
Baden, Austria, 28 August - 2 September 1974

PROGRAMME OF CONFERENCE

Wednesday, 28th August 1974

09.30	First Plenary Session Chairman :Prof. E. Broda Opening ceremony Formal greetings by the Minister of Science and Research, Dr Herta Firnberg Response by the President of Pugwash, Prof. H. Alfven
10.45	Coffee break (The opening ceremony until the coffee break is open to the Press.)
11.00	Report from the Secretary-General of activities during the past year Discussion Setting up of Working Groups and instruction
12.30 - 14.30	Lunch
14.30 - 18.00	Working Group meetings

Thursday, 29th August 1974

09.30 - 12.00	Working Group meetings (10.30 - 10.45 coffee break)
12.00 - 14.00	Lunch
14.30 - 18.00	Working Group meetings (16.00 - 16.15 coffee break)
21.00 - 23.00	Special Evening Session Chairman :Prof. J. Rotblat Plenary Discussion on Nuclear Arms Control and the Problem of Proliferation

Friday, 30th August 1974

09.30 - 12.00	Working Group meetings
12.00	Outing into Wachau and Reception by the Government of Lower Austria (Departure of buses from the Congress House at 12 sharp.) Meals will be served during the outing.

1968-67 I.I.A.S.A. Sept 3

Johnson - McBundy -
Civil problems of Ind. nations - Lord Zuckerman
Systems Analysis comb ? Appl approach
1972 - London → 12 nations
Ntl. Academies on behalf of their countries - earmarked money from govts 3.5 Mill $ Budget - 70 man years/yr
Intelligent clearinghouse - Global Models (Forrester-Meadows
Hydrosphere - Atmo - Eco - Sociosphere . Handbook on Syst Analysis
P.H. - Hyatt, Howard Sch. P.H.

Saturday, 31st August 1974

09.00 - 12.00	Working Group meetings
14.30 - 18.00	Working Group meetings

Sunday, 1st September 1974

09.00 - 12.00	Second Plenary Session Chairman :Prof. M. Nalecz Presentation of Working Group Reports and discussion
14.30 - 16.30	Third Plenary Session Chairman :Prof. O. Maaloe Continuation of presentation of Working Group Reports and discussion
17.00	Departure of buses for the Vienna opera from the Congress House.

Monday, 2nd September 1974

Plenary 9:50

09.00 - 12.00	Working Group meetings
14.30 - 16.00	Fourth Plenary Session Chairman :Prof. H. Alfven Discussion of the agenda for the 25th Conference in India
16.30	Concluding ceremony with address by the Federal Chancellor of Austria, the Hon. Dr. Bruno Kreisky
18.00	Departure of buses from the hotels to Vienna for Reception by the Federal Government (food will be served at the Reception)

Change in Work. group 3

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P.H. report
H. Brown
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PETER MARKL (Ilse)
1070 WIEN
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Institut: 34 46 31/39

DR
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...minister avisi... neuerliche Erhöhung ...lch-krisengroschens, da rund 120 Millionen Schilling zur Subventionierung der Exportförderung fehlten. Die Erhöhung — die zur Hälfte von den Bauern bezahlt werden muß, die andere Hälfte schießt der Bund zu — dürfte zwei oder drei Groschen pro Liter betragen. Auch diese Regelung werde bei den kommenden Verhandlungen über die Marktordnung zur Sprache kommen, betonte Weihs.

Marktordnungsserie Seite 7

europä... für den F... markt Schwierig... Rückkehr Frankreichs ... päische Währungsschlange... alles wichtige Themen, über ... Schmidt und Giscard d'Estaing bei ihrer Zusammenkunft gesprochen haben oder über die man noch sprechen wird. Aber es ist in der Tat weder vorstellbar noch wün... würd... erzielt w... wiß vernünftig... ausreichend? Muß nic... bei den einzelnen Staate... deutsche, besser noch eine deutsch-französische Initiative einsetzen? Ist nicht jeder Monat, ja jede Woche kostbar geworden? Und wenn man hier nicht das deutsche Ansehen, die deutsche Wirtschaftsmacht, die ganze geballte Kraft der Bundesrepublik einsetzen will, wo dann? Muß man nicht für diesen Zweck auch Schelte und Unbeliebtheit riskieren? Wobei es gar nicht so sicher ist, daß sich diese Mißhelligkeiten tatsächlich einstellen würden. Gibt es eine Einigung ohne Einiger? Und wenn diese Rolle auf die Bundesrepublik fällt, kann sie sie zurückweisen? Wirtschaftliche Sturmwolken ziehen herauf; man wird das Gewitter wesentlich besser unter einem festgezimmerten europäischen Dach bestehen als in den leicht fortzuschwemmenden Hütten der einzelnen Nationalstaaten.

Fortschritt des Grauens

p. m. p. — Die zehntausend zur Zeit in Europa lagernden Atombomben würden ausreichen, zehntausend kleine bis mittlere Städte des Kontinents zu zerstören, vom Arsenal außerhalb unseres alten Erdteils gar nicht zu reden. Doch es gibt die beruhigende Annahme, niemand werde sich ihrer bedienen, weil nicht nur jeder den Gegenangriff zu fürchten habe, sondern außerdem ein strahlenverseuchtes Chaos niemandem die Chance gäbe, sich eines Siegervorteils zu erfreuen. Auf der Badener Pugwash-Konferenz wurde nun auch von dem chemischen Agens VX geredet, das sowjetischen wie amerikanischen Wissenschaftlern gleicherweise bekannt ist. Fünfundzwanzig Bomber, damit ausgerüstet, würden genügen, 80 Prozent der Bevölkerung von New York, London oder Moskau zu vernichten. Und zwar ausschließlich die Menschen, alles übrige bliebe unversehrt. Also eine ihrem Zweck entsprechend technisch perfekte Waffe, und außerdem billiger in der Herstellung als jede Atombombe. Was vor allem für die Entwicklungsländer eine Versuchung bilden könnte, sich damit auszurüsten. Gewiß, irgendwann wird das aus dem Jahre 1925 stammende Verbot der chemischen Waffen, bis heute von vielen Staaten nicht ratifiziert, erneuert werden. Aber was bleibt, ist das Wissen um den Fortschritt des Grauens, der offensichtlich unaufhaltsam ist.

...inen

...äußerste Sparsamkeit

...tag, wer... ...udgetgespräche ...e eröffnet. Vorge... ...nd Aussprachen Androschs ...it den Ministern Bielka, Rösch und Broda. Am Freitag sind die Kapitel Bauten, Handel und Gesundheit auf dem Programm. Montag werden die Minister Häuser, Lütgendorf und Weihs in der Himmelpfortgasse erscheinen, am Dienstag aber Sinowatz und Frau Firnberg. Die Gesprächsrunde wird am kommenden Mittwoch mit der Behandlung des Kapitels Verkehr abgeschlossen.

Der Terminplan sieht vor, daß der Ministerrat den Entwurf des Bundesvoranschlags 1975 am 24. September beschließen, und daß Finanzminister Androsch dann am 22. Oktober seine Budgetrede vor dem Nationalrat halten wird. Am 6. November soll die erste Lesung des Budgets im Plenum stattfinden, worauf dann vom 11. bis 22. November der Finanzausschuß die Detailberatung vornimmt. Die große Debatte im Plenum startet am 3. Dezember und wird nach dem bisherigen Plan am 19. Dezember abgeschlossen sein.

Finanzminister Androsch erklärte Mittwoch, die Erstellung des kommenden Budgets werde im Zeichen äußerster Sparsamkeit stehen. Er wolle nach dem Grundsatz vorgehen, daß begonnene Vorhaben erst fertigzustellen sind, bevor man neue Projekte in Angriff nimmt. Der Bund werde auch weiterhin den Bemühungen um die Stabilisierung der Kaufkraft Vorrang einräumen.

Die Problematik der heurigen Budgetverhandlungen ergebe sich aus dem Umstand, daß im nächsten Jahr die dritte Steuersenkung innerhalb weniger Jahre verwirklicht werden soll. Seit 1969 sei der Anteil der Budgetausgaben an der gesamten Volkswirtschaft von 28,1 auf 25,7 Prozent im heurigen Jahr zurückgegangen. Hätte man jetzt denselben Prozentsatz zur Verfügung wie damals, könnten die Budgetausgaben um 16 Milliarden höher sein. Vom langsameren Wachstum der Budgetausgaben profitieren die öffentlichen Investitionen. Da von diesen ein Großteil auf den Bereich des Bauten- und Verkehrsressorts entfällt, werde es nun darum gehen, vor allem für diese beiden Ressorts größere Mittel sicherzustellen.

am 23. S... ...osen GI bestellen, de... sächlich die „Blutgruppe null" aufweist. Da in Hinkunft aber die beiden TV-Intendanten von Weisungen des GI unabhängig sein werden, wird bei Streitfällen letzten Endes der kommerzielle Direktor zu entscheiden haben, was von der Programmplanung realisierbar erscheint.

Völlige Unklarheit herrscht indessen weiterhin über das Schicksal der vom Gesetz vorgesehenen Beschwerdekommission. Der Verfassungsgerichtshof wird sich Anfang Oktober mit der Frage beschäftigen, ob eine Entsendung von drei Höchstrichtern in dieses 17köpfige Gremium mit der Verfassung in Einklang zu bringen sei. Juristen sind sich darüber einig, daß das Höchstgericht auf Verfassungswidrigkeit erkennen dürfte. Damit ergeben sich für die SPÖ zwei Auswege, von denen einer durch die ÖVP bereits versperrt worden ist: Beide Großparteien könnten durch Verfassungsbestimmung bestimmen, daß dem Höchstgericht diese Entsendung von drei Richtern in die Kommission auferlegt wird. Dazu wird sich die große Opposition nicht hergeben. „Wir haben den ganzen Plunder abgelehnt und sollen jetzt den Sozialisten mit Zweidrittelmehrheit über die Hürde helfen?" winkt man in der VP ab.

Somit bleibt der SPÖ nur die Verkleinerung der Kommission auf 14 Mitglieder durch eine einfache

fass... gese... näre...

Sam...

WIE... General... bundes, leitenden... einer eig... werden. ... den Den... schaft, ab... nerschaft w... „Sprecherau... gestellter" i... Ziel am best...

Am Arbei... Chance erke... gewählten R... den Angest... Sprecherauss... nete Kommun... ständigen Kon... leitung sein. I... einer Gruppe ... leichter Vertra... Aktivität eine... aber werde da... Fach- und Führ... das langfristig ...

24th Pugwash Conference on Science and World Affairs
Baden, Austria, 28 August - 2 September 1974

REPORT FROM THE SECRETARY-GENERAL

The past year has seen a number of serious developments in the international scene: the flare-up of war in the Middle East and the accompanying energy "crisis" resulting from the embargo and the drastic rise in the price of oil -- which has, however, been followed by a hopeful beginning to the process of peaceful settlement by negotiation; the deadlocks in the Geneva Conference on European Security and the Vienna Conference on Mutual Force Reductions in Europe; the explosion of a nuclear device by India, with nuclear testing at undiminished levels by all five of the earlier nuclear powers; the failure to achieve the promised progress towards strategic arms limitation at this year's meeting of the heads of state of the USA and USSR; continuation of mass starvation resulting from the lack of rain in the Sub-Sahara and its over-abundance in South-East Asia; the outbreak of civil war in Cyprus and its inflamation through unilateral outside intervention.

When, at our Conference last year in Aulanko, Finland, we laid out the agenda for this year's Conference, items were included pertaining to most of the developments just listed. But we certainly did not foresee at that time that many of them would reach crisis proportions during the intervening year -- which only emphasizes the importance of our collective responsibility for understanding and clarifying the issues involved and, if and wherever possible, for arriving at useful suggestions for their peaceful and constructive resolution.

In my view, the world is passing through a situation of unstable equilibrium, in which the major political, economic and social forces arising from modern technology -- forces which we had all hoped would result in cohesion, stability and benefit for all mankind -- seem to be driving it towards dissention, anarchy and situations of immense human suffering. Will it be possible to reverse these trends? Can the centrifugal forces be overcome in time? How do we get back on the track of progress, peace and plenty? these are

problems to which we must devote our fullest efforts in the next week, in the specific areas of our Working Groups, and afterwards when we return home.

However, my assignment today is not one of exhortation but, rather, to report to you the efforts and the accomplishments -- and failures -- of Pugwash during the past year, which was also the first year of my stewardship as your Secretary-General.

First, a matter of organization: there has been one retirement from the Continuing Committee, Professor Rudolph E.Peierls of the UK -- who has been replaced by Professor Frederick C.Frank of the University of Bristol -- and two additions, Dr. Esam El-Din Galal of Egypt, elected in April as the second representative of African scientists on the Continuing Committee, and Professor T.Toyoda of Japan, elected just two days ago as the second member from Asia. Professor Toyoda was one of the founding members of the Kyoto Conference which is the local name of the Japanese Pugwash Group, and has been its Secretary-General for many years. He has attended many Pugwash Conferences and contributed significantly to our programme. This being his third Conference (he has attended the last two), Dr.Galal can now be regarded as a Pugwash veteran; Professor Frank has previously attended only the I8th Conference (Nice, I968). We warmly welcome all three of them to the Committee.

The retirement of Professor Peierls leaves a real gap. Member of the Committee since I963 and its Chairman since I969, his firm-but-fair guidance has been invaluable. He shall be sorely missed, as we already miss him at this Conference, but we hope he will remain an active and enthusiastic Pugwash participant for many years to come.

The new Chairman of the Continuing Committee is Professor Maciej Nalecz of Poland, who, already in the Continuing Committee meeting that has just taken place during the past two days, has amply demonstrated that your Committee's guidance is in good hands.

Since the Aulanko Conference, the Committee has met three times: immediately after the Conference in Helsinki, mainly for the purpose of drafting the Conference statement; in Cracow, Poland, on April 2nd and 3rd; and Monday and Tuesday of this week, here in Baden. To me it is amazing that even with the increasing load of problems with

which a new and perhaps hyper-active Secretary-General manages to confront them, the work is carried out with the kind of smoothness and dispatch that one would only expect from a much more homogeneous group; the Pugwash lubricant seems to work exceedingly well.

The Executive Committee of the Continuing Committee -- Messrs. Bauer, Feld, Markov, Peierls (Nalecz since April 4th) and Rotblat -- has met on four occasions since Aulanko, to consider a number of urgent matters. On two of these occasions, the Executive Committee felt impelled to issuue public statements in the name of Pugwash: on November I9th, I973, it sent and released a letter to General Augusto Pinochet, President of the military junta in Chile, and to General Cesar Ruiz, Chairman of the Council of Rectors of Chilean Universities, concerning the current situation of scientists and scholars in Chile; on May 25th, I974, it sent and released a cable to Premier Indira Gandhi relating to the explosion the week before by India of a nuclear device. The text of both these releases are appended to my report.

This past year has seen the achievement of a large number of Pugwash projects, mainly arranged by the various national Pugwash Groups. These range from true International Symposia through workshops to bilateral meetings and purely national enterprises. Since all of these have been reported in past Pugwash Newsletters or will be in(two)current issues of the Newsletter, now in the process of publication, which will be in your hands shortly after this Conference, I shall, in the following, do little more than list and categorize these events.* Even so, simply in the listing they form a rather impressive ensemble, both as to number and content. However, I note that most of these projects were already initiated and planned before the onset of my tenure, so that I can claim little credit for their achievement, although I must bear the burden of blame for any deficiencies in their execution.

I. International Symposia

I. "The Political Situation in Europe: The Arms Race and

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* The reports from the various meetings are being circulated in the relevant Working Groups; any participant who desires one can obtain it by applying at the Conference Secretariat.

Prospects for Disarmament". Cracow, Poland, April 4-8. I974. (42 participants from I7 countries; I5 submitted papers). Reported in Pugwash Newsletter Vol.I2, No.I, July I974.

2. Energy Problems (joint Anglo-French Symposia)

A."The Need for, and Terms of Reference of, an International Institute of World Energy Problems".

B."Social, Economic and Political Implications of the World Energy Situation".

Arc-et-Senans, France, July 4-8, I974.
(24 and 3I participants respectively, from 20 countries and 6 international organizations; 23 submitted papers)
Reported in Pugwash Newsletter Vol.I2, No.I, July I974.

II. Workshops

3. Preparatory Meeting of the African Pugwash Symposium, Cairo, Egypt, January 4-8, I974.(2I participants from 6 countries) Reported in Pugwash Newsletter Vol.II, No.3, January I974.

4. Code of Conduct on Transfer of Technology.
Geneva, Switzerland, April I-5, I974.(I5 participants from I3 countries). Reported in Pugwash Newsletter Vol.II, No.4, April I974.

This document has already received wide notice, both unofficially and officially in a variety of governmental and international fora. It has been adopted by the United Nations Commission on Trade and Development (UNCTAD) as an official document at its meeting this past July. It has also received wide circulation through publication in the April-May issue of World Development, in which form it is appended to this report. (Annex 3)

5. Chemical Warfare, Helsinki, Finland, April I6-I8, I974.
(24 participants from I7 countries; I0 submitted papers.)
Reported in Pugwash Newsletter Vol.II, No.5, June I974.

III. National Symposia

6. Tactical Nuclear Weapons in Europe, Leiden, The Netherlands, November 3, I973. Reported in Pugwash Newsletter Vol.II, No.3. January I974.

7. Natural Resources and Problems of the Environment. Bucharest, Rumania, November 26-28, I973. Reported in Pugwash Newsletter Vol.II, No.3, January I974.

IV. Bilateral Meetings

8. Indo-American Vikram Sarabhai Memorial Pugwash Meeting on Fields for Possible Mutually Useful Collaboration Between Indian and US Scientists and Technologists, Hyderabad, India, January 9-I2, I974. Reported in Pugwash Newsletter Vol.II, No.3, January I974.

9. Joint Meeting of the Executive Committees of the Canadian and US Pugwash Groups, Pugwash, Canada, July I3-I7, I974.

Although this meeting was intended primarily for the discussion of organizational and planning questions of mutual interest, and possible fields of future cooperation, the participants felt impelled by recent developments in the nuclear area to compose and issue a statement entitled "The Uncontrolled Atom: A Crisis of Complacency", the text of which will appear in the Pugwash Newsletter Vol.I2, No.I, July I974, and which is also appended to this report.(Annex 4)

V. Miscellaneous -- Educational, Publications etc.

IO. Statement on the Pugwash Approach to the Global Population Problem, prepared by an ad hoc drafting committee as proposed at theAulanko Conference, and submitted as a Pugwash document to the UN World Population Conference now meeting in Bucharest. Reported in Pugwash Newsletter Vol. II, No. 4. April I974.

II. Published in December I973, the Pugwash Monograph "The Future of the Sea-Based Deterrent", Tsipis, Cahn and Feld,eds., MIT Press. This is the output of a US Pugwash Group Symposium held in November I972.

I2. Pugwash Day at the International Youth Science Fortnight, London, England, August I2, I974. Approximately 500 young science students from up to 35 countries heard a discussion of issues of Pugwash interest by a panel, consisting of Professor Joseph Rotblat, M.Jules Moch (France), Mr.Philip Noel-Baker (UK), Professor Sir Rudolph Peierls (UK), Professor Bernard T.Feld

in Africa; The Pugwash Movement in Africa.

2. Science and Ethics, Dubrovnik, Yugoslavia, I4-I8 January, I975. Agenda items: Significance of contemporary science and technology for ethical problems; The natural and the Social sciences; Fact-stating propositions and moral evaluations; Man and the laws of nature and history;The moral responsibilities of scientists in the face of total destruction.

3. The Role of Self-Reliance in Alternative Strategies of Development, Dar es Salaam, Tanzania, early I975.

4. Scientific, Technological and Cultural Cooperation in Europe, Budapest, Hungary, April, I975.

5. Problems of Transfer of Technology Related to the Transfer of Weapons Systems and Arms Production in Developing Countries, F.G.R., first half of I975.

6. The Spread of Nuclear Power and its Implications for the Spread of Nuclear Weapons, Canada, March I975.

7. Food, Water and Energy, Israel, I975.

8. Social Function of Scientists and Engineers, and a New Design Toward Complete Nuclear Disarmament, Kyoto, Japan, August/September, I975.

As may be noted, many of the Symposia in preparation (and possibly others not yetcome to my attention at the time of preparation of this report) are aimed at preparing for the 25th Pugwash Conference to be held in Madras, India, 27 December I975 - 2 January I976, on the theme "Development, Resources and World Security". In accordance with the procedure initiated at our last Conference, the agenda for the 25th Conference is being circulated to all participants in Baden, to solicit your comments and suggestions, and, most important, for consideration of relevant items in the relevant Working Groups at this Conference in order to make an early start on detailed planning for papers, possible participation, etc. You will all have an opportunity to discuss this proposed agenda, and to help in the early preparations for the Conference, both in your Working Groups and in the Plenary Session planned for next Monday afternoon.

Thinking in the even-longer range, it is now planned to hold the 26th Conference in the German Democratic Republic in August or September 1976, and the 27th in the Federal German Republic in 1977. Note that 1977 will be the 20th Anniversary of the Pugwash Conferences.

Returning to the present, however, I should point out that the list of planned Symposia and Conferences given above comprises only those of an international format. Many of our National Pugwash Groups have lively programmes of studies, seminars and symposia, some outgrowths or follow-ups of discussions on important problems raised at earlier symposia or conferences, while others represent the early stages of planning for eventual international programmes.

One ongoing activity deserving mention is a planned series of workshops on specific subjects of importance in achieving a Chemical Weapons Ban Treaty - an outgrowth of the Workshop held in Helsinki in April.

Another is the continuation, on a somewhat larger and more formal scale , of a series of informal meetings between Pugwash scientists and members of the UN Secretariat and of its Specialized Agencies on topics of current importance on the UN agenda. It is hoped to hold such a meeting late this October, in connection with the annual gathering in New York of the Heads of the UN Specialized Agencies;some subjects for discussion are: status of the Nuclear Test Ban and its influence on the prospects for continuation and strengthening of the Non-Proliferation Treaty; and, the future regime of the oceans and sea-beds and its relations to problems of arms control in the oceans.

So much, then, for what we have done in the past year, and what we plan for the coming one. All of this takes hard work and devotion - but I need not dwell on that point with this audience, since you are where it all comes from. But (I'm sure you've seen this coming) it also takes money and, what with inflation, my extensive travels, and the rapidly expanding programme of Pugwash activities, your Central Office is now spending it at a rate at least fifty per cent greater than before I assumed the Secretary-Generalship. Fortunately, many Pugwash Groups have been

fulfilling the pledges of support, made at the Oxford Conference two years ago; indeed, some have even exceeded these pledges. And, equally fortunately, a number of individuals have continued to give generously of their support. I am especially pleased that, among these, the Eaton's and the Swartz's will be with us at this Conference. In this regard, I would be remiss not to mention the even more important expenditures of effort and time being devoted by Mr. William Swartz to the solution of our financial problems. As Chairman of our Finance Committee, he will be discussing, with representatives of our National Pugwash Groups and others, ways and means of putting Pugwash on a firm financial basis. I am sure you will all give him your sincerest co-operation.

To co-opt an old cliché - there are things that money can't buy, and Pugwash has these in abundance; but, as a sage friend of Pugwash has so aptly put it: "Have you ever tried buying them without money?"

And now I finally come to the one painful role that is the lot of the Secretary-General in giving his Annual Report - the calling of the roll of Pugwash veterans who have died since our last Conference. It is an all-too-distinguished list, distinguished in science as well as in public affairs; they will be sorely missed:

Prof. Lord Patrick M. S. Blackett, UK
Prof. H. Friedrich-Freska, FGR
Prof. Hugo Muench, USA
Prof. Daniel Thorner, France
Dr. Sir Robert Watson-Watt, Canada

I ask you all to stand for a moment of silent tribute and remembrance.

Annex .1

19th November, 1973

General Augusto Pinochet, President
Military Junta
Santiago
Chile.

Dear Sir,

The Executive Committee of the Continuing Committee of the Pugwash Conferences on Science and World Affairs, meeting in London on November 17, 1973, expressed its serious concern over reports of violent treatment, dismissal, harassment and persecution of scientists and scholars as a consequence of their social and political views.

Science and scholarship can prosper only under conditions of free and untrammelled enquiry. Students and fledgling researchers can only become productive in an open atmosphere of uninhibited exchange of information and views. The fruits of scientific and scholarly research benefit not only the nation in which they are carried out; they add to the world-wide sum of knowledge and promote human progress in general. Scientists and scholars everywhere are therefore vitally concerned with the fate of their colleagues in all nations.

We call upon you -- in the name of humanity and of human progress -- to respect the traditional independence of the Universities in Chile and of their scientists and scholars.

Sincerely yours,

B. T. Feld
Secretary-General

c.c. General Cesar Ruiz
Chairman, Council of Rectors
of Chilean Universities,
Santiago,
Chile.

Annex 2

25 May, 1974

To Premier Indira Gandhi of India:

The Executive Committee of the Pugwash Conferences on Science and World Affairs views with alarm the recent underground explosion of a nuclear device in your country, and the encouragement that will result for further proliferation of nuclear weapons into nations much less responsible than your own, thereby making much more difficult the achievement of the objectives of Russell, Einstein, Nehru, Bhaba, Sarabhai and other Pugwash founders to bring the worldwide nuclear menace under control. We respectfully request you reaffirm most emphatically India's intention, as stated in your letter to President Bhutto, to refrain from nuclear weapons production. Further, we fervently hope you will announce India's preparedness to adhere to the Non-Proliferation Treaty and to join constructively in its review and strengthening in 1975.

B. T. Feld
Secretary-General

Annex 3

World Development, Vol. 2, No. 4 & 5, April-May 1974, pp. 77–82.

Pugwash Conferences on Science and World Affairs

DRAFT CODE OF CONDUCT ON TRANSFER OF TECHNOLOGY

(with an Introductory Statement by the Secretary-General, Professor Bernard T. Feld)

In the hope of promoting discussion of this important topic, *World Development* is taking the opportunity, kindly offered by the Pugwash Conferences on Science and World Affairs, to publish in full the Draft Code of Conduct recently prepared by the Working Group on Code of Conduct on Transfer of Technology, together with an Introductory Statement by Prof. Bernard Feld, Secretary-General of the Pugwash Conferences and the relevant section of the Report of Working Group 4, which recommended the establishment of the special Working Group.—*Ed.*

INTRODUCTORY STATEMENT

The Pugwash Conferences on Science and World Affairs started in 1957, as a result of an appeal by Bertrand Russell, Albert Einstein and nine other world-renowned scientists to the world scientific community to meet together in order to consider the dangers of nuclear war and to reach a common understanding on measures for avoiding nuclear disaster and for helping to arouse world public opinion toward this end. The first Conference, held in Pugwash, Nova Scotia (Canada) in July 1957, demonstrated the possibility of scientists, from many countries with different and conflicting ideologies, meeting together as individuals, unofficially, to apply the spirit and approach of science, and its common language, to the solution of the most vexing and difficult problems facing mankind.

Since 1957 there have been held, under the Pugwash banner, twenty-three Conferences, and nineteen Topical Symposia, at which some seven hundred of the world's most distinguished and influential scientists and scholars from around fifty countries have met privately, as individuals, and discussed a great variety of problems, ranging from the control over nuclear and other weapons of mass destruction, national and international security issues, scientific and technical co-operation in various realms, the responsibilities of scientists and the application of science and technology for the improvement of the lot of the developing world.

At the most recent Pugwash Conference, held in Finland in September 1973, Working Group 4, considering the 'Social, Economic and Political Barriers to the Application of Science and Technology to Development', concluded:

> In the light of the existing international situation, disadvantageous to technology buyers in the LDCs—be they governments or private firms- there is an urgent need for a Code of Conduct to govern international technology transactions . . . that would take into account the legitimate rights of the proprietary technology owners and the needs of the LDC technology buyer [and] would be enforced by the governments of the DCs of all economic systems in dealings of their nationals with the LDCs, and by the LDCs as well.
>
> The Group noted that the adaptation of the traditional mechanisms of technology trade to the needs of the LDCs is not an easy task. The elaboration of a Code of Conduct covering international technological transactions would eliminate abuses in this field and improve the bargaining power of the LDC technology buyers *vis-à-vis* the DC technology sellers. . . . Therefore, the Group recommends that Pugwash should establish forthwith a Working Party of experts in the area of technology transfer to formulate a preliminary draft of such a Code of Conduct.

To implement this recommendation, a group of fifteen specialists from thirteen countries met in Geneva on 1-5 April 1974. The members of the group, with vast experience and knowledge in the field of science and technology and its impact on development, acted strictly in their own private capacities; but as they came from both East and West, North and South, they were able to cover a wide spectrum of views on the whole problem of technology transfer. (Both USA and USSR participants were invited but unfortunately, at the last minute, they were unable to attend the meeting.)

The draft Code of Conduct deals with international technology transactions. In the framework of its stated objectives and principles, it defines the obligations of suppliers and receivers of technology, with a deliberate attempt to strengthen the bargaining power of the LDCs, at present in a rather weak position as technology recipients.

Although, as it stands now, the draft Code can be considered to have only moral force, it is hoped that, through appropriate government actions and international negotiations, it will eventually become a definite and concrete instrument of action, accepted and respected by all members of the world community.

REPORT OF WORKING GROUP 4

Transfer of Technology

The Group evolved a consensus that access to modern technology represents one of the basic conditions for development. Although technology transfer mechanisms differ according to political and economic systems, the Group's consideration of the barriers to technology primarily related to technology owned by its producers in DCs [developed countries], under patents and industrial property legislation. Such technology is introduced into LDCs [less developed countries] in many forms: in conjunction with direct investment, in the form of capital goods exports or through the licensing of patented technical knowledge to local firms.

It was pointed out that this proprietary technology sold to LDCs tends to support primarily the interests of capital and technology suppliers whether governments or private firms of DCs. Since it is rarely subject to adaptation to local conditions (the size of the market and production factors, among others) by the sellers, its impact upon building up the development potential of the LDCs, particularly in the science and technology field, is often negligible and sometimes even negative. Many LDCs face the problem of lacking relevant information for choosing appropriate technologies, and often receive advice biased toward the use of capital-intensive technologies, to the detriment of the obviously desirable objective of expanding over-all employment. Given the fact that a growing number of LDCs must expand their non-traditional, manufacturing export activities, in order to marshall additional financial resources needed for development, the question of importing and applying technologies that would fortify technical capabilities, and create employment at the same time, becomes a crucial element of over-all development strategies. The solution of this problem is not facilitated by the empirically proven fact that foreign investors and technology suppliers tend to concentrate all their research and development in their home countries and thus hinder the growth of local R & D efforts in the LDCs.

The financial terms, as well as restrictive clauses imposed on the LDCs in technology purchase contracts concluded with capital and technology providers from the DCs, also constitute a heavy financial burden upon the LDCs. The scientific and technological community in the DCs should insist that, at least, the norms applied in the technology trade between DCs should be enforced in technology trade transactions between the DCs and the LDCs. National legislation, known as anti-monopoly laws, have existed for a long time to defend the society, the technology buyers and the consumers against possible abuses on the part of powerful producers of modern technology.

In the light of the existing international situation, disadvantageous to technology buyers in the LDCs—be they governments or private firms—there is an urgent need for a Code of Conduct to govern international technology transactions. Initiatives to establish such a code, made on various occasions in UN agencies, have encountered strong opposition in some key Western technology-producing countries. These countries have claimed that this field should be left to market forces and bilateral bargaining between the technology sellers and buyers. In the discussions of the Group it was noted that such official opposition to any international rules of conduct in respect to the technology trade, is stronger than the opposition of private technology sellers in the DCs. Indeed, many of the latter consider that a Code of Conduct would prevent economic disputes with the LDCs that might—as has happened in the past—generate political tensions between the DCs and LDCs.

A Code of Conduct for technology transfer that would take into account the legitimate rights of the proprietary technology owners and the needs of LDC technology buyers, would be enforced by the governments of the DCs of all economic systems in dealings of their nationals with the LDCs, and by the governments of LDCs as well. While a Code should be elaborated at international level within the UN family, this cannot be successful unless it receives the support of the international scientific and technological community. Since the demand for technology in the LDCs is steadily increasing and the foreign sellers of proprietary technology are receiving fairly good profits from their transactions with the LDCs, there are no reasons to believe that the elaboration and international enforcement of the above-mentioned Code of Conduct would hinder the flow of foreign technology to the LDCs. On the contrary, it is quite probable that it would enhance the LDCs over-all ability to purchase foreign technology under more equitable conditions. Such development would, in turn, make easier the task of incorporating that technology into the domestic productive systems and establish the conditions propitious for the creation of local technological capabilities. The presence of local technological capability seems to be a prerequisite for the solution of the present conflict between the employment creation objectives of the LDCs and the labour-saving effects of technological progress in the DCs.

The Group noted that the adaptation of the traditional mechanisms of technology trade to the needs of the LDCs is not an easy task. The elaboration of a Code of Conduct covering international technological transactions would eliminate abuses in this field and improve the bargaining power of the LDC technology buyers *vis-à-vis* the DC technology sellers. This action, however, would have to be accompanied by internal and regional action by the LDCs. On the national level many moves aimed at improving access to information about the state of the international technology market are being taken in Latin America and some Asian and African countries. Moreover, national science and technology plans and programmes have been formulated for the purpose of establishing local priorities for R & D and improving institutional R & D set-ups. Relatively little effort has unfortunately been made with respect to technological needs of many smaller LDCs. Unless they group themselves together and work out regional science and technology policies, they face the danger of misallocating their scarce human and financial resources without improving their bargaining positions *vis-à-vis* powerful technology producers in the DCs.

While it was generally agreed that scientific and technological communities in the DCs could help through bilateral assistance to solve many problems related to the establishment or the strengthening of the science and technology policies of the LDCs, it was thought that the question of a Code of Conduct in the field of technology transfer should receive a very high priority and be tackled vigorously within the Pugwash Movement. Therefore, the Group recommends that Pugwash should establish forthwith a Working Party of experts in the area of technology transfer to formulate a preliminary draft of such a Code of Conduct. Such a group, composed of 6–8 persons, would meet for a week or so next spring and elaborate a draft Code by mid-summer of 1974. This action would represent tangible proof of the direct interest of Pugwash in creating the necessary international conditions for the advancement of science and technology in the LDCs, given the Pugwash consensus that access to modern technology represents one of the basic conditions for development and a means to diminishing socio-political tensions both within the LDCs and between the LDCs and the DCs.

DRAFT CODE OF CONDUCT ON TRANSFER OF TECHNOLOGY

Preamble

The decision to direct the attention of this Working Group* of the Pugwash Conferences on Science and World Affairs to a consideration of a Code of Conduct on Transfer of Technology reflects a growing demand of the international community for regulation in this field. We have taken note particularly of:

(i) paragraph 9 of resolution 39 (III) of UNCTAD, adopted in April 1972 asking for a study of possible bases for new international legislation regulating the transfer of patented and unpatented technology from developed to developing countries;

(ii) the agreement of the Heads of State of Governments of the Non-Aligned Countries in September 1973 to continue the efforts within international organizations to obtain easier and less costly access to modern technology and for the adoption of such an international code, taking due account of the independence of the developing countries;

(iii) the October 1973 resolution of the Interparliamentary Council calling upon the Parliaments and Governments of all countries of the world, *inter alia*, to draw up new international legislation for the transfer of technology, including a code of conduct governing this transfer;

(iv) the statement by the United Nations Advisory Committee on the Application of Science and Technology (ACAST) in November 1973 giving emphasis to the great importance of moving rapidly towards the formulation of a code;

(v) the request by UNCTAD's Trade and Development Board in September 1973 that the Intergovernmental Group on Transfer of Technology at its third session study the possibility and feasibility of an international code of conduct in this field;

(vi) the recommendation of the 23rd Pugwash Conference on Science and World Affairs to establish a Working Group to 'formulate a preliminary draft Code of Conduct' on transfer of technology;

(vii) paragraphs 15 and 20 of the United Nations General Assembly resolution 3041 (XXVII), which noted with appreciation that intergovernmental action was being mobilized by UNCTAD in a number of fields, including restrictive business practices and transfer of technology, and recommended that the Trade and Development Board of UNCTAD should select the areas in which action can be initiated for the negotiation and adoption of multilateral legal instruments within its field of competence.

I. Objectives and principles

1. While technology transfer mechanisms, including those involving international technology trade transactions, may differ according to political and economic systems and levels of development, the access to modern technology represents one of the basic conditions for socio-economic development of all countries and the maintenance of world peace and increase in over-all prosperity. It is considered of vital importance to establish and implement international rules that would enable every country to participate on an equal footing in the international technology transfer. Therefore, the present Code of Conduct on Transfer of Technology has the following objectives and principles:

(i) to establish general equitable rules of behaviour in the international technology markets taking into consideration particularly the justified needs of developing countries and legitimate rights and obligations of technology producers and suppliers and technology recipients;

(ii) to make clear the distinction between proprietary technology and freely available technology and reflect this distinction in terms and conditions of technological transactions;

(iii) to foster the expansion of international trade in proprietary technology on terms mutually beneficial to suppliers and recipients by eliminating restrictive technology trade practices and regulating monopolistic rights accruing to some proprietary technology owners for the purpose of assuring the strengthening of the negotiating power of developing countries;

(iv) to ensure fair pricing of technology trade transactions, by assessing all direct and indirect costs to the recipients and profits to the suppliers, and taking into consideration, *inter alia*, the duration of a contract and the dynamics of technological progress;

(v) to introduce as a minimum the most-favoured-licensee clause in the international technology trade transactions involving developing countries;

(vi) to expand free flow of non-proprietary technology on a non-discriminatory basis and through appropriate channels and mechanisms to suit the requirements of developing countries;

* Membership of the Working Group comprised: Chairman, Miguel S. Wionczek (Mexico), Enrique Aguilar (Mexico), Alvaro G. de Alencar (Brazil), Ulf Anderfelt (Sweden), Dietrich Barend (FRG), Dieter Ernst (FRG), E. E. Galal (Egypt), Lazare Kopelmanas (France), Rasto Macus (Yugoslavia), Pierre N'Goma (Gabon), C. H. G. Oldham (UK), Jorge Sabato (Argentina), Baldev Singh (India), Toshio Shishido (Japan), A. Szentfülöpi (Hungary).

(vii) to ensure the responsibility of suppliers and recipients to adapt technological trade transactions and flows of freely available technology to factor proportions of the countries with different development levels and to their local development needs and absorptive capacity;

(viii) to increase the contribution of technology, under specially favourable conditions, for the solution of pressing social problems in developed and developing countries; and

(ix) to ensure that technological transactions entail the strengthening of local technological capability of developing countries, which would permit their endogenous technological advancement for the purpose of diminishing gradually their technological dependence upon the outside world and assuring their increasing participation in world technology production and trade.

II. Scope of application

2. For the purpose of this Code of Conduct the term 'technology transfer' covers any kind of transfer of proprietary or freely available technology, independently from its legal form. It includes, *inter alia*, the following:

(i) licensing agreements covering patents, inventors' certificates, utility models and industrial designs as well as trade-marks, service names, and trade names transferred together with proprietary or freely available technology;

(ii) licensing agreements covering the provision of know-how and technical expertise in the form of plans, diagrams, models, instructions, guides, formulations, specifications, and involving personnel training;

(iii) agreements covering provision of basic or detailed engineering designs for the installation and operation of plant and equipment and for the production of goods and services;

(iv) purchases of machinery, equipment, intermediate goods and raw materials, insofar as they are part of transactions involving technology transfer;

(v) industrial and technical co-operation agreements of any kind including international sub-contracting as well as provision of management and marketing services; and

(vi) technology transactions associated with the establishment and operation of wholly-owned subsidiaries or affiliates and of joint ventures with various degrees of participation.

3. The provisions of the Code of Conduct apply to all transactions covering transfer of technology regardless of the parties involved whether private capital, state or regional, or international institutions. These provisions should be considered as minimum standards for achieving adequate conditions of technology transfer with regard to the development possibilities of developing countries.

III. Relations between suppliers and recipients of technology

4. The following clauses and/or practices, *inter alia*, in transfer of technology arrangements are likely to have significantly adverse effects as restrictive business practices, whether in developed or developing countries, and shall not be utilized:

(i) clauses and/or practices prohibiting or limiting in any way the export of products manufactured on the basis of the technology in question including restrictions on exports to certain markets, permission to export only to certain markets, and requirement of prior approval of the licensor for exports;*

(ii) clauses and/or practices restricting the sources of supply of raw materials, spare parts, intermediate products and capital goods;†

(iii) clauses and/or practices using quality controls or product standards by the supplier as a means of introducing unwarranted requirements on the technology recipients;

(iv) clauses and/or practices requiring the acceptance of additional technology not desired by the recipient, as a condition for obtaining the technology in question, and requiring the remuneration for such additional technology, e.g., package licensing;

(v) clauses and/or practices requiring higher technology payments on goods produced for exports *vis-à-vis* goods for the domestic market;

(vi) restrictions in obtaining competing or complementary technology through patents and know-how from other licensors with regard to the sale or manufacture of competing products;

(vii) clauses and/or practices restricting the recipient's volume, scope and range of production or field of activity;

(viii) clauses and/or practices whereby the supplier of technology reserves the right to fix the selling or resale price of the products manufactured;

(ix) clauses and/or practices requiring the recipient of technology to enter into exclusive sales or representation agreements with the supplier of technology;*

(x) limitations on the research and development (R & D) policy and activities of the recipient company;

(xi) grant-back provisions establishing a unilateral flow of technical information and improvements from the technology recipient without reciprocal obligations from the technology supplier. All new technologies, patents and improvements developed by the technology recipient as a result of the agreement shall be the property of the technology recipient;

(xii) clauses and/or practices obliging the recipient to convert technology payments into capital stock;

(xiii) requirements by the supplier in licensing arrangements, except management contracts, to participate in the management decisions of the recipient enterprise;

(xiv) requirements to use the staff designated by the technology supplier;

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* It was considered that in certain appropriate circumstances this might be justified.

† This paragraph is to be read in conjunction with para. (vii) in Chapter V.

(xv) requirements that the recipient pay royalties during the entire duration of manufacture of a product or the application of the process involved and, therefore, without any specification of time;
(xvi) clauses and/or practices prohibiting or restricting the use of the technology after the termination or expiry of the contract in question;
(xvii) continuation of payments for unused or unexploited technology;
(xviii) licensee's undertaking not to contest the validity of the supplier's patents;
(xix) restricting the use of the subject matter of a patent and any unpatented know-how licence which relates to the working of the patent once the patent has expired;
(xx) the charging of royalties on patents after their expiry.

5. The following clauses and/or practices, *inter alia*, in transfer of technology arrangements involving the use of trade-marks are likely to have significantly adverse effects, whether in developed or developing countries, and shall not be utilized:
(i) requirements prohibiting or restricting exports by the licensee of goods covered by a trade-mark licensing arrangement;
(ii) the tying of the supply of imports of a product bearing a particular trade-mark to the trade-mark owner and thereby prohibiting imports from a third party or a licensee;
(iii) the use of protection afforded under the trade-mark system to restrict a licensee's activities;‡
(iv) obligations to use a particular trade-mark with patented process or the know-how supplied;**
(v) restrictions in obtaining competing or complementary technology from other licensors with regard to the sale or manufacture of products involving trade-marks.

IV. Relations among suppliers of technology

6. All horizontal cartel activities among technology suppliers involving restrictions on territory, quantity, price and customers affecting the transfer of technology shall not be utilized against developing countries, particularly the following practices:
(i) import cartels;
(ii) rebate cartels and other price-fixing arrangements;
(iii) national export cartels;
(iv) international cartels, which allocate markets or control exports or imports.

7. Any adverse effects of the following cartel activities on the transfer of technology should be avoided:
(i) private and semi-official agreements on certain standards in developed countries;
(ii) specialization cartels if they do not lead to a dominant position;
(iii) cartels for the exchange of technical information;
(iv) rationalization cartels if they do not lead to a dominant position;
(v) small-scale industry and small-scale marketing cartels.

V. Guarantees

8. The supplier shall guarantee that:
(i) the technology acquired is in itself suitable for the manufacture of products covered by the agreement;
(ii) the content of the technology transferred is in itself full and complete for the purposes of the agreement;
(iii) the technology obtained will in itself be capable of achieving a predetermined level of production under the conditions specified in the agreement;
(iv) national personnel shall be adequately trained in the operation of the technology to be acquired and in the management of the enterprises;
(v) the technology is the most adequate to meet the particular technological requirements of the recipient given the supplier's technological capabilities;
(vi) the recipient shall be informed and supplied with all improvements on the techniques in question during the lifetime of the agreement;
(vii) where the recipient of the technology has no other technological alternative than acquiring capital goods, intermediate inputs and/or raw materials from, or selling his output to, the technology supplier or any source designated by him, the prices of the articles shall be consonant with current international price levels;
(viii) for a certain period of time the supplier shall guarantee to provide spare parts, components, and servicing of the technology without additional charges for maintaining this guarantee;
(ix) all transfer of technology arrangements should include a provision by which if the licensor grants more favourable terms to a second licensee these terms will be automatically extended to the first licensee.

9. The recipient shall guarantee that:
(i) the acquired technology will be used as specified in the contract;
(ii) all legitimate payments as specified in the contract shall be made to the technology suppliers;
(iii) the technical secrets as defined in the contract shall be honoured;
(iv) the quality standards of the products specified in the contract will be reached and maintained where the contract includes the use of the supplier's trade-mark, trade name, or similar identification of goodwill;
(v) the socio-economic conditions and needs of the country of the recipient have been taken into account while entering into a technology transfer agreement.

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‡ For example, to act as a distributor rather than a manufacturer of the trademarked product. It was recognized that such a restriction might be justified where 'house marks' or 'family marks' were involved.

** It was considered that in certain appropriate circumstances this might be justified.

VI. Action by governments

10. Governments of developing countries shall, if they have not already done so and consistent with their development objectives and social and economic policies, take the necessary legislative and administrative measures to enforce the application of the standards on transfer of technology as set out in Chapters III, IV and V of the present Code.

11. Governments of developed countries, both with market and socialist economies, recognize the rights of developing countries to take the necessary measures set out in the preceding paragraph and shall accept the standards set out in this Code, and encourage the transfer of technology to developing countries based on these standards.

VII. Laws and jurisdiction for settlement of disputes

12. The following provisions shall govern the procedures for jurisdiction and settlement of disputes:

(i) the technology transfer agreements between technology suppliers and recipients from different countries should be subject, with regard to their scope, enforcement and interpretation, to the laws of the technology-receiving country;

(ii) in the event of a dispute between a supplier of technology and a recipient of technology, legal jurisdiction for settlement of the dispute shall reside in the courts of the technology-receiving country;

(iii) if the laws applicable to the technology transfer agreements do not exclude recourse to arbitration in this field and the parties concerned agree in their contracts to submit their possible disputes to arbitration, such disputes will be settled according to the procedures set out in the contract;

(iv) in order to permit the solution of technical disputes at an early stage and thus minimize the need for legal arbitration or judicial settlement of disputes, parties may insert in their arbitration procedures provisions whereby disputes of a technical nature would be submitted as soon as possible after they arise to impartial technical experts appointed in a way acceptable to all parties concerned.

VIII. International organizations

13. The international organizations, within the limits of their competence, shall assist the developing countries in the application of the standards of the Code on Transfer of Technology.

IX. Measures according special treatment to developing countries

14. In addition to the provisions of Chapters III, IV and V, transfers of technology to the developing countries shall include forms of preferential treatment designed to take account of the weaker position of their enterprises in the technological, financial or managerial field. To this end, governments of developed countries shall by every means available ensure that their technology-supplying firms grant preferential measures in transactions involving the transfer of technology to developing countries. Such measures shall include, *inter alia*:

(i) phasing out of down payments, or including such payments as part of royalties on production, on a soft basis;

(ii) scaling down of the charges for technology in proportion to the size of the recipient's market;

(iii) untying of credits for the purchase, from the most competitive source, of capital goods, spare parts and intermediate components;

(iv) rebates on imports of raw materials, equipment and components for licensed production;

(v) development of local technological capability and R & D by technology suppliers with affiliated companies in developing countries;

(vi) development of the R & D and technological capability of the recipient firm;

(vii) adapting the technology to be transferred to make it appropriate to conditions and factor endowment of the recipient country;

(viii) transferring to the recipient firm non-proprietary technology which the supplier may possess in the field of activity of the recipient;

(ix) sub-licensing rights under special concessional terms.

X. Implementation and revision

15. The Code of Conduct for Transfer of Technology should be the object of a multilateral legal instrument to be internationally negotiated and agreed upon, and to become binding on signatories once the conditions for its entry into force, to be established in the legal instrument itself, are fully met. In addition, such instrument should further define the necessary measures for the full implementation of, and full compliance with, the Code of Conduct, as well as establish the conditions for its revision.

Annex 4

The Uncontrolled Atom: A Crisis of Complacency

by the Canadian and United States Pugwash Groups,
Meeting at Pugwash, Nova Scotia, July 13-14, 1974.

There are moments when a succession of separate but related events force us to recognize that the world has changed, that previously accepted assumptions can no longer be defended. These days of mid 1974 are such a time for mankind's view of the ominous threat of nuclear devastation.

In the past few years we had all become complacent. A series of international agreements -- the Limited Test Ban, the Non Proliferation Treaty, SALT I -- seemed to show progress, at last, in the effort to control the nuclear arms race. The United States and the U.S.S.R., for all their vast and vastly expensive arsenals seemed to have found ways to avoid nuclear war. The pressures on non-nuclear nations to change their status did not appear irresistible.

Then came the rude awakening.

The first shock was the Indian test of a nuclear explosive. The official Indian comment that this was a test for "peaceful uses" could not, and seemingly was not intended to conceal that the nation of Gandhi and Nehru had in fact tested a nuclear bomb.

Next came President Nixon's offer of nuclear power plants to Egypt and Israel, and the sale of nuclear reactors by France and the United States to Iran. Although nuclear energy may have an important role in assuring adequate supplies of energy for all nations, these same nuclear reactors produce plutonium that can be used to construct nuclear weapons. The magnitude of the new programs and the sudden attention to an area

scarred by four wars in the past 25 years could not help but raise questions: Are the world's nuclear safeguards really safe? Or, more pointedly, is the spread of nuclear power plants an open sesame to the spread of nuclear weapons?

During this same period, and for the first time since 1965, all five of the nuclear powers conducted nuclear weapons tests -- the Chinese and French in the atmosphere, the Soviets, Americans and British underground -- in an almost frantic race to improve the lethal quality of their nuclear weapons.

Finally came the shambles of the Moscow summit. The inability to reach agreement on limitation of strategic nuclear weapons virtually guaranteed a new major increase in the already astronomical level of overkill available to the superpowers. A new cycle in the arms race is about to begin: MIRVs for the U.S.S.R.; MARVs for the U.S. B-1 bombers and Trident submarines for the U.S.; SS-17s and SS-18s for the U.S.S.R. And so on and on and on.

The ultimate mockery at the summit was the "threshold test ban." Here is an agreement that, in the guise of restraint, permits underground explosives equivalent to 150,000 tons of TNT. That is ten times larger than the bomb that obliterated Hiroshima, and larger than almost all the tests conducted by the U.S. and the Soviet Union in recent years. The agreement furthermore is not scheduled to go into effect for almost two years (an opening that has resulted in a prompt request for $100 million by the United States Atomic Energy Commission to do some big bomb tests before the 1976 deadline).

In the light of these events, one must admit that we have all been foolishly complacent. Bemused by SALT I into the belief that the superpowers were moving toward greater responsibility. Ignorant of the political sensitivities that would lead an India to the production of nuclear bombs. Unthinking about the implications of the spread of nuclear power for the spread of nuclear weapons.

These are the somber reflections of a joint meeting of the executive committees of the Canadian and United States Pugwash Groups. But, gathering in Pugwash, Nova Scotia, 17 years after the initial Pugwash Conference on Science and World Affairs, we could not content ourselves with Jeremiads. Then, at the call of Bertrand Russell and Albert Einstein, and with the gracious hospitality of Cyrus Eaton, scientists from all over the world gathered as concerned individuals and world citizens, to see whether they could help find a path out of the Cold War and nuclear confrontation. Out of that meeting grew the world-wide Pugwash movement. And in that tradition, we must ask: What is to be done?

First, we must recognize that the nuclear threat is <u>not</u> under control. On the political level, we must push the governments of the nuclear nations toward stronger positions on nuclear control and weapons reductions. As in the past, the primary responsibility for our present state rests on the two superpowers, the United States and the U.S.S.R. They must demonstrate by actions as well as words that they are having second thoughts on the utility and rationality of their grossly inflated levels of nuclear armament. They must be brought to stop testing and developing new nuclear weapons and to begin reducing their present stockpiles and their massive military expenditures.

The non-nuclear countries also have a responsibility. One can sympathize and agree with the charges that the present configuration discriminates against them. But we must press them nevertheless into a tough and thoughtful analysis of their future in a world in which nuclear weapons are the norm. Will their national security -- or even their political influence -- really be enhanced? If not, what can they do by their own actions to curb nuclear proliferation?

At the technical level, a number of questions must be clarified:

What about the utility of "peaceful" nuclear explosions? Do they represent a real technical alternative or a cruel hoax to cover the development of nuclear weapons?

Are the "safeguards" for nuclear power plants, developed under the Non Proliferation Treaty, really adequate? If not, what are the specific ways, technical and political, in which they can be improved?

Inescapably, we must conclude that the world has a very long way to go before the nuclear threat is under reasonable control. Somehow, we must dispel the complacency that has enveloped this problem and restore a sense of urgency and concern. For individuals, as for nations, an ethic of arms control must replace the ethic of the arms race.

Address at the 24th Pugwash Conference on Science and World Affairs at Baden, Austria, August-September 1974

by Hannes Alfvén

§1 The end of an epoch

In essential respects the state of a nation, or of the whole earth, can be characterized by numbers, such as the population, GNP, industrial production, energy consumption, production of waste, and capability for military destruction. From the beginning of history until about a century ago all these variablesincreased with a doubling time of the order of some centuries - of course with large fluctuations from time to time. Essentially due to the impact of science and of the technology emanating from it, the doubling time has been reduced by at least one order of magnitude. The population of the earth now doubles in about 30 years, the energy consumption in 10 years, the capability for military destruction in perhaps only a few years. For about one century there has been a general consensus that this rapid increase was highly desirable. Every nation wanted to be populous, to have a rapidly increasing GNP and to have a rapidly increasing military power.

We are now entering a new phase in the evolution of mankind: it begins to be generally understood that the rapidly increasing curves cannot possibly go on increasing indefinitely. All of them are necessarily reaching a limit which they should not be allowed to exceed, because a further increase would necessarily result in catastrophe. Exactly where this limit is located is not known, but it is obvious that several of the curves have already exceeded this limit. They must be brought down in order to secure that our planet remains "a livable world". If this could be achieved we may reach a new state in the evolution, characterized by a slow but stable increase in those variables in which an increase is desirable.

The transition from the present state of runaway increase to a less dynamic but also less hazardous and dangerous state is the main scientific-technical-economic-political problem of today. It requires much competence of the human society to make the necessary transition without many and devastating catastrophes. It seems that in most countries the governments are not aware of this: they act as if we should continue the runaway increase indefinitely. The environmentalists often have a much better understanding for the necessity of finding a new type of evolutionary pattern. In fact, the environmentalist movement is largely caused by a feeling that the establishment often acts with obsolete concepts as a background.

To a future historian describing the development of the industrial part of the world, the epoch which is now approaching its end, may look like a science-stimulated quantum transition from a low to a high standard of living, a transition which is possible only once in human history.

§2 Our finite planet in space

Basically the ceilings of all the rapidly rising curves are dictated by the fact that we live on a planet with finite natural resources, a finite capacity of accepting waste, and so small dimensions that there is nowdays no place to hide outside the reach of missiles with nuclear warheads.

As the limits to growth are dictated by the properties of the Earth they do not apply to space activity. Man can penetrate into space and build up space colonies without encountering the limitations resulting from the finite size of the earth. In space there are unlimited resources of energy and of waste disposal facilities. There are large mineral resources on the Moon and other planets, and - perhaps most easily exploitable - on the asteroids. There are already investigations how to use the unique environment in a spacecraft, especially zero-gravity and extreme vacuum,

for new industries. Astronauts and cosmonauts report that life in a spacecraft is so pleasant that spacecrafts may attract tourists, and also patients whose illness may possibly be cured in a zero-gravity hospital. The time when a space colony becomes self-supporting is not very distant. Already astronomy, meteorology and investigations of the earth's resources have partially moved into space. Communication satellites have been used for several years. Some people believe that the "spy satellites" have been and are essential for the stability of the terror balance between the superpowers.

§3 The launching pad problems

Even if the space activity has a considerable - and it seems largely benificial - feed-back on conditions on "the launching pad", the Earth, it will not in the foreseeable future be of real help in solving the most threatening developments on the earth: these no doubt, are the mass production of people and the mass production of plutonium, both at present uncontrolled runaway processes.

The first of these threats, the population explosion, has been attracting increasing attention in Pugwash. It was discussed most recently in Sinaia, Oxford, and Aulanko. Just now the first U.N. Conference on population is meeting in Bucharest. Let us hope that this will have a great impact on the world, especially in those countries which have not yet understood how serious the problem is. The population problem will be one of the major topics at the next Pugwash conference, in India.

For these reasons it seems justified not to devote so much attention to it at the present Conference.

Instead, we must necessarily focus our attention on the classic Pugwash problem: the arms race, especially the atomic bombs. The last few months have produced such a deterioration in the general situation that one may ask whether the clock of the Bulletin should not be moved forward again. But let us first discuss a more general aspect: the coupling between atomic bombs and atomic energy.

§4 Proliferation of fissionable material

To many of the scientists who had contributed to the release of nuclear energy it was a consolation that the fission reaction was not only exploited for warfare but also for the benefit of mankind: it promised what was considered to be a clean and abundant source of energy. For a long time it was a credo for most scientists that the development of peaceful energy exclusively was a blessing to mankind. The non-proliferation treaty (NTP) was an attempt to prevent the spread of nuclear bombs, but at the same time to give a boost to the peaceful nuclear energy all over the world. The IAEA was trusted to be the prime promoter of this double ambition.

Pugwash has already warned many times that the NPT was a fragile document: it did not really prevent an increasing number of countries from "going nuclear", and especially, the superpowers have not kept their promise to stop the nuclear race. Further, because a number of states have not accepted the NPT, it has not become the important tool it was intended to be, and IAEA has not been able to fulfil the task assigned to it.

§5 Nuclear reactors and the environment

Although there had always been some objections against the peaceful use of nuclear energy, the objections did not cause very much concern until about five years ago when a number of competent scientists rang the alarm bell. It was essentially the discussion in the Bulletin of Atomic Scientists and in Science which demonstrated that the objections must be taken seriously. In Aulanko one of the working groups was devoted to an analysis of these problems, and the working group came to the conclusion that "Owing to potentially grave and as yet unresolved problems related to waste management, diversion of fissionable material, and major radioactivity releases arising from accidents, natural disasters, sabotage, or acts of war, the wisdom of a commitment to nuclear fission as a principal energy source for mankind must be seriously questioned at the present time". The Continuing Committee endorsed this in its statement: "The as yet unsolved problem of waste management and the possibly unsolveable

(in an absolute sense) problems of catastrophic releases of radioactivity and diversion of bomb grade material combine to create grave and justified misgivings about the vast increase in the use of nuclear power that has been widely predicted. The wisdom of such an increase must at the present time be seriously questioned".

It deserves to be noted that this discussion shows how well the Pugwash way of discussing a problem works. Although several of the participants were affiliated with atomic energy establishments, which under other conditions would have made it difficult for them to accept conclusions critical of these establishments, their role in Pugwash as independent scientists made the discussion purely scientific without damaging influence of the affiliations.

Since our latest conference the development of atomic energy has taken two contradictory directions: on one side, the energy crisis has given a tremendous boost to the application of atomic energy, but on the other side the opposition against it has also avalanched. The objectors to nuclear energy claim that the real reason for building nuclear reactors is that already tens or hundreds of billions of dollars, rubles, mark, yen, francs, and kronor have been invested, not to speak of the still more important political prestige. They do not accept the argument that atomic energy is indispensable for solving the energy problem of the world, or that atomic reactors are less polluting than other sources - taking into account all the radiation hazards. The only argument which then remains is that atomic energy is cheaper than other forms of energy - which may be true or may be false, depending upon the way the book-keeping is made and what guesses are made about the price of different fuels in the future. In summary there is no urgent enough need for atomic energy to justify the taking of all the risks associated with it.

In the USA a number of concerned scientists have lead the opposition, and Ralph Nader, the consumers' advocate, has started a nation-wide campaign against nuclear energy. In almost every part of the country there are fierce fights between the reactor companies and the environmentalists.

In the U.K. the government has recently reduced the nuclear energy program to one third (from 3000 MW/year to 1000 MW/year) and turned down the light water reactor "on the basis of unreliability". Although several political factors seem to have contributed to this decision, the opposition by the environmentalist against nuclear energy is believed to have been a major influence.

To take another example, in Sweden a government proposal to build 25 reactors, aiming at making Sweden the leading country in the world in nuclear energy per capita production, was defeated by Parliament which only authorized 10 reactors already under way and postponed the decision about the rest until 1975. The atomic energy program is now one of the major political issues, with Labour and Conservatives for nuclear energy, and the Centre (main opposition party) and the Communists against it.

§6. Are the militant and peaceful atom Siamese twins?

In the cases mentioned the main objections against nuclear energy have been the risk of a reactor accident, the dangers associated with the transport of radioactive material, the refuelling, and the unsolved problem of waste disposal. The background of all these difficulties is of course that large energy production by fission is necessarily associated with an enormous production of radioactive materials and it is doubtful whether even the most advanced technology is sufficient to keep this under control. A contributing concern is the fear of illicit use of plutonium for making terror bombs. a process which is now generally recognized to be relatively simple ("making an atomic bomb in a garage").

However, in reality a still more serious concern, as recent events have clearly demonstrated, is that it is impossible to separate the military and peaceful uses of atomic energy. The mass production of plutonium and U-235, necessarily associated with atomic energy, makes fissionable material abundant in the world. The result is that atomic bombs will be easy to make by a rapidly increasing number of sovereign states, and probably also by guerrilla organizations. Together with the enormous quantities of radioactive waste products which are very difficult to control, this pushes

us into an extremely unpleasant and dangerous situation.

A new phase in this development started last May with the Indian explosion of a nuclear device. We should not blame India for making these means of mass destruction any more than we blame the other five members of the nuclear club. Yet with this event the situation has rapidly worsened, and may now get out of control. Pakistan will immediately do whatever it can to acquire atomic bombs. Iran has already been promised by France what possibly will be the means for producing them. The US has given both Egypt and Israel similar promises. (Israel is believed by many people to have manufactured atomic bombs already clandestinely.) Brazil, Argentine and South Africa are also in the queue. Together with the SALT fiasco in June 1974, this means that the non-proliferation efforts have largely broken down. We are entering a world where more than a dozen countries may well use nuclear blackmail or nuclear bombs in many of their political conflicts. This may mean that the next war in e.g. the Middle East will not take six days but six hours or six minutes; this is the nuclear time scale for complete genocide which took years for Hitler.

The spread of atomic bombs to the developing nations should not make us forget the enormously more threatening situation in the industrialized part of the world. In addition to the basic terror balance between the United States and the Soviet Union - employing intercontinental ballistic missiles and submarines - there are no less than 10,000 atomic bombs located in Europe. When fired they could completely annihilate 10,000 European cities- if there were so many!

It is customary to put all the blame for the arms race on the superpowers. They certainly deserve to be blamed, but Europe has to take its fair share also. The 10,000 bombs are in Europe at the request of the political leaders in Europe who claim that this threat of complete annihiliation is necessary for the military "security" of Europe. One may question whether such an enormous destructive capability serves any sensible purpose. Even if we accept the NATO doctrine that atomic bombs in Europe are necessary in order to deter the Warsaw pact countries from attacking, and the

reciprocal doctrine of the Warsawpact countries, it seems that the damage and suffering caused by 10 bombs - or at the most 100 bombs - would be amply sufficient to deter any sensible politician. The remaining 9990 - or at least 9900 - bombs are superfluous and can be of value only to madmen.

The existence of such a large number of bombs is not at all a military secret. Every student of world affairs knows this - but the people of Europe seem not to know what is being prepared for them - or they are fatalistic enough not to care for their future!

§7 The review of the NPT

The non-proliferation treaty is up for review in 1975. One of the main tasks of our Conference here is to discuss the new situation which has arisen because of the break-down of the present NPT. It is obvious that a completely new approach is necessary. In an operative NPT the IAEA has an important control function but it is more questionable whether it should continue to promote the proliferation of peaceful nuclear energy.

It is essential to make all people aware of the real situation in the world. It is unreasonable that political discussion in all countries should be centered on a number of petty problems, but that the fatal problem of today - how to stop plutonium production and get rid of the quantities already produced - is almost completely neglected. A broad education and information is urgently necessary. We may hope that the results of such a campaign will be that,for example, the people of Europe will protest against the slaughter which some of their leaders are preparing for them, and that this protest will be strong enough to have a political impact.

§8 The environmentalists

As stated in the introduction, the group of people who are most seriously concerned about the runaway processes is what is sweepingly referred to as the environmentalists.

The UN Conference on the Environment in Stockholm in 1972 was the first official recognition of the importance of the environmentalist movement. The conference dealt with a number of threats to the environment which no doubt are serious, but unfortunately it neglected the much more serious threat from the production of large quantities of plutonium and other radioactive elements in nuclear reactors. (There were even voices recommending nuclear energy as a saviour from other types of pollution!) After the Conference the environmentalists have become increasingly aware of the dangers associated with nuclear energy and the objection against it comes largely from them.

One may hope that the environmentalists will soon also take the next step: Realize that the threat from nuclear bombs is even more serious, and turn an increasing part of their activity against this threat. This means a revitalization of the campaign against the atomic bomb which was lively 20 years ago but has now been largely forgotten. In the present situation, when the leading politicians of the world have so clearly demonstrated their incompetence to handle the most important problems of the world, a popular movement against atomic reactors and especially against atomic bombs seems to be the only new factor which has a fair chance of stopping the flood of fissionable material. It seems reasonable that they should ask for a world-wide ban on the production of plutonium and the submission of the present stock to effective control, e.g. by IAEA.

In fact of all the runaway processes of today, the mass production of this synthetic element is the most dangerous one. It has an extremely high toxicity - a few microgrammes inhaled is enough to cause lung cancer - and it is still more dangerous as the raw material for atomic bombs. It is remarkable how well it deserves its name which is connected with the Greek-Roman god Pluto, who is the god of death but also of wealth and power. The mass production of plutonium gives certainly wealth and power to small but very powerful groups who profit from it but it also threatens all of us with death. The decisive conflict of today is not between capitalists and communists, not between rich and poor, but between the mass producers of plutonium and us who merely wish to survive.

Programme

		For Participants	For Associates
Tu, 27 Aug.	Arrival Day		
	afternoon (departure of buses from the Hotels at 15)	Visit to International Institute for Applied Systems Analysis (IIASA)	
	evening, from 19	Informal gathering at the Restaurant Stadtkrug	
We, 28 Aug.	morning at 9.30 (please be absolutely punctual)	Opening Ceremony	
	afternoon	sessions	Burgenland
	evening	free	free
Th, 29 Aug.	morning	sessions	Vienna
	afternoon	sessions	Vienna
	evening	free	free
Fr, 30 Aug.	morning till 11.50	sessions	free
	afternoon and evening (departure of buses from the Congress House at 12 sharp)	Outing into Wachau and Reception by the Government of Lower Austria	
Sa, 31 Aug.	morning	sessions	Vienna Woods
	afternoon	sessions	free
	evening	free	free
Su, 1 Sept.	morning	sessions	Vienna
	afternoon till 16.30	sessions	free
	evening (departure of buses for Opera from the Congress House at 17)	Opera ("Der Rosenkavalier" by Richard Strauss).	
Mo, 2 Sept.	morning	sessions	Vienna
	afternoon till 16	sessions	free
	afternoon at 16	Concluding Ceremony with address by the Federal Chancellor	
	evening (departure of buses from the Hotels at 18)	Reception in Vienna by the Federal Government	
Tu, 3 Sept.	Departure Day		
	morning (departure of buses from the Hotels at 10)	Visit to International Institute for Applied Systems Analysis (IIASA)	

24th Pugwash Conference, Baden 1974

Informations and Technical Time Table

The Information Desk will be manned every day from 8.30 as long as needed.

Normal morning sessions: 9 to 12; coffee break at 10.30.

Normal afternoon sessions: 14.30 to 18; coffee break at 16.

Plenary meetings will be announced separately.

Lunch in Restaurant Stadtkrug (Congress House), normally 12 to 14.

Dinner at the same place, normally at 19.

For those participants and associates, who take part in the Wachau trip on Friday afternoon, no lunch or dinner will be served in Baden, but there will be meals en route. There will be no time to go to the hotel before departure after the morning meeting.

No dinner will in general be served in Baden on Monday, September 2nd, because of the reception by the Federal Chancellor in Vienna. Whoever is unable to attend, should apply for an additional meal ticket for the Stadtkrug at the Information Desk.

Visitors of the Opera (participants and associates) on Sunday will obtain sandwiches at 16.30 in the Winter Garden of the Congress House, and after return from the Opera a light supper in the Stadtkrug. Bring your meal tickets ! Thus, associates have to come to the Congress House at 16.30. Participants have no time to go to the hotel before departure. Light or dark suit requested. NB. The actual performance begins at 18 at the State Opera in Vienna.

Please turn over

24th Pugwash Conference

Wachau Outing

PRELIMINARY REMARKS

for those who want to know a little more.
(See also coloured postcards enclosed.)

Dear Participants, dear Associates!

This excursion will take you to a landscape, of which every Austrian speaks with some pride. You will see the Wachau, the most interesting part of the Danube valley, between Melk and Krems. It is rich in treasures of art and history.

The DANUBE is closely connected with the fate of our people. Coming down from the Alps and passing Vienna, the river rolls into the vastness of the Hungarian plains. Since the stone age men followed this water course. In 16 B.C. the Danube became the frontier between the Germanic tribes and the Romans for almost 500 years. Later it was used by Eastern invaders like the Avars and Magyars, coming up the Danube valley from Hungary.

The crusaders went there downwards the river on their way to the Holy Land. Later Turkish, French, Russian, German and Austrian soldiers came there on the water or on the land - fought, occupied, retired and left their traces in folklore and culture.

The Roman conquerors brought the WINE to these warm and sunny slopes. In springtime the orchards are in abundant bloom - earlier than elsewhere in Austria. In the autumn everybody is on his feet, grape-gathering in the terraced vineyards, on hills, soon turning yellow-red by the fiery autumn foliage.

The waterway connected the urban residences of clerical and temporal Lords. The local aristocracy didn't want to be inferior and hired foreign artists for shaping their castles, churches, monasteries, and they also built houses of wealthy citizens. The foreign masters were soon followed by highly talented artists of local origin, modifying the external stimuli to a peculiar style. There exist special terms in the history of art, such as "DANUBE SCHOOL" (a revolutionary, very expressive style in painting and sculpturing at the transition from late Gothic to Renaissance, about 1470 - 1530) and "DANUBE BAROQUE", which includes several schools founded by outstanding artists of that region.

Rich catholic monasteries have become centers of arts and studies - like MELK on the upper end of the Wachau, which will be the first station of our trip. But castles and fortresses on the summits along the Danube remind us of the fact that in all times war and invasion threatened this Danube valley. (Some of the castles, however, were those of robber knights!). Even the churches had to function as fortresses where fugitives sought safety from the invaders, especially the Turks.

The visit to the little Wachau town of DÜRNSTEIN is intended to be a culmination point of our outing. We shall reach it by crossing the Danube on a little ferryboat. Dürnstein (sometimes called the "Pearl of the Wachau") is crowned by an old fortress, nowadays in ruins, where KING RICHARD LIONHEART (Coeur de lion) was imprisoned 1192 - 1194.

Richard Lion Heart, King of England (1189-1199), was an adventurous and pugnacious knight and very successful as a military leader during the third crusade. Having become overweening by his successes and victories he picked a quarrel with another commander-in-chief at that crusade - the Austrian Duke Leopold the Fifth of Babenberg. On his homeward journey King Richard was shipwrecked near Aquileia. and had to take his way through Austria. Near Vienna he was recognized, having paid with Byzantine gold coins. He was brought to Dürnstein as a prisoner.

The ransom for his release represents the biggest monetary transaction of the Middle Ages (150.000 silver marks - or 35 tons of silver), the payment of which caused enormous difficulties to England. But the English raised the sum for their King. The Pope, Coelestin III., disapproved of Leopold's action, a fact which later had fatal consequences for Leopold and his son Friedrich.

Below the fortress lies the little town, which is dominated by the picturesque baroque church and monastery, a creation of the same master who also built Melk (Jacob Brandtauer, who never spoke of himself as an architect, but often signed as "master mason J.Brandtauer". We mention this detail intentionally with regard of today's building activities most of which are carried through by "architects" with well sounding academic degrees.)

Here also lies the Hotel-Restaurant "Richard Löwenherz". It comprises a former nunnery building that was bought by the family THIERY in 1788, French emigrants who later established one of the most famous and most distinguished restaurants of Austria. Here the Governor of the Land of Lower Austria gives a reception in honour of the

24th Pugwash Conference on Science and World Affairs.

On our way home, we shall touch Krems and have a quick view on the illuminated historic parts of the city. Afterwards, everyone in the bus - except the driver - is allowed to sleep until we have returned to Baden.

THE FUTURE:

WACHAU IN DANGER !

After having given some historic facts of the Wachau, we should look into the future. There are no invaders threatening the Wachau any more. The threat of this century are rather the hydraulic engineers who have thought up the idea of damming up the Danube right in the Wachau. The idea is to gain some electricity and also to raise the water level to serve big "Euro-riverboats". These are intended to ply between the North Sea and the Black Sea when the Rhine-Main-Danube Canal will be finished. This would mean a barrage made of reinforced concrete, long protective dams along the river, which would cut off the villages, tremendous lock gates, high tension lines, etc.etc. The water would be stagnant.

It so happens that some members of the Austrian Organizing Committee of this Pugwash Conference are involved in a long-drawn struggle to defeat these barbarous intentions. The problem is that mighty and financially strong pressure groups can advertise the presumed economic advantages, which really are wild estimates only, while they neglect the terrible drawbacks that cannot so easily be expressed as monetary values. Scenic, historical or cultural values cannot be "monetarized" adequately - which is what the present market system demands. It is, of course, hard to argue with technocrats, who, according to H.Stern, know the price of everything, but not its value.

However, the exertions of the friends of the Wachau, who include also the elected representatives of the local population, have found a favourable response with the Federal Government. The schemes for the technical exploitation of the Wachau have been referred back to experts. They have been given the task to study all possible alternatives to facilitate shipping even if they are much more expensive, and there is hope that the idea of a power station here will be dropped altogether.

B.Lötsch

BG-9

Lok Sabha

Statement by the Prime Minister in the Rajya Sabha on 22nd July 1974 regarding underground nuclear explosion experiment.

Honourable Members are aware that at 08-05 hours on May 18, 1974 the Atomic Energy Commission successfully carried out an underground nuclear explosion experiment at a depth of more than 100 metres in the Rajasthan desert. This experiment was part of the research and development work which the Atomic Energy Commission has been carrying on in pursuance of the national objective of harnessing atomic energy for peaceful purposes.

Honourable Members may recall that on November 15, 1972, I stated in the Lok Sabha that "The Atomic Energy Commission is studying conditions under which peaceful nuclear explosions carried out underground could be of economic benefit to India without causing environmental hazards". Exactly a year later, on November 15, 1973, I informed Honourable Members of the Rajya Sabha of the continuing interest of the Atomic Energy Commission in this field and also stated that after satisfactory answers to the problems of the possible effects on environmental and ecological conditions are available, the question of actual underground tests for peaceful purposes could be considered.

I am glad to inform Honourable Members that this successful experiment on May 18 has not resulted in any way in radio-active contamination of the atomosphere. The radio-activity was so well contained that a party of scientists was able to fly 30 metres above the site and reach upto 250 metres on the ground within an hour of the experiment without encountering any radioactive contamination. The Atomic Energy Commission is at present engaged in studying the results of the experiment.

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It is expected that this process will take about six months. In keeping with scientific tradition, the Atomic Energy Commission proposes to publish papers giving the results of the experiment for the benefit of the scientific world.

All the material, equipment and the personnel in this project were totally Indian. India has not violated any international law or obligation or any commitment in this regard with any country.

This experiment has evoked mixed response from various countries. While developing nations have, by and large, welcomed the experiment as a step in the research and development work carried on by India in the field of atomic energy for peaceful purposes, advanced nations, with some exceptions, have not shown equal understanding. The United States of America, while expressing satisfaction that the International Atomic Energy Agency's safeguards system has worked in regard to agreements with India and that the material used has not come from the United States, have reiterated that the policy of that Government is against nuclear proliferation. The USSR have noted that India has carried out a research programme striving to keep level with the world technology in the peaceful uses of nuclear explosion. The Chairman of the Indian Atomic Energy Commission has received congratulatory message from the French Atomic Energy Commission on the success of the experiment. While China officially reported the event without commenting on the explosion, the reaction of the Government of Japan has been to express regret for the experiment.

Reactions from Canada and our neighbour, Pakistan, have been sharp. While Canada is satisfied that India has not violated any agreement between the two countries, the

Canadian Secretary of State for External Affairs has stated that the experiment represented a severe set-back to efforts being made in the international community to prevent all nuclear testing and to inhibit the proliferation of nuclear explosion technology.

The Government of India is unable to subscribe to the view expressed by the representatives of the Canadian Government in this regard. I have repeatedly reaffirmed our policy of using nuclear energy for peaceful purposes and have specifically stated that we have no intention of developing nuclear weapons. The Government of India sincerely hopes that the Government of Canada will appreciate and understand the background of this experiment. I have already mentioned in the earlier part of this statement the fact that our Atomic Energy Commission has been reviewing the progress in this technology from the theoretical and experimental angles. This intention was not kept secret and was made known to the world. If differences of interpretation have arisen between the Government of Canada and the Government of India, it is the Government of India's hope that they will be satisfactorily resolved in the discussions which are under way between the representatives of the two countries.

The Government of India is unable to understand the repeated talk of nuclear blackmail indulged in by the representatives of the Government of Pakistan. I have explained in my letter to Prime Minister Bhutto the peaceful nature and the economic purposes of this experiment and have also stated that India is willing to share her nuclear technology with Pakistan in the same way as she is willing to share it with other countries, provided proper conditions for understanding and trust are created. I once again repeat this assurance and hope that the Government of Pakistan will accept India's position in this regard.

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The Government of Pakistan has also made allegations about radio-activity having been carried to that country. I would take this opportunity of stating that this was impossible as there was no venting of radioactivity to the atmosphere and no formation of a radioactive cloud. Moreover, the wind was blowing in the opposite direction as it normally does at this time of the year and even in theory, any hypothetical radioactivity could never have gone to Pakistan. The wind pattern on May 18, 1974 was from, repeat from, the south-west.

There are several published reports by scientists from advanced countries on potential utilisation of peaceful nuclear experiments. The International Atomic Energy Agency organised in 1970, 1971 and 1972 Panel Meetings on the peaceful uses of nuclear explosions and India attended all these meetings as a Panel Member. In the Foreword to the Peaceful Nuclear Explosions Phenomenology and Status Report, 1970, an indication has been given of the projects for which peaceful nuclear explosions could be used. The following quotation will be adequate in this regard:-

"Fully contained nuclear explosions (those not breaking through to the ground surface) could be used for many projects. On an industrial level pilot-scale experiments have already been made on gas and oil stimulation, with encouraging results. In addition, the use of cavities created by such explosions appeared to have an economically attractive future for projects such as underground gas and oil storage, and the storage of radioactive wastages from nuclear power stations and chemical plant, for in situ retorting of oil from shale oil deposits, and for in situ leaching of low-grade ores broken up by the explosion. The latter application is of particular interest to one Member State, India, who could by this means use her very large low-grade non-ferrous metal ore deposits, thus making

her more independent of imports of these metals [illegible] furthering the national economy".

In view of the fact that we have just now carried out the experiment and the results will be available to us after six months, it is considered premature to talk of any particular technological application at a selected site. For any project of this nature to be considered economical and feasible, more experimental data must be available.

Honourable Members will notice that in the Panel discussions to which I have referred and in which most of the advanced countries have participated, it was emphasised that activities in the field of peaceful nuclear explosion are essentially research and development programmes. Against this background, the Government of India fails to understand why India is being criticised on the ground that the technology necessary for the peaceful nuclear explosion is no different from that necessary for a weapons programme.

No technology is evil in itself; it is the use that nations make of technology which determines its character. India does not accept the principle of apartheid in any matter and technology is no exception.

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Agenda for 25th Pugwash Conference
"Development, Resources and World Security"
Madras, India, 27 December 1975 - 2 January 1976

1. Alternative Development Strategies for Developing Countries:
   (a) Possible strategies taking into account population growth, limitations on resources etc.
   (b) Implications for Science and Technology policies
   (c) Role of different assistance/co-operation mechanisms in furthering alternative strategies, e.g. bilateral assistance, involving highly industrialized countries, UN assistance, non-UN multilateral mechanisms, co-operation with other developing countries both bilaterally and multilaterally.

2. Social and professional responsibilities of scientists and technologists in relation to development:
   (a) Individual responsibilities
   (b) Collective responsibilities
   (c) Special responsibilities of developed country scientists for facilitating and promoting the utilization of science for development.

3. The Evolving International System and its Implications for Development and Security:
   (a) Problems arising from the remnants of colonialism and economic imperialism
   (b) Impact on development of the expenditure of the world's unevenly distributed resources
   (c) Technological, economic and political dimensions of exploitation of the seas and sea beds and utilization of their resources for development.

4. Current Issues of Arms Control, including political aspects of the problem, Especially Relating to the LDC's:
   (a) Trends in the world military balance and their implications for the developing world
   (b) Restraining the nuclear arms race; relationship to the problems of non-proliferation
   (c) Prospects for disarmament and the transfer of savings therefrom to development
   (d) Dangers of the naval arms race in the Indian Ocean
   (e) Problems of the trade in conventional armaments.

Possible Plenary Sessions

1. Alternative Development strategies for developing countries. Developing countries have hitherto largely followed the prevailing pattern and institutional structures of agricultural, industrial and educational development that exist in the highly industrialized countries of today. There is increasing evidence that such a strategy is not really appropriate to the objective social, economic, and cultural conditions, which exist in the developing countries. Hence, completely new approaches to human settlements, agricultural and rural development, industrialization, both rural and urban, transportation and communication, have to be conceived and delineated in operational terms.

P.T.O.

2. Progress Reports on the Code of Conduct for the Transfer of Technology and Problems of Transfer of Technology Related to the Transfer of Weapons System and Arms Production in Developing Countries.

3. Role of self-reliance in development strategies.

The 24th Pugwash Conference
Disarmament, Energy Problems and International Collaboration
Baden, Austria, 28 August - 2 September 1974

List of Topics for Working Groups

1. Current Problems of Arms Control and Disarmament
   a) Review of Current Status of the Arms Race
   b) Status and Progress in SALT
   c) Progress in the CCD
      - Comprehensive Test Ban
      - Chemical Warfare Ban
      - Budget Limitations
   d) Review of New and Old Proposals for Strategic Arms Reductions
   e) Unilateral Actions and Restraints
   f) Obstacles to Comprehensive Disarmament

2. European Security and Force Reductions
   a) Status of the ESC and MFR Conferences
   b) Nuclear Arms Control and Disarmament in Europe
   c) Regional Arms Control Problem
      - Central Europe
      - Northern Europe
      - Mediterranean Area
      - Nuclear Arms-free Zone in the Balkans

3. Peace and Security in the Middle East and Persian Gulf Area
   a) Resolution of the Arab-Israeli Conflict
   b) The Arms Race in the Area, including the Military Involvement of the Great Powers
   c) Oil Supplies as a Factor in Possible Conflicts
   d) Future Possibilities for Collaboration between all States in the Area, especially in the Realm of Development

4. Security and Arms Problems in Other Areas
   a) Impacts of the Arms Trade
   b) The Problem of Southern Africa
   c) Arms Control and Security Problems
      - NPT
      - Nuclear-free Zones
      - No-first-use Agreements
      - Peacekeeping and the UN
      - Novel Approaches and Ideas

5. Different Approaches to International Co-operation in Science and Technology
   Lessons from, e.g., the International Institute for Applied Systems Analysis (Austria); International Centre for Theoretical Physics (Trieste); International Centre for Insect Physiology and Ecology (Nairobi); WHO Fertility Programme; European Molecular Biology Organization

6. The Energy Problem
   a) Report from the Symposium on the World Energy Institute
   b) International Consequences of National Energy Demands
   c) Energy Use and Well-being

24th Pugwash Conference on Science and World Affairs
Baden, Austria, 28 August - 2 September 1974

REPORT OF WORKING GROUP 1

Current Problems of Arms Control and Disarmament

I. The Current Status of the Arms Race and Strategic Arms Limitation.

While the Group continues to view some of the achievements of SALT I, notably the ABM treaty and the understandings relating to the verification of compliance with the agreements, in a favourable light, there was great disappointment about other aspects of Soviet-American arms control efforts. There has been little, if any, progress in achieving a permanent agreement limiting offensive force levels, and new American and Soviet strategic offensive weapons programmes are going forward unabated.

While the present level of expenditures on some of these new programmes appears to be relatively low, the costs will rise very rapidly when they pass from research and early development to advanced development and procurement. The number and kinds of deliverable nuclear warheads will also increase greatly.

The Group noted with apprehension changes in doctrine and trends in weapons design and performance that threaten to make nuclear war more credible as an instrument of policy to political leaders and, therefore, probably more likely.

The May 18 test of a nuclear device by India; the prospect of nuclear reactors being made available to Egypt and Israel without their having acceded to the Nuclear Non-Proliferation Treaty; and the fact that the June Soviet-American summit meeting did not make meaningful progress on arms control are additional causes of concern.

Suggestions were made in the Working Group for dealing at a technical level with the problem of measuring strategic strength, a

difficulty that has plagued the Strategic Arms Limitation Talks, but there was scepticism about the usefulness of the approach suggested and in general about the usefulness of static measures of strength. There was a consensus that the real question in negotiating limits and reductions in strategic arms is one of political will. Yet, attempts to evaluate objectively the effectiveness of strategic systems could aid in the evaluation of the impact of proposed future developments and help to single out those trends which might be the most dangerous. It was also emphasised that, assuming that some political will is present on both sides, the format and basis of negotiation is an important element that can help or hinder the attainment of an agreement. There is therefore ample scope, indeed need, for continued informed attention by scholars and scientists. Pugwash, in particular, should try to continue to focus on developing and examining imaginative suggestions and novel approaches to the possible substance and format of strategic arms control and disarmament agreements.

Some in this Group view improvement in missile accuracy and the continuing development and deployment of multiple independently targettable re-entry vehicles (MIRV's), and also of manoeuvrable re-entry vehicles (MARV's), with particular alarm, feeling that these developments may have several undesirable consequences. Such developments will result in an improvement in capability to destroy fixed targets, particularly adversary ICBM's; and with such improvement there may be an increase in incentive to attack such targets in a time of crisis. As ICBM's become more vulnerable there will also be an increase in incentive to launch them in a crisis in anticipation of the possibility that if not launched they may be

destroyed by adversary MIRV's. And, with doubts raised about the effectiveness of ICBM's as retaliatory weapons, there will be an impetus to defend them, to increase other components of strategic forces, possibly to increase numbers of ICBM's so that more could survive attack, and particularly to develop land-mobile ICBM systems. With these concerns in mind, it was suggested that even at this late date it may be desirable and feasible to limit MIRV deployment, development of MARV's, and improvements in accuracy so that there will be less concern about the survivability of ICBM deterrent forces. It was also suggested that it should be accepted that fixed land-based ICBM's may be obsolescent as reliable components of deterrent forces and that they should be phased out and not replaced by land-mobile ICBM systems.

This raises questions about the reliability of missile-launching submarines as retaliatory forces and about the impact of improvements in anti-submarine warfare capabilities. There was a consensus in the Group that there is little reason for immediate concern. Particularly considering the expected increases in the range of submarine-launched missiles, it is unlikely that a submarine-based missile force could be quickly destroyed. In the view of some participants this situation could change if sonar detection capability increased greatly. It was suggested that reducing the amount of money and resources devoted to anti-submarine warfare, as well as limiting numbers of nuclear powered attack submarines, would contribute to maintenance of confidence in the viability of missile-launching submarines as components of deterrent forces.

But some participants cautioned against emphasis on such forces, noting that the problems of command and control and hence the risks of accidental launch of submarine-based missiles may be

greater than in the case of ICBM's or aircraft. They also noted the possibility of increase in tensions in the event of mysterious disappearances of such submarines and difficulty in identifying the source of attack if it involves the use of submarine-based missiles, particularly as the number of nations having SLBM capabilities increases. Only if one attaches great weight to the likelihood of a deliberate attack by one of the nuclear powers against the missile forces of another, would there appear to be a strong case for the submarine as the premier component of deterrence.

The development of other new strategic weapons systems, notably long-range cruise missiles, which might be launched from submarines, surface ships or aircraft, is an additional cause for concern.

It was argued that the arms race cannot be brought under control by limits on force size alone, and that there must also be a limitation of development of new weapons systems. Failing this, concern about the impact of possible qualitative changes in adversary capabilities will be a driving force for a continuing arms race. While such concerns can perhaps be discounted at the present in the case of the Soviet Union and the United States, considering the enormous "overkill" capability inherent in their strategic forces, the concern would be much enhanced at lower force levels. It follows that a continuing qualitative arms race will be a major impediment to significant arms reduction.

Because of difficulties in verification of compliance, direct prohibition on weapons development may not be a very promising line of attack on the qualitative arms race problem. However, the imposition of limits on testing of new weapons, particularly strategic systems and their components, can be verified more easily, and in the view of some the negotiation of such limits can in many

instances prevent or limit weapons development. The two most obvious areas where such an approach may be fruitful are in nuclear warhead testing and the testing of missile delivery systems.

There is likely to be less resistance from proponents of weapons development to agreements that for a time permit some testing than to those which prohibit it entirely and immediately. With this in mind, it was suggested that agreements involving weapons test quotas that diminish to zero with time on an explicit schedule might be the most realistic approach to containing weapons development. Others argued that many developments can be carried out using simulation techniques (which could satisfy technical people, although perhaps not the military).

It was argued that agreements that permit limited testing may even be counterproductive in that they would lead to public complacency. They may be useful as political devices, but are unlikely to prove much of an impediment to weapons development.

Questions were raised as to whether space activities might be used to circumvent the intent of imposing limits on missile tests. This would probably not be a severe problem considering the differences in preferred performance characteristics of space systems and missiles.

There was a consensus that there is now rough parity in strategic strength between the United States and the Soviet Union and that this is a favourable factor in approaching the limitation and reduction of strategic arms. It was suggested that scientists should take it as their task to attempt to examine various arms control and disarmament measures in an objective way based on the premise that there must be equal security for both powers and that the security of other powers should not be adversely affected.

Others argued that emphasis on "equal security" for the United

States and the Soviet Union and on such concepts as "essential equivalence" in strategic strength is misplaced. In their view, this approach has been sterile - indeed, a counter-productive - one. While the two powers have argued about issues of relative advantage, their nuclear stockpiles and military strength has increased and the security of both, and also that of other states, has diminished with this vertical proliferation of nuclear weapons. Additionally, the security of all is likely to deteriorate further with the widespread horizontal proliferation of nuclear weapons that now seems likely.

Those holding these views feel that the major threat in the world today is not in the likelihood of the development of imbalances in strategic strength between the United States and the Soviet Union but rather in the horizontal and vertical proliferation of nuclear weapons and the concomitant increase in the likelihood of the initiation of nuclear war by accident, miscalculation or actions by third parties. Accordingly, in the view of this Group, it is time to focus increasing attention on reducing these risks. Excessive emphasis on maintaining "essential equivalance" in Soviet and American strategic forces or "equal security" for both nations in bilateral negotiations is likely to be diversionary. A reversal of the Soviet-American arms race is a necessary condition to progress in dealing with these more serious threats, and if, in bringing about that reversal, either by negotiation or unilateral actions, some temporary imbalances in strength develop as between the United States and the Soviet Union, this is a matter of little importance.

II. Banning Nuclear Weapon Tests.

The threshold test ban proposal, which would after about two years prohibit underground weapons testing of yields in excess of 150 KT, was received by many of the Group in an unfavourable light. It was pointed out that such an agreement would have an insignificant effect on nuclear weapons development, that the negotiation of such an agreement might reduce the impetus for a comprehensive test ban, and that it might have a negative effect on the Non-Proliferation Treaty. However, other members of the Group view the US-USSR agreement as an essential step forward towards achieving a comprehensive test ban.

Compliance with a comprehensive test ban could now be verified with adequate confidence without on-site inspection, which was a major source of contention during the negotiations of the early 1960's, and there was a consensus in the Group that a comprehensive agreement banning all underground nuclear weapon tests should now be speedily concluded.

III. The Peaceful Uses of Nuclear Explosions.

In the light of the recent Indian test of a nuclear device, and also because it is an issue in connection with the proposed threshold Test Ban Treaty, the question of peaceful uses of nuclear explosions commanded considerable attention from the Working Group. Pugwash has in the past opposed plans or programmes for the peaceful uses of nuclear explosives on the grounds that they would complicate attempts to achieve a universal and comprehensive test ban and to prevent proliferation. The recent Indian test was thus viewed by many of the Group as a matter of deep regret and anxiety.

It was argued that there was growing evidence of considerable economic advantage in the use of nuclear explosions for peaceful

purposes, in e.g. exploitation of oil and gas and low grade non-ferrous metal deposits, in the creation of storage cavities and in excavation. However, other participants disputed these claims, arguing that no such advantage had been demonstrated, notwithstanding the large development efforts by the United States and the Soviet Union. They further argued that the adverse effects of the proliferation of nuclear explosions capabilities, even if the intent is entirely for peaceful purposes, will far offset whatever utilitarian pay-off there might be. However, some participants felt that nations who had shown great responsibility in conducting themselves in the international arena, and to whom peaceful nuclear explosions could offer developmental benefits, should not be denied the opportunity to develop and use such technology, merely because, some other nations did not believe such technology was useful to them.

The Group agreed that it was technically impossible to distinguish between nuclear weapon tests and peaceful nuclear explosions in the present state of the art. Whatever the intent in the case of India, there is always the possibility that nations might engage in weapons development under the guise of a peaceful uses development programme. In the view of many participants the Indian explosion sets an unfortunate precedent in this respect. It was pointed out that for some peaceful purposes sophisticated kinds of devices would be needed which produce minimal amounts of radioactive residues. Thus, depending upon the types of applications, a peaceful uses programme is likely to involve not only the development of a limited family of primitive devices, but a continuing programme of refinement, and nearly all of the knowledge developed in such a programme will contribute to weapons capability.

The possibility of the developing countries engaging in a nuclear arms race when their resources are needed otherwise is to be regretted just as in the case of the developed nations. Some of the Group expressed particular concern that the acquisition of nuclear weapons by countries with unstable economic and social structures would make their actual use quite probable. They urge that all concerned take immediate and effective steps toward either prohibiting or controlling peaceful nuclear explosions throughout the world.

Several proposals were made for minimizing possible adverse effects of attempts to use nuclear devices for peaceful purposes. One suggestion was that already developed devices be used and be inspected by representatives of other nuclear powers to ensure that new devices were not being tested, but the feasibility of this was questioned. Some participants were of the view that if peaceful explosions are to be carried out they should be under some international regime with effective safeguards.

Many members of the Group felt that no nuclear explosions, whether for peaceful or military purposes, should be conducted.

Notwithstanding the many technical economic studies that have been made of the peaceful nuclear explosion question and some reservations about feasibility and cost, it would be desirable to have a Pugwash symposium on the subject. If there is one, its scope should be broad, including consideration of impact of peaceful nuclear explosions programmes on the proliferation of weapons capabilities.

IV. The Nuclear Non-Proliferation Treaty (NPT).

Many participants thought the NPT is an essential measure for preventing nuclear weapons proliferation and that strengthening its effectiveness and universality is a must for achieving the goals stated in the Treaty preamble, especially in view of the forthcoming Review Conference in 1975. However, some questioned its utility

because of its discriminatory character, the fact that two of the nuclear weapon powers have not acceded to it, and the likelihood of its resulting in discouraging the development of a potentially useful PNE technology.

Concern was expressed about the viability and utility of the NPT, particularly in the light of the explosion of nuclear devices in recent months by six nations, of which two conducted tests in the atmosphere; the likelihood of reactors being supplied to countries which have not acceded to the Treaty; the failure of the Soviet Union and the United States to limit their nuclear arms significantly and to make progress on arms control as required by Article VI of the Treaty; and the on-going modernization and miniaturization of tactical nuclear weapons. It was also noted that the failure to abide strictly by the terms of Article III of the Treaty, concerning international safeguards, and to implement Article V, providing for the establishment of an international regime for Peaceful Nuclear Explosions, may have had adverse effects.

V. Nuclear-free Zones.

Various opinions were expressed on the subject of nuclear-free zones. There was agreement that, where such a security arrangement had been shown to be viable, as for instance under the Antarctic Treaty and the Treaty of Tlateloleo, it represents a very positive development. However, it was agreed that there may be difficulties in applying it to other geographical areas, particularly if the definition of such Zones is not made an integral part of concrete nuclear disarmament measures.

The following general principles for the establishment of nuclear-free zones were proposed: the initiative should come from the countries in the area themselves; the area should be self-contained and not too small; it should be recognized as such and accepted as

nuclear-free by all nuclear powers; the nuclear-free status should not imperil the security of any one of the states involved; the countries of the zone should clearly state their intentions not to acquire or produce nuclear weapons or permit stationing of foreign weapons on their territories or their passage through them and not to conduct any peaceful nuclear explosions without appropriate arrangements at an international level. Reservations were expressed about the restriction on passage of nuclear weapons through the territories of states in the zone, as it was pointed out that questions of feasibility and international law were involved.

The suggestion of the creation of a nuclear-free zone in Southern Asia was advanced, with provisions for the development of national programmes of peaceful nuclear explosions under international verification. The advantages and the difficulties of including the entire Indian Ocean region in such a security arrangement were noted. However, doubts were expressed by many participants whether a Zone defined in these terms would be meaningful or realistic. Firstly, the Indian Ocean and particularly bases in that Ocean had necessarily to be included in such a zone. Secondly, even after such an inclusion, a zone of that kind would not be self-contained from a geopolitical or military point of view.

The importance was emphasized of the presence, in the neighbourhood of the area in question, of a nuclear-weapon country - a presence that is perceived as highly relevant to the security of at least one of the countries that should be included in the proposed zone. The likelihood of an unrestrained nuclear arms race in the area, in the absence of any security arrangement was pointed out by other participants as well as the danger implied by such a development for all the countries involved. The suggestion for a viable nuclear-free zone in Southern Asia should receive urgent and serious attention by

the concerned countries. The hope was expressed that the Government of India will not undertake further nuclear tests so that a favourable climate can be built for the creation of the proposed nuclear-free zone.

VI. Unilateral Actions and Restraint.

The group discussed the merit of unilateral arms control and disarmament moves. Such initiatives avoid the delays associated with the attempt to reach a negotiated agreement, delays that often result in additional weapons procurement through the "bargaining chip" argument. There was agreement that in several instances unilateral moves followed by reciprocal responses have been an effective technique for arms control and disarmament. It was however noted that this approach cannot be a substitute for a comprehensive and agreed disarmament plan.

The view was expressed that there are several political advantages in introducing the strategy of unilateral reciprocated initiatives into the disarmament process. It has a potential for mobilizing public opinion in favour of disarmament. It may make the disarmament debate and negotiations more understandable, and make governments and negotiators more accountable. It tends also to the removal of secrecy and the development of confidence-building dynamics in the disarmament process.

It was pointed out that several arms control and disarmament initiatives could now be undertaken that would increase the national security of the parties involved even in the absence of reciprocation. This should be particularly emphasized by supporters of such unilateral arms control initiatives, to counter the backlash that may result from the lack of an immediate response. The elimination of less reliable components of strategic forces is one such example. Reductions

in military budgets is another.

The usefulness of unilateral initiatives in bringing about the only real disarmament progress achieved thus far, namely the elimination of biological weapons, was noted.

The Group was of the opinion that circumstances were particularly opportune for a similar initiative with respect to chemical weapons, because of the continued stalemate on this question in the CCD, and the danger of use of such weapons in conflicts between smaller nations with resultant serious potentials of escalation and repercussions affecting weapons policies of the super-powers. The timeliness of such a unilateral action by one of the super-powers is underscored because it could be undertkane at no significant cost to their own military security; it would in fact provide a constructive opportunity to rid themselves of a cumbersome weapon. At the same time it could provide the needed breakthrough to accomplish the objectives of a general halt to research and development on CW agents and the abolition of CW stockpiles.

VII. Chemical Warfare.

The Group welcomes the presentation in April of the Japanese draft chemical weapons convention aiming at comprehensiveness, which the CCD had before it, as a potential way out of the US-USSR impasse in the CW negotiations. We also note with interest the July communique from Moscow which gave notice of a possible US-USSR joint initiative, as yet undefined, within the CCD, on chemical warfare. The Group welcomes these developments, but reiterates its belief (expressed in the preceding section) in the value of independent unilateral actions in this area by the superpowers. The Group does, however, recognize that chemical weapons are not solely a super-power problem. It therefore urges that the security implications of chemical weapons for the confrontations that exist between

certain of the smaller nations, as in the Middle East, be given greater emphasis in the present multilateral negotiations, particularly as regards verification. Chemical weapons proliferation is seen as a very real danger against which new internationally-agreed constraints are urgently needed.

Taking a longer-term view, the Group observed that chemical weapons, like any other novel munitions technology, are subject to that process of assimilation which led, in the case of flame weapons, from popular condemnation and military disfavour in the aftermath of World War I towards that degree of conventionality representated by the heavy use of napalm in the conflicts of the past decades. The Group recognized the importance of reinforcing the barriers that at present exist against this process. In this connection, it noted with concern the continuing failure of the United States to ratify its signature of the 1925 Geneva Protocol, and urged immediate ratification unqualified by any reservation or 'understanding' about irritant agents and herbicides. The Group also noted with concern that there are several new types of chemical weapons emerging from the R and D pipeline which may have the effect of weakening popular and parliamentary opposition to chemical warfare programmes; these include the binary nerve-gas munitions and families of munitions based on two new incapacitating agents. It is thus becoming increasingly important that the CCD devotes attention not only to the production and stockpiling of chemical weapons, but also to chemical weapons research and development.

Without passing judgement on the necessity of verification of limitations relating to chemical warfare the Group endorses the plan of action recommended by the steering committee of the Pugwash CW Study Group as appended to this report.

VIII. Reduction of Military Expenditures.

The Group deplored the tendency for military expenditures to increase despite the settling of a number of acute international problems, and developments towards detente. It was felt that the reduction of military expenditures as a result of multilateral, regional or bilateral agreements, or by unilateral action, was highly desirable, and that a portion of the savings should be devoted to improving the economic and social development of the developing countries. In the case of bilateral or multilateral agreements, the problem of the comparability of military expenditures in different countries is of course a matter that would require careful study.

IX. A Comprehensive Approach to Disarmament.

The opinion was expressed that, despite the many agreements arrived at in the field of arms control and disarmament, the arms race has neither been halted nor even slowed. It was felt by some that the incremental approach to disarmament had failed and that progress in military technology had far out-run progress in arms control. It was therefore important to seek a new approach. Those holding this view felt that more comprehensive measures would not only lead to faster progress towards disarmament, but might also help to overcome inter-service rivalries, reduce the significance of temporary assmmetries, lessen the need for equal security at each step, and enable the reinforcing effect of verification for several types of measures to overcome some of the problems of verification.

It was also suggested that progress on the partial measures of arms limitation now under consideration seemed to be stalemated and that a new approach by way of seeking a comprehensive programme of disarmament could help to stimulate renewed interest in, as well as progress towards, nuclear and general disarmament.

X. A World Disarmament Conference.

The Group was of the opinion that in view of the stalemate in the existing forums for disarmament negotiations, and the absence of China and France, a World Disarmament Conference could play a useful role. It was felt by some that a WDC could help to stimulate the interest of world leaders as well as of the peoples of the world. Thus, it could direct attention to the need and possibilities for a comprehensive programme of disarmament. It could also create new subsidiary organs of restricted size to negotiate disarmament agreements which might attract the participation of China and France.

Others were not convinced that a World Disarmament Conference would help to break the present deadlock, or necessarily improve the performance of the present negotiating bodies. The Conference might also be used for propaganda purposes. They argued that the problem was due more to the absence of political will than to the inadequacy of the machinery for discussing and negotiating arms control and disarmament measures.

There was unanimous agreement, however, that a WDC, which was properly prepared and in which all nuclear powers and other militarily significant states participated, could help promote the cause of disarmament.

Draft Annexe for the Report of Working Group 1

Report of the Steering Committee of the Pugwash CW Study Group

PLAN FOR A PROGRAMME FOR THE PUGWASH CHEMICAL WARFARE STUDY GROUP

Working Group No. 1 of the 23rd Pugwash Conference in Aulanko, Finland (1973) recommended "that Pugwash urges intensified activities in the form of establishing a Chemical Warfare Study Group (CWSG) to work on verification issues in order to help the CCD in resolving this problem".

After the Continuing Committee had approved this proposal, the first Workshop of the CWSG was held in Helsinki, 16-18 April 1974, on the invitation of the Finnish Pugwash Group. The Workshop, which was prepared with the aid of SIPRI, was very fruitful. There were 28 participants from 11 countries; 13 background papers and 10 proffered papers were presented. The report has been circulated to CCD members and others. The key papers and recommendations will be published by SIPRI in book form. This work is planned to appear by January 1975.

The Helsinki CW Workshop recommended in its report "that a continuing effort be undertaken by the Pugwash Study Group ... to explore in depth certain of the major obstacles in the CCD negotiations for a CW treaty". This could take place in the form of "a series of small workshops treating specific key problems that need to be solved. This activity will continue until a meaningful chemical disarmament treaty has been achieved or as long as there remains some hope of reaching the goal" (opening address). The Workshop report also proposed the following topics for study by the Pugwash CWSG :

"1. The organizational aspects of the international verification apparatus.

"2. Functions to be performed by the international organization.

"3. The provisions for interaction between the international and national verification organizations.

"4. Disposal of chemical weapons stockpiles and possible redeployment of research, production and storage facilities.

"5. A critical evaluation of the results at the International Symposium on Preventive and Therapeutic Measures in Poisoning by Anticholinesterase Compounds (to be held in Herzegnovi, Yugoslavia, 6-10 October 1974) to decide whether a continuing international effort is warranted.

"6. The possibility of international co-operation in research and development of means and methods of protection against a CW attack.

"7. Early identification of CW candidate agents or trends towards them by literature search or other indications."

The report also emphasized the importance of dissemninating information about CW disarmament: "one way of helping to do this would be to organize the distribution of all relevant publications to key experts (participants in the CCD expert meetings, in SIPRI symposia, and in Pugwash CW discussions) and to request that they write articles on the particular problems on which they are experts".

The Workshop nominated a steering committee for the CWSG (Kaplan, Miettinen, Reutov, Robinson) and asked Miettinen to act as coordinator and rapporteur until the work of the CWSG is formally organized.

Since the Helsinki Workshop, the following main events have

taken place in the CW disarmament field:

1. May 1-14: Hearings on US CW policy were held in the US House of Representatives (Chairman, Cong. Zablocki). The key questions were ratification of the Geneva Protocol and procurement of binary weapons. The US Department of Defense, State Department, Arms Control and Disarmament Agency, and a number of Congressmen and experts gave statements.

2. July 3: a Joint US-Soviet Communique was released in Moscow. In it, "the USA and USSR agreed to consider a joint initiative in the Conference of the Committee on Disarmament with respect to the conclusion, as a first step, of an international convention dealing with the most dangerous, lethal means of chemical warfare".

3. July 17-22: an expert meeting on CW was held at the CCD, Geneva. Its main purpose was to discuss the Japanese draft convention. Eight working papers on CW were presented. They dealt with definitions, the scope of a partial treaty covering the supertoxic agents, and verification of such a treaty. No details of the joint USA-USSR proposal of July 3 was yet available.

4. August 6: the US House of Representatives voted against appropriating procurement funds for binary weapons.

The following specific action programme is recommended:

1. The Continuing Committee confirm the general plan and composition of the CWSG steering committee and nominates Prof. Miettinen as rapporteur and coordinator of its activities.

2. A number of small ad hoc Workshops should be organized in the nearest future in various countries on specific narrow key issues by national experts under the auspices and support of National Pugwash Committees. The programme of workshops would be based on the items recommended by the Helsinki Workshop.

3. It is recommended, however, that the emphasis of the Pugwash studies be placed in the first instance on verification issues, national and international, including:

a. organizational aspects, national and international;

b. provisions for interaction between the national and international organizations;

c. verification functions to be performed (tentative list):

(1) verification of development and identification of future trends by literature scanning;

(2) verification of production by economic data monitoring;

(3) verification of disposal through destruction and/or redeployment;

(4) possible contributions for verification from existing international organizations.

4. Pugwash notes with interest and supports the International Symposium on Preventive and Therapeutic Measures in Poisoning by Anticholinesterase Compounds in Yugoslavia, October 6-10, 1974.

5. The CWSG should notify the Continuing Committee if it identifies other important technical areas which might benefit from the contributions of a Pugwash study group.

24th Pugwash Conference on Science and World Affairs
Baden, Austria, 28 August - 2 September 1974

MEMBERS OF WORKING GROUPS

WORKING GROUP 1

CURRENT PROBLEMS OF ARMS CONTROL AND DISARMAMENT

CONVENERS

F. CALOGERO (Italy)
V.S. EMELYANOV (USSR)
G.W. RATHJENS (USA)

MEMBERS

I. AHMAD (Pakistan)
I. DICULESCU (Romania)
D. v. EHRENSTEIN (FGR)
W. EPSTEIN (Canada)
M. KAPLAN (WHO)
G.B. KISTIAKOWSKI (USA)
K. LOHS (GDR)
J. LUNDIN (Sweden)
J.K. MIETTINEN (Finland)
J. MOCH (France)
G.S. NADJAKOV (Bulgaria)
V.P. PAVLICHENKO (USSR)
J. PERRY ROBINSON (UK)
O. REUTOV (USSR)
T. TOYODA (Japan)
K. TSIPIS (SIPRI)
P. WEINZIERL (Austria)

Sept 1, 1974

24th Pugwash Conference on Science and World Affairs
Baden, 28 August - 2 September 1974

REPORT OF WORKING GROUP 2

EUROPEAN SECURITY AND FORCE REDUCTIONS

The Working Group has considered the following topics:

I. The concept of security

II. The status of the Conference on Security and Co-operation in Europe (CSCE), and the Vienna negotiations on arms reduction.

III. Arms control and disarmament in Europe, including nuclear-free zones.

The Group also considered the report and suggestions of the XIXth Pugwash Symposium, held in Cracow on April 8, 1974, on The Political Situation in Europe: Arms Race and Prospects for Disarmament.

I.

The prevailing trend in today's Europe is the process of détente and growing confidence among states. Peaceful co-existence between all states, regardless of social, political and economic systems, is becoming an established principle of international relations in Europe. However, the Group stressed that confidence-building between East and West must involve organizations, groups, and individuals as well as governments. The successful maintenance of peace in Europe would also have great importance for the promotion of peace in other parts of the world, as well.

There was thorough discussion of the concept of security. It was stressed that security cannot be considered in military terms alone. Many other factors -- including political, economic, historical, social, cultural and psychological --

play an important role in perceptions of security. In particular, increased co-operation among states in all fields will contribute to the security of all states, and it is important to promote this view in public opinion.

The discrepancy between the improving political climate and the lack of any reduction in armaments or forces is a cause of grave concern. Security of states continues to be based mainly on the system of balance of power, which is inherently connected with the maintenance of national military capabilities, which are in turn a source of pressures for increase in armaments. There was agreement that there is currently no basis for concern that either NATO or Warsaw Treaty powers would deliberately attack the other. However, the heavy deployment of weapons and forces in Europe increases the chances that any eruption of violence will escalate very rapidly. In particular, the large number of nuclear weapons in Europe constitutes a major risk in this respect.

II.

CSCE

The Conference on Security and Co-operation in Europe (CSCE) is a major positive step in the development of international relations, and is a natural consequence of the ongoing process of détente. It was reported that good progress is now being made in the work of the Conference. It was agreed that the Conference should be brought to a positive conclusion as soon as possible.

The Group discussed prospects for further measures to promote peace, security, and all-European co-operation. It was agreed that some kind of organized continuation of the CSCE would be necessary and valuable.

A number of long-range goals could be pursued through such machinery. Among those mentioned were: long-term economic planning for the whole of Europe, aiming at full employment, full use of economic resources, maximum welfare, and appropriate action in such fields as energy and pollution; and facilitating travel and scientific, technological, commercial, and cultural interchange throughout Europe.

A view was expressed in favour of concluding an all-European Treaty, or a number of treaties, for long-term peaceful and friendly co-operation between all European states.

Vienna Force Reduction Talks

It was agreed that measures of arms control and disarmament should be based on the cornerstone principle of undiminished security for all the states of Europe. A military balance already exists in Europe, and the Vienna negotiations, rather than jeopardizing that balance, should aim at preserving it, although at lower levels of armaments, manpower, and costs.

The key to success at Vienna lies less in details and formulae than in the political will of the nations involved. Otherwise it will always be possible for technical complexities and asymmetries to frustrate achievement of real force reductions. Eventual disbanding of military structures of NATO and Warsaw Pact seems to be desirable, although this may not be possible for some time.

Fears were expressed that prolonged negotiations would divert attention from the fact that the "arms race" continues. The Group discussed different approaches to breaking the stalemate in force reduction negotiations. For instance, the existence of multilateral talks should not rule out measures for arms reduction taken outside the framework of those talks. These measures could even promote the negotiating process at Vienna.

Because of the dangers associated with the present level of tactical nuclear weapons in Europe, and the general agreement that these levels are excessive, reduction of these weapons is an especially important possibility for action outside the Vienna talks.

It was suggested that there could be a "twinning" of individual East and West European countries, for early bilateral force reductions, and reduction of defense budgets. The same "twinning" could also help reach economic, cultural and other exchanges on a bilateral basis.

III.

The Group emphasized the link between disarmament and security in Europe. In this connection, it extensively discussed the question of nuclear-free zones, partly in joint session with Working Group 1. Specific proposals to establish such zones in the Nordic countries, in Central Europe, in the Balkans, in the Mediterranean and in the Middle East were mentioned. Some members suggested that a combination of several of the proposed zones to form a large zone -- possibly reaching from the Mediterranean to the Arctic -- would be desirable, and could become a major disarmament measure.

The principles and limitations of nuclear-free zones are set forth in the report of Working Group 1.

The Group urged the full implementation by all European countries of existing arms limitation treaties, including the Limited Test Ban Treaty and the Non-Proliferation Treaty.

There were also fears that a Western European nuclear force would have an adverse effect on the sense of security and détente, accelerate the arms race, and perpetuate the existing division of Europe.

All participants favoured cuts in military spending in all countries associated with European security, and the use of resources saved for common purposes, including development aid.

It was agreed that neutral and non-aligned states in Europe play a positive role in negotiations on European security. They should take part in the implementation of confidence-building measures applied to Europe in general. In addition, they contribute to arms control by staying neutral and non-nuclear. The existence of non-aligned territory -- covering a large part of the dividing line between East and West in Europe -- is in itself a valuable military constraint, and should be respected as such.

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Because of the importance and complexity of the matters involved, the Group recommends to the Continuing Committee that it organize a special symposium on all aspects of nuclear-free zones and a working group on European security and co-operation, which could ensure continuity in discussions between Pugwash Conferences.

April '75 - Budapest - Symp. on Europ. Security and Co-operation

WORKING GROUP 2

EUROPEAN SECURITY AND FORCE REDUCTIONS

CONVENERS

M. DOBROSIELSKI (Poland)
K. KORHONEN (Finland)
J. PRAWITZ (Sweden)

MEMBERS

H. AFHELDT (FGR)
K.T. BRATANOV (Bulgaria)
F. CSAKI (Hungary)
R. HUNTER (USA)
H. KROGER (GDR)
O. MAALOE (Denmark)
W. MULTAN (Poland)
T. NEMEC (SIPRI)
A. PASCOLINI (Italy)
C. PENESCU (Romania)
G. RIPKA (France)
I.A. SOKOLOV (USSR)
H.A. TOLHOEK (Netherlands)
V.G. TRUKHANOVSKY (USSR)

24th Pugwash Conference on Science and World Affairs
Baden, 28 August - 2 September 1974

REPORT OF WORKING GROUP 3

PEACE AND SECURITY IN THE MIDDLE EAST

The Group had several meetings on the assigned topic "Peace and Security in the Middle East". It was decided to organize the discussion along the general lines of the agenda elaborated at a meeting of the Conveners with some members of the Group and of the Pugwash Executive Committee in London on 25 May. Acordingly, the Group dealt first with topic (A) "Problems of Security" and then (B) "The Palestinian Problem". At the end of the discussion, Topic (C) "Impact of Inter-Related Problems" was discussed very briefly.

A. Problems of Security

Military tactical or strategic measures have proven not to assure the conflicting sides of any real degree of security. They seem to fuel more animosity and initiate counter-measures necessitating an upgrading of the tactical and strategic needs of the originator and so on. While not denying that in the present transitory phase towards peace, defensive measures cannot be ignored as a concrete safeguard , yet it should be apparent that for a settlement, alternative and more lasting measures to assure security must be accepted by both parties as a more practical solution to their problem. These measures may include: (a) de-militarized zones on both sides of the borders; (b) international guarantees for all concerned parties on an equal footing; (c) transient presence of an international peace force.

There is a clear indication in the Group's view that a

solution to the problem can only be achieved through a mutually agreed disengagement strategy in view of the animosity and divergence of stands long established by the dispute. On the other hand, it is also clear that this strategy should have the potential of eventually leading to co-operation at the proper juncture of future development. In the view of some participants this future strategy of co-operation should incorporate joint economic ventures with mutual investment at suitable locations.

One sinister development of the geographical spread of the military confrontation is the shift in the nature of the confrontation from a local to a regional one. A narrowing of the gulf between the two opponents to avoid far-reaching consequences and to achieve a rapid de-escalation of the conflict necessitates limitation of the scope of the claims and counter-claims of the contending sides.

B. The Palestinian Problem

The discussion led to a view accepted by all participants that the solution of the Palestinian problem is of the utmost importance and without it no peace can be expected in the region. All participants expressed the view that the Palestinian people must receive a full and free opportunity for self-determination.

In the view of the Israeli participants and others, several solutions could be considered, one of which - it was pointed out - could be the establishment of a Palestinian State in part of the original British mandate area, should the Palestinians decide on it.

It was understood that any solution had to be compatible with the security and sovereign rights of the State of Israel.

It was understood that the indisputable right of the Palestinian

nation to establish their own state is the pre-condition to any settlement of the Middle East problem, without which no cessation of confrontation could take place.

The Arab participants emphasized that the repatriation of the Palestinian Arabs to their homeland is the only insurance of real peace and lasting pacification.

The consensus of opinion in the Group was that this meeting represented a welcome positive and realistic approach by all concerned in spite of areas of disagreement. Public opinion should urge the extension of this approach on the Conference which should be speedily convened at Geneva to achieve a peaceful settlement.

BADEN WORKING GROUP 3 AGENDA ELABORATION 25/5/74

The opportunity of the Geneva Peace Conference, based on UN resolutions and the experience of the past 12 months, raises hopes of a new approach leading to the eventual settlement of outstanding conflicts. Peaceful coexistence would allow the time and provide the atmosphere for the tremendous effort needed to eliminate the causes of antagonism and with the purpose of developing constructive and imaginative new initiatives for the resolution of old problems.

In this context, an objective evaluation of the origins and contributing factors to the causes of antagonism is essential to orient and guide the steps of the hoped-for new approach. It should be the aim of this group to approach its discussion with this new development in mind.

A. Problems of Security

1. Acceptance of inviolate borders
   Political, economic and strategic considerations.
2. Military threats, existing and potential.
3. Threats to economic survival and development.
4. Attempts to undermine the international position of the other side.
5. Opening of the area to foreign domination and influences.
6. Incompatability of ideological and cultural stands of the parties.
7. Historical and psychological inheritance.

B. The Palestinian Problem

1. The issue of home land.
2. Self-determination and development.
3. The problems of violence.
4. Future role of Palestinians as an element of co-operation or ferment of future conflict.

C. Impact of interrelated problems

1. Strategic, economic and political intentions of the great powers.
2. Europe, its needs and contributions.
3. Local resources, their international importance and potential influence (oil).
4. Mobilization of outside pressures -- sectarian, political, economic, etc.
5. Impact of immigration.
6. Impact of Pan-Arabism.
7. Relationship to developing countries and recognition of their interests and needs.
8. Requirements of Development.
9. Role of mass communication techniques, either for exacerbating or improving relations in the area.

WORKING GROUP 3

PEACE AND SECURITY IN THE MIDDLE EAST AND PERSIAN GULF AREA

CONVENERS

O. HOFFMANN-OSTENHOF (Austria)
L. MATES (Yugoslavia)

MEMBERS

E. BAUER (France)
H. CROWE (Canada)
C. DJERASSI (USA)
G. EL SOURANIE (Egypt)
S. FRIEDLANDER (Israel)
E.E. GALAL (Egypt)
M. HOWARD (UK)
E. MARTZ (Austria)
N. SAFRAN (USA)
P.B. SMITH (Netherlands)
G. STEIN (Israel)
C.E. SUAREZ (Argentina)
W. SWARTZ (USA)
M. THEE (Norway)

Sept 1, 1974

24th Pugwash Conference on Science and World Affairs
Baden, Austria, 28 August - 2 September 1974

REPORT OF WORKING GROUP 4

"Security and Arms Problems in Other Areas"

1. The Arms Trade - Current Trends

The Working Group discussed the situation arising from the considerable proliferation of sophisticated weapons and general extension of the arms trade which had taken place in recent months. A new pattern appeared to be emerging in which some countries had acquired large additional revenues, which they were devoting to the purchase of weapon systems while others, especially in the poorer areas of the Third World and even some industrial countries, were faced with the possibility that economic factors would impose their own restraints. There was serious cause for concern that new regional arms races would diminish the scope for promoting human welfare: the coincidence of the so-called oil crisis with the increasing incidence of famine in several areas of the Third World indicated the need for new initiatives. Amongst other possibilities, the Group considered the desirability and feasibility of a Code of Conduct for arms sales comparable to that recently drafted on the transfer of civil technology.

In the last decade or so, in spite of an apparent reduction in international tensions, the complexity and number of mass destruction weapons had greatly increased. The number of supersonic military aircraft had more than doubled, while military nuclear capability had been extended to France and China and other countries were closer to achieving it. Total

military expenditure exceeded that on all forms of education and public health combined. Though the less developed countries were responsible for only six per cent of all military expenditure in 1970, they already claimed thirty seven per cent of the world's military manpower and their budgets as well as their use of manpower for military purposes were growing in 1973 at a rate well above that of the rest of the world. The resulting waste of trained manpower and of potential funds for social development seemed obvious. There was a need to enquire more closely into the reasons for such apparently foolhardy expenditure. The probability was that in many cases it was a result of a partial coincidence of interest between arms supplying countries and the local leadership committed to maintaining an established economic and social system. For a number of reasons, only occasionally the result of real or actually perceived threats from neighbouring states, the enhancement of the military apparatus had become a conventional process, and the alternative uses for the resources involved were not fully considered. A shift of five or ten per cent in global military expenditure, if carried out with a constructive objective in mind, could radically change the position, with regard to aid and development programmes. Accumulated earnings from e.g. oil production, at present being spent on arms or, by investment, in foreign commercial enterprises or government stocks, devoted to the safeguarding of the position of ruling elites, could well be switched to social programmes and the promoting of long-term self-reliance.

Though the purchasers might contribute in their own way to the resolution of the problem, the primary responsibility must rest with the major arms producers. Only their expenditure

was really significant in global terms. It followed, therefore, that a Code of Conduct or Practice would only be practicable if agreed amongst them and would in any case be open to the objection that the imposition of a restraint on arms sales might serve to consolidate the advantage of those who were already well equipped. More than ever a moratorium or a limitation of arms transfers seemed to be inseparable from the detailing of steps towards disarmament.

There was some evidence arising from e.g. the question of arms sales to South Africa and the Nigerian Civil War that public opinion could have an effect on government policies. Campaigns to require public justification for particular deals and for the publication of some realistic and detailed defence estimates might be successful in some countries and should be encouraged. Some complacency had developed with regard to the threat of global nuclear war, but the potential for regional destruction and misery had certainly increased. This might be publicized in conjunction with the drought conditions which were leading to starvation, especially in parts of Africa, in an effort to persuade people to understand the possible relationship between a reduction in defence expenditure and the advancement of human welfare. In particular, a restructuring of defence industries in some developed countries could reduce the pressure for arms sales. The trend was for governments in major arms producing countries to assume direct responsibility for arms sales and this improved the possibilities of exerting pressure: this was probably to a greater extent the case where

armaments industries were being restructured and nationalized. The association of a military identity with national identity largely arising from high levels of armament expenditure in developed countries was, however, an obstacle to restraint in arms sales which had in some way to be combatted.

2. Other Regional Problems

2.1 Southern Africa

The political changes portended in "Portuguese" Southern Africa by domestic changes in Lisbon and the independence of Guinea-Bissau substantially alter the geopolitical configuration and offer new possibilities for meaningful Pugwash initiatives.

Working Group 4 took cognizance of its own limited capabilities of dealing with the problem of racism and oppression imposed upon the majority of inhabitants by the white minority regime.

Particularly appreciated was the successful effort of the Secretary-General in including a South African scientist for the first time at Pugwash. But it was strongly felt that Pugwash must now make a greater effort towards constructive action on the Southern African problem, which not only involves Africans who suffer within South Africa and Rhodesia, but poses a threat to neighbouring independent countries.

In order for Pugwash to be effective, efforts are needed to include more Africans, particularly scientists concerned with arms issues in Pugwash meetings. The decline in Third World participants since the Addis Ababa meeting was noted with regret.

2.1.1 South Africa

The Working Group considered some of the psychological aspects of racism particularly in so far as they related to the self-proclaimed national identity of the white population which seemed to be at the root of the problem.

The rapid development of South African facilities for producing enriched uranium, for internal use and for export, and secret progress on nuclear technology, raise the spectre of nuclear proliferation. While recognizing the limitations of a brief report, the Group suggests that the Continuing Committee issues a general statement urging countries involved in the transference of nuclear and delivery technology to South Africa to desist from such actions and appealing to scientists not to contribute directly or indirectly to these programmes.

The United Nations sanctions against sending arms to South Africa were again endorsed, but it was recognized that that country was now nearly self-sufficient in the production of conventional weapons. Technological know-how on such weapons still flows to South Africa from Europe. Furthermore, such breaches of the UN resolution as the supply of submarines continues and full compliance with sanctions is essential.

Some members felt that sharp increases in the price of gold raise the likelihood of 'the Praetorian Guard' offering major financial inducements to arms suppliers. In addition to arms, South African gold may also be used in an attempt to further reduce its civilian and military dependence upon

imported petroleum products. It was suggested that the Continuing Committee establish an ad hoc group to consider the feasibility of moves to stop the flow of all technology involved in the finding and development of oil reserves in South Africa, including the overseas training of South Africans. Such a group might also explore possible means of stopping the assistance of multi-national companies whose expertize is being sold to South Africa or exchanged in return for oil concessions.

Some members of the Group felt that changing political circumstances made reconsideration of oil sanctions and their implementation by a blockade of South Africa opportune.

2.1.2 While there was enthusiasm for changes in Portuguese Africa, concern was expressed that a neo-colonial situation might develop in Angola and Mozambique.

2.1.3 Discussion of a nuclear-free zone embracing Africa was not conclusive because of difficulties in (a) embracing the whole continent or (b) drawing an intra-continental line demarcating a nuclear-free zone somewhere West and South of the North East corner of the continent.

2.2 Arms proliferation in Latin America was not discussed in part because of the absence of Latin American Pugwashites in the Group.

2.3 On Asia, there was some concern about arms escalation including possible nuclear proliferation and the Working Group regretted the lack of participation of scientists invited from the People's Republic of China and it was felt that their participation was important for a meaningful Pugwash discussion.

3. Repercussions of the Oil Crisis

There was no doubt that the impact of the world energy crisis on military expansion and arms sales was of critical importance not only in the oil producing countries. The Working Group felt that the dramatic enlargement of military establishments in e.g. the Persian Gulf area, was greatly to be regretted. The practice of financing this expansion out of "surplus" oil revenues highlighted the already alarming situation with regard to the so-called development gap. In some of these countries very large sums were being spent on sophisticated armaments and arms production facilities. The provision of these, sometimes in exchange for an oil supply agreement, put further pressures on major arms producing countries to increase their commitment to this type of industry. Moreover, the establishment of subsidiaries of armament firms with a high proportion of local capital in less developed countries raised important issues and tended to weaken the control of national governments over the arms trade. Major arms producers were likely to have a strong interest in getting their share of the increased oil revenues by whatever means.

While the economic implications of this development were profound the immediate politico-military consequences in the oil rich areas were likely to be the most serious and new attempts at territorial expansion might emerge. The responsibility of states with expertize in weapons technology to exercise great restraint in spreading it was a matter which Pugwash scientists should be encouraged to urge at every opportunity, particularly in these circumstances.

4. UN Peacekeeping

The Cyprus situation had amongst other things highlighted problems relating to the functions and composition of UN peacekeeping forces. Views differed on the purpose and role of such forces. Some felt that the burden should not continue to rest on contingents provided by the smaller powers, others were of the opinion that it was first essential to consider the status of peacekeeping or policing forces. There was, however, general agreement that the present position was unsatisfactory and there were often tragic results, for which the international community must accept responsibility.

5. Military Threats to the Environment

The Working Group wishes to draw attention to serious dangers which may arise from attempts to control the environment and climate for military purposes. The Group considers that all necessary steps should be taken by scientists to restrain such activities. The problems posed by so-called meteorological and geophysical war should be continuously monitored within the Pugwash Movement with the idea of preventing the abuse of the environment. If necessary, steps should be taken to promote international agreements on the subject.

6. Conclusion

The Group was aware that the problems of security and the arms trade were becoming increasingly complex. It was impossible to predict accurately the economic situation which would even in the shorter term prevail, for example, in Europe and North America. The expansion of arms markets to pay for oil might be

matched by a situation in which arms procurement in industrial countries had to be reduced. A reform of the international monetary system may be a pre-requisite of a reduction in arms transfers. Large oil revenues might themselves not continue. Inter-nation collaboration in weapon development might well be accelerated because of monetary pressures. This uncertainty with the inherent prospects of dramatic change requires particularly close monitoring by Pugwash.

WORKING GROUP 4

SECURITY AND ARMS PROBLEMS IN OTHER AREAS

CONVENERS

FEDERENKO (USSR)
W.F. GUTTERIDGE (UK)
E.S. MUNGER (USA)

MEMBERS

F. BARNABY (SIPRI)
R. BARNET (USA)
B. BROMS (Finland)
A. BURZYNSKI (Poland)
A. CHAYES (USA)
GIGLIARELLI-FIUMI (Italy)
JURKIN (USSR)
Ms. MARY KALDOR (UK)
P. LOCK (FGR)
Z. MAKI (Japan)
N. Ch. MANGANYI (S. Africa)
H. MARCOVICH (France)
H. SPRINGER-LEDERER (Austria)
V.F. WEISSKOPF (USA)
H. YORK (USA)

24th Pugwash Conference on Science and World Affairs
Baden, 28 August - 2 September 1974

REPORT OF WORKING GROUP 5

DIFFERENT APPROACHES TO INTERNATIONAL CO-OPERATION IN SCIENCE AND TECHNOLOGY

1. Working Group 5 considered some forms of International Co-operation in Science and Technology from the perspective of the two main concerns of the Pugwash Movement. These relate solely to World Peace from the points of view of disarmament and underdevelopment.

The Working Group also agreed that the approach would be based upon the principle of the right of free access to knowledge concerning all scientific and technological investigations.

2. The Group received and discussed reports of three international institutes and two international programmes. These examples of co-operation were in the fields of applied systems analysis (IIASA), theoretical physics (ICTP), insect physiology and ecology (ICIPE), reproductive biology and fertility regulation (WHO), molecular biology (EMBO). This discussion identified the wide range of differences in objectives, mechanisms, and funding arrangements among these examples. The Group based their discussion upon the reports and upon the expertise and experience represented by the participants.

3. It was recognized that international co-operation in science and technology may have different objectives that cannot be maximized in any one programme. Such collaboration among the more developed nations normally has as its main objective the production of new knowledge, which relates to their

own development, and which indirectly contributes towards peace through better understanding. It was felt, however, that this type of collaboration should include components of value to development in the less developed countries, even though these components may not be principal thrusts of such programmes.

4. Collaboration between industrialized and less developed countries should have as its principal objective the building of indigenous capability in the advancement of science and its application. It should, therefore, be directed so as to assist in solving problems directly related to development of the poorer countries. Such collaboration has not had its objectives so defined as exemplified by the fact that collaboration has been principally in the field of science whereas the transfer of technology, with the notable exceptions of medicine amd agriculture, have received little attention. This problem should be a main concern of the Pugwash Movement for there are few established precedents to guide the application of technology, a most sensitive issue. The Code of Conduct, prepared under Pugwash auspices, is a positive example of how Pugwash can contribute to development through technology.

5. Collaboration amongst the LDC's, particularly in science and technology, should be encouraged and promoted. It would increase indigenous capability (scientific self-reliance) and enable more efficient use of the scarce resources needed to effect the development of technology. Building indigenous capability among LDC's was understood to mean the building of capacity within those countries to contribute in unique ways

to the advancement of knowledge, as well as to deal with the application of science and technology to development problems. It also implies the ability to identify indigenous models of development, but it was recognized that, while these capacities and models are being developed, technological progress will largely depend on the rich countries. However, the transfer of technology must be improved with the goal of indigenous capability in mind.

6. International collaboration can take place in joint projects, joint programmes, or in building new institutions or strengthening existing ones. All these approaches have their merits in different problem areas and at different levels of scientific development. There has often been a tendency for international effort to be directed to the setting up of new institutions. This is attractive because of the flexibility afforded, the independence from established structures, and the greater visibility of the activity. However, it may be at times more economic to build on existing institutions; this may make for better integration into local institutional fabric, including universities, and for greater chances of long-term funding. The relative merits of the two approaches, however, require further assessment and study in varying contexts.

The roles of international institutes and other types of organized international research programmes were discussed. Our examination of such activities was not comprehensive. However, the five specific reports dealt with five different examples of multinational programmes. International centres are frequently designed to fulfill very specific objectives; for example, acquisition of new scientific information of world-wide interest or centralization of a research facility which cannot be afforded

by the individual countries. They may also contribute significantly to evolution of indigenous science and technology in less developed nations even when that is not their principal objective.

We recognize the potential unique value of some international research centres. Sometimes analysis may indicate that the same objectives can be accomplished as well through other mechanisms, e.g. networks of regional institutes or effective collaboration among already existent local institutions. In such cases the potentially greater value of the dispersed structure in contributing to indigenous capability in many nations should be weighed carefully in the choice of strategy.

7. At the present moment, financial support to science and technology is precarious. A sine qua non to building up the research capabilities of developing countries is assurance of continued support over a number of years. Such assurances cannot be obtained from most present funding arrangements which are on an annual basis. The financial contributions of developing countries to collaborative research schemes (in the form of salaries, building, land, etc.) were by no means negligible, and were a most valuable factor in insuring continuity of support to such research. It was further agreed that pilot projects initiated by scientists should be given priority and financial support either through bilateral arrangements or through co-operative multilateral agreements.

8. The Group learned from the examples given that there may be many forms of management of international collaboration in science and technology. Each form has developed in response to the objectives of the programme or centre. The examples

illustrate the advantage of developing a basis of good management, and we note that in every case this has had substantial input from the scientists involved.

9. The difficulties of determining priorities for research at national, regional, and international levels have at times made it unclear as to which problems might most benefit from international collaboration. It was recognized that in some situations collaboration has led to actual distortion of national and regional priorities, due to misinformed, although well-meaning efforts. In others, for example in certain bilateral agreements, the selection of research areas has been based more on political aims than on scientific considerations. In conclusion the Group expressed its strong feeling that scientists must be involved in the decision-making process for research policy.

RECOMMENDATIONS

A. In relation to the agenda for the 25th Pugwash Conference in Madras, India, 27 December 1975, the Group agreed that Agenda Item 1c) was a principal item on the Agenda and recommends that careful attention be given to an evaluation of various strategies to be followed and criteria to be applied in accomplishing the most difficult objectives of international co-operation such as:

1. indigenous capability in less developed areas of the world
2. co-operation in selection, adaptation, and particularly development of best suited technologies for developing countries.

The Group emphasized the need for advance preparation in

relation to Agenda Item 1c.

B. Pugwash should work for increased awareness and participation of the world scientific community in international collaboration in science and technology.

This would involve recognition of opportunities, recommendation of priorities, and work with political and other agencies to effect implementation.

Needless to say, effective functioning of scientists in this area will require development of rare sensitivities to the great variety of world circumstances. At the present time, this kind of awareness can probably only be obtained through experience in trying to do the work. Development of relevant academic programmes in this area is a very desirable goal.

C. During the next two years, Pugwash should encourage organization of, and provide sponsorhip of, a number of additional symposia and studies on concrete subjects within this area.

A good example is the symposium scheduled to be held in Tanzania, March 1975 as an input to the Madras Conference.

The Group considered that in matters related to development, Working Groups, including those at Pugwash Conferences, should aim to have at least 50% of participants from the less developed nations.

D. Pugwash should attempt to establish and maintain inventories of the many reasonable objectives of international collaboration. This inventory should be up-dated from time to time to permit balance among objectives of such programmes no matter under whose

auspices they are conducted.

We do not recommend that Pugwash attempt detailed reviews of all programmes or to provide quality control judgments. This would be far beyond our present resources. We can identify objectives and try to obtain rough measures of the total effort that bears on them.

Weisskopf: World University

WORKING GROUP 5

DIFFERENT APPROACHES TO INTERNATIONAL CO-OPERATION IN SCIENCE AND TECHNOLOGY

CONVENERS

RUTH ADAMS (USA)
J. BARZELATTO (Chile)
C.G. BERNHARD (Sweden)

MEMBERS

F. MADL (Hungary)
A.T. BALEVSKI (Bulgaria)
A. BINDARY (Egypt)
M. BREITENECKER (Austria)
G. BRUCKMANN (Austria)
P. BUDINI (ICTP)
J. de WILDE (Netherlands)
E. ECKLUND (IAEA)
V.A. ENGELHARDT (USSR)
W. HAFELE (IIASA)
G. HAMMOND (USA)
J.M. HARRISON (UNESCO)
A. KESSLER (WHO)
A. KEYNAN (Israel)
O. LLOYD (IAEA)
O. MAALOE (Denmark)
M. NALECZ (Poland)
T.R. ODHIAMBO (Kenya)
~~A. PARTHASARATHI (India)~~
M. PETRESCU (Romania)
A. SALAM (Pakistan)
L. SCHMETTERER (Austria)
C. STANDLEY (WHO)
K. THOMAS (FGR)
F.G. TORTO (Ghana)

WORKING GROUP 6

THE ENERGY PROBLEM

CONVENERS

J. HOLDREN (USA)
P.L. KAPITZA (USSR)
M.G. KRISHNA (India)

MEMBERS

H. ALFVEN (Sweden)
P. BAUDOUX (Belgium)
J. BOGARDI (Hungary)
E. BRODA (Austria)
Y. CHERNILIN (IAEA)
EL BAROLASY (Egypt)
B.T. FELD (USA)
F.C. FRANK (UK)
W. FRANK (Austria)
H. GLUBRECHT (IAEA)
M. HOFFNUNG (France)
V. KNAPP (Yugoslavia)
F. KOHLER (Austria)
V.F. KULESHOV (USSR)
N.A. LANE (IAEA)
E. LEIBNITZ (GDR)
B. LOTSCH (Austria)
P. MARKL (Austria)
J. MINCZEWSKI (Poland)
P.L. OLGAARD (Denmark)
H. RAIFFA (IIASA)
I.T. ROSENQVIST (Norway)
J. ROTBLAT (UK)
A. VAN DER WOUDE (Netherlands)
A.P. VINOGRADOV (USSR)

Pugwash warnt vor Giftkrieg:

Mit „Van Ix" läßt sich Millionenstadt ausrotten

WIEN (AZ). Mit 25 Bombern, die mit der in Schweden entdeckten phosphororganischen Verbindung VX beladen sind, kann man 80 Prozent der Einwohner der Weltstädte töten, aber inzwischen hat man noch giftigere Stoffe entdeckt. Das dramatische Anwachsen der Giftigkeit neuer chemischer Stoffe, die zum Unterschied von Atomwaffen keine Zerstörungen anrichten, sondern nur Menschen umbringen und außerdem billig und leicht herzustellen sind, zeigt die Notwendigkeit, so bald wie möglich zu einem Verbot der Anwendung, der Produktion und Lagerung chemischer Waffen zu kommen, erklärte das sowjetische Akademiemitglied Reutow in einer Pressekonferenz über die Ergebnisse der 24. Pugwash-Konferenz, die vom 28. August bis 2. September in Baden bei Wien abgehalten wurde.

Reutow verwies darauf, daß es nur einen einzigen internationalen Vertrag gegen chemische Kriegführung, 1925 in Genf abgeschlossen, gibt, der aber nicht von allen Ländern — so zum Beispiel nicht von den USA — ratifiziert wurde. Die Hauptschwierigkeit für ein Übereinkommen gegen die Verbreitung chemischer Waffen ist die Nachprüfung und Kontrolle seiner Einhaltung. Die Pugwash-Organisation hat eine permanente Arbeitsgruppe für dieses Problem geschaffen, die entsprechende wissenschaftlich fundierte Vorschläge machen soll.

An der diesjährigen Pugwash-Konferenz, so benannt nach dem kanadischen Ort, in welchem 1957 zum erstenmal Gelehrte aus Ost und West in Sorge über die negativen Auswirkungen von Wissenschaft und Technik Weltprobleme diskutierten und Auswege vorschlugen, nahmen 120 Atomphysiker, Chemiker, Biologen, Soziologen und Wirtschaftswissenschafter aus 31 Ländern sowie 15 Beobachter von 8 internationalen Organisationen teil. Die Tagung, die von der Bundesregierung unterstützt wurde, hatte „Abrüstung, Energieprobleme und internationale Zusammenarbeit" zum Thema, und das Problem der Verhinderung der chemischen Kriegführung war nur einer der vielen Gegenstände, die behandelt wurden.

Die Probleme, vor denen die Welt steht, sind nicht angenehm, und man sollte sich mit ihnen nicht abends im Bett beschäftigen, weil man sonst nicht einschlafen kann, sagte der derzeitige Präsident der Pugwash-Konferenzen über Wissenschaft und Weltangelegenheiten, der schwedische Nobelpreisträger Hannes Alfven, in der Pressekonferenz. Aber man muß sie ins Bewußtsein der Menschheit rufen, weil es sonst ein schreckliches Erwachen gibt.

„Es gab ein weitverbreitetes Gefühl unter den Konferenzteilnehmern, daß die gegenwärtige kritische Weltlage feste und entschlossene, sogar drastische Maßnahmen von seiten aller Nationen der Welt, aber besonders von den Großmächten, erfordert, um die gegenwärtigen Trends durch konstruktive Initiativen umzukehren", heißt es in der Abschlußerklärung. Das Ziel ist das Aufhalten des Rüstungswettlaufs, die Verhinderung der Ausbreitung der Atomwaffen, das Schließen der wirtschaftlichen Lücken zwischen den reichen und den armen Ländern und schließlich die allgemeine und vollständige Abrüstung.

GEFAHREN DER BAKTERIENFORSCHUNG

Unter den Gefahren, auf die aufmerksam gemacht wurde und für deren Verhütung Vorschläge gemacht wurden, sind nicht nur einige Aspekte der Atomkraft, sondern auch gewisse neue Entwicklungen der Molekularbiologie. Für experimentelle Zwecke werden in großem Maßstab Mikroorganismen (Bakterien und Viren) erzeugt, die neue Eigenschaften haben. Diese Kleinstlebewesen könnten aus dem Laboratorium entwischen und unter Tier und Mensch mit gefährlichen Folgen weit verbreitet werden. Die Forschungen auf diesem Gebiet sollten vorübergehend eingestellt werden, bis die Angelegenheit gründlich von einer internationalen Gruppe qualifizierter Wissenschafter untersucht worden ist.

In Baden wurden unter anderem auch die Schaffung weiterer atomwaffenfreier Zonen, die Wichtigkeit der Verhinderung der Entwicklung von Techniken zur Kontrolle des Klimas und der Veränderung der Umwelt für militärische Zwecke sowie Energiefragen erörtert. Die Ergebnisse werden den Regierungen und den betroffenen Regierungsstellen der verschiedenen Länder zugänglich gemacht werden.

Brandt will nicht SI-Chef werden

BONN (afp). Der SPD-Vorsitzende Willy Brandt hat keinerlei Interesse, den Vorsitz der Sozialistischen Internationale zu übernehmen, erklärte der stellvertretende SPD-Sprecher Uwe Karsten-Heye in Bonn. Er gehe davon aus, daß sich an der früheren Aussage Brandts, sich ausschließlich der Arbeit des Parteivorsitzenden zu widmen und keine internationalen Ämter zu übernehmen, nichts geändert habe.

Der jetzige Vorsitzende der Internationale, der österreichische Sozialist Bruno Pittermann, hatte kürzlich Brandt als seinen Nachfolger ins Gespräch gebracht. Dr. Pittermann hatte den deutschen Friedensnobelpreisträger als geeigneten SI-Vorsitzenden bezeichnet.

Franco golft wieder mit 81 Jahren

Kaum jemand rechnete damit, daß der 81jährige spanische Diktator Franco seine letzte schwere Krankheit überleben würde. Jetzt spielt er wieder Golf und sitzt dem Staatsrat vor. Politisch neigt sich seine Ära freilich dennoch unwiderruflich ihrem Ende zu. Ganz Spanien bereitet sich auf die Zeit nach Franco vor

Frelimo will Regierung bilden

BEIRA (afp). Eine provisorische Regierung von Mozambique wird unter Führung von Frelimo-Präsident Samora Machel am 25. September anläßlich des zehnjährigen Bestehens der Befreiungsfront von Mozambique ihr Amt antreten, hieß es am Mittwoch in Beira nach Meldungen von Lusaka.

In der Sambiahauptstadt Lusaka beginnt heute Donnerstag die dritte Gesprächsrunde über die Zukunft Mozambiques. Aus Lissabon kommt Außenminister Mario Soares, begleitet von zwei Mitgliedern des Kabinetts. Er beharrt auf der Übertragung der Souveränität und der praktischen Verwaltungsverantwortung an den Frelimo. „Wir haben nicht zehn Jahre lang gekämpft, um in einer kolonialistischen Regierung mitzuarbeiten", sagte er. Damit waren alle portugiesischen Vorstellungen über eine Regierung mit Frelimo-Teilnahme vom Tisch gefegt.

Die neue Achse Paris-Bonn

Giscard und Schmidt wollen europäische Zusammenarbeit wieder ankurbeln

VON AZ-KORRESPONDENT GEORG SCHEUER (PARIS)

PARIS (AZ). Die Achse Paris-Bonn hat ihre erste Feuerprobe bestanden: Präsident Giscard d'Estaing und Bundeskanzler Helmut Schmidt haben bei ihrem Gespräch „auf der gleichen Wellenlänge" diskutiert und sollen übereingekommen sein, schon für heuer ein europäisches Gipfeltreffen zu initiieren.

Wenngleich das dritte Treffen von Bundeskanzler Schmidt und Präsident Giscard d'Estaing am Montag als „zwangloses Diner" verlief und ohne Kommuniqué beendet wurde, kennt man die Themen und Thesen, die bei dieser Gelegenheit angetönt und abgestimmt wurden.

Die bundesdeutsche „Devisenspritze" für Italien als Auftakt für eine gemeinsame und langfristig angelegte Hilfsaktion der ganzen EG war dabei nur der unmittelbare Anlaß. Man weiß, daß Italien ungefähr die dreifache Summe braucht, um die gegenwärtige Wirtschafts- und Sozialkrise zu bewältigen und um ein politisches Chaos zu vermeiden, das auch für die anderen EG-Länder Folgen nach sich ziehen könnte. Frankreich ist damit in erster Linie angesprochen.

Auf beiden Seiten des Rheins ist man sich darüber klar, daß finanzielle Feuerlöschaktionen nicht genügen. Auf der Tagesordnung steht eine Reduzierung und Annäherung der Inflationsraten innerhalb der EG und damit die Wiederankurbelung der Wirtschafts- und Währungsunion, die zu Jahresbeginn durch Pompidous Extratour mit dem Francfloaten in Frage gestellt wurde.

Hinzu kommt der Bauernaufstand in Mittel- und Südfrankreich mit besonders dramatischen Akzenten in Korsika. Er dehnt sich nun auch auf die Beneluxländer aus. Die Konferenz der neun EG-Agrarminister hatte sich damit am Dienstag auseinanderzusetzen.

Inflations- und Agrarkrise können aber letzten Endes nur mit politischen Mitteln bekämpft werden. Giscard d'Estaing machte dazu in seiner Fernsehbotschaft in der letzten Woche einige Vorschläge und Anspielungen: Den EG-Gipfel noch vor Jahresende zur beschleunigten Verwirklichung der politischen Union, womöglich mit Schaffung einer handlungsfähigen politischen Europabehörde, die vorher von Pompidou und de Gaulle immer wieder verhindert oder verzögert wurde. Wieweit meint es Giscard d'Estaing damit ernst? Dies sollte Schmidt in seinem Gespräch mit dem neuen Herrn des Elysée nicht zuletzt feststellen.

Voraussichtlich war dies nicht die letzte Beratung unter vier Augen im neuen unkonventionellen Stil der beiden führenden Männer in Paris und Bonn. Die Ergebnisse und Konsequenzen wird man auch ohne Kommuniqué voraussichtlich schon bald kennen, vielleicht früher als erwartet.

Ölkredite: Westen schöpft Rahm ab

Sechzig Länder haben in den ersten sechs Monaten 1974 19,7 Milliarden Eurodollar bei der Weltbank aufgenommen, während die Anleihen für das ganze Jahr 1973 insgesamt 22 Milliarden betrugen. Das Kapital wurde zum größten Teil zur Deckung der wachsenden Erdölkosten aufgenommen. Fast zwei Drittel gingen an die Industrieländer, von denen Großbritannien (4,8 Milliarden), Frankreich (2,9 Milliarden) und Italien (2,25 Milliarden) die größten Anleihen aufnahmen. Ein weiteres knappes Drittel ging an die Entwicklungsländer, unter ihnen Mexiko (982 Millionen), Spanien (852 Millionen), die Philippinen (777 Millionen) und Brasilien (623 Millionen).

telegramme

Beziehungen USA-DDR

WASHINGTON (upi). Mit der Unterzeichnung entsprechender Dokumente nehmen die Vereinigten Staaten am Mittwoch diplomatische Beziehungen mit der Deutschen Demokratischen Republik auf. Die Dokumente sollten ursprünglich im Juli unterzeichnet werden, die Verzögerung ergab sich auf Grund des Konflikts um die DDR-Kontrollen an den Transitwegen.

Sowjetdissident festgenommen

MOSKAU (upi). Die sowjetische Polizei verhaftete am Mittwoch den 51jährigen jüdischen Wissenschafter Vitali Rubin unter der Beschuldigung des Parasitentums. Rubin erlitt bei seiner Festnahme einen Herzanfall und mußte in ein Krankenhaus gebracht werden. Rubin, ein Spezialist für alte chinesische Philosophie, ist seit zwei Jahren arbeitslos. Damals hatte er um Ausreise nach Israel angesucht.

Freund Haile Selassies getötet

ADDIS ABEBA (upi). Äthiopische Soldaten haben den früheren Provinzgouverneur und engen Freund von Kaiser Haile Selassie Dejazmatch Tasehayu Inquselassie erschossen, als er seiner Festnahme Widerstand entgegensetzte.

Zeitungsstreik in Lissabon

LISSABON (upi). In Lissabon erschienen am Mittwoch keine Zeitungen. Die Journalisten- und Druckereiarbeitergewerkschaft hatten ihre Mitglieder zu einem 24stündigen Sympathiestreik für die älteste Zeitung Portugals „Journal de Commercio" aufgerufen. Die im Jahre 1853 gegründete Zeitung kann bereits seit zwei Wochen nicht erscheinen, weil sich sowohl Journalisten wie auch Drucker im Ausstand befinden und die Entlassung des Direktors Carlos Machados fordern. Machado hatte sich vorher geweigert, in Gesprächen über Lohnerhöhungen und Verbesserung der Arbeitsbedingungen einzutreten.

Dean im Gefängnis

WASHINGTON (upi). John Wesley Dean, ehemaliger Rechtsberater von Expräsident Richard Nixon und später „Kronzeuge" gegen Nixon bei den Watergate-Enthüllungen, hat in Washington eine ein- bis vierjährige Gefängnisstrafe wegen seiner Beteiligung an der Verschleierung des Skandals angetreten.

welt in bewegung

„Ein Hasardspiel, von dem niemand weiß, wie es ausgehen wird" — so hat noch vor kurzem ein Labour-Sprecher die inoffizielle Entscheidung seiner Partei kommentiert, im Oktober die Engländer vorzeitig an die Wahlurnen zu rufen.

Jetzt stehen die Chancen für Harold Wilsons hart bedrängte Regierungspartei freilich schon bedeutend besser: Mit der Verabschiedung des „Sozialkontrakts" zwischen der Labour-Regierung und den Gewerkschaften ist den englischen Sozialisten ein wichtiger Schritt nach vorwärts gelungen. Selbst der linke Flügel der Arbeitnehmervertreter hat sich bereit erklärt, durch freiwillige Zurückhaltung bei Lohnforderungen der Regierung beim Kampf gegen die Inflation zu helfen.

Bisher hatten sich Englands kämpferische und im Ausland vielverteufelte Gewerkschaften stets dagegen gewehrt, sich ihre Lohnpolitik vorschreiben zu lassen, und sich lieber in opferreichen Arbeitskämpfen ihren Anteil geholt. Bei der Polemik gegen diese „englische Krankheit" wurde freilich oft unterschlagen, daß in England die Klassenunterschiede zwischen oben und unten weiter als anderswo auseinanderklaffen und daß der Schrumpfungsprozeß von der führenden Wirtschaftsmacht zum „kranken Mann Europas" weitgehend von den arbeitenden Menschen bezahlt worden ist. An der Unfähigkeit, sich mit den Gewerkschaften zu verständigen, ist nicht nur die konservative Regierung Heath gescheitert, sondern letztlich auch die vorangegangene Labour-Regierung unter Wilson.

Gewiß ist der jetzt beschlossene Sozialpakt noch keine Sozialpartnerschaft, sondern nur ein Schritt in einem historischen Prozeß. Dabei hat das Industrieprogramm der Labour Party eine Rolle gespielt, das

Sozialpakt auf englisch

Maßnahmen zur Investitionskontrolle und zur schrittweisen Arbeiterselbstverwaltung vorsieht. Das bedeutet mehr Mitverantwortung für die Arbeitnehmer — und eine Vorleistung zu dieser Mitverantwortung haben die Gewerkschaften jetzt erbracht. Ob sie auch honoriert wird, werden die nächsten Wochen zeigen.

Barbara Coudenhove-Kalergi

Sozialplan für Lehrlinge

SJ setzt sich für Chancengleichheit ein

Trotz Verbesserungen im Bildungssystem besteht für den Lehrling derzeit noch keine Chancengleichheit. An diese These knüpft eine Lehrlingskampagne an, die in den nächsten Wochen in allen Gruppen der Sozialistischen Jugend Österreichs durchdiskutiert wird.

Bei einer Blickpunkt-2000-Veranstaltung der SJ in Steyr wurde von Funktionären und Lehrlingen der Sozialistischen Jugend bereits eine Diskussionsgrundlage erarbeitet. Deren Ziele: Bessere Ausbildung, soziale Gerechtigkeit und verstärkte Aktivitäten für Lehrlinge.

Beim Verbandstag der SJ im November soll ein Programm für Lehrlinge beschlossen und zur psychologischen Unterstützung das Jahr 1975 zum „Jahr der Lehrlinge" erklärt werden.

GESAMTSCHULE

Als wichtigen Schritt zur Chancengleichheit nennt die SJ in ihrem Arbeitspapier die Einführung der integrativen Gesamtschule. Eine solche wäre, so die SJ, geeignet, gleiche Voraussetzungen für Schulbesucher und Lehrlinge bis zum 15. Lebensjahr zu schaffen.

Weiter verlangt die SJ an Stelle der eng spezialisierten Ausbildung eine Ausbildung nach möglichst breiten Berufsbildern.

ÜBERBETRIEBLICHE WERKSTÄTTEN

Zur Ausbildung führt das Arbeitspapier dann im Detail an: „Gleichzeitig fordern wir die Errichtung überbetrieblicher Lehrwerkstätten. Sie sollen die Unabhängigkeit von profitorientierten Betrieben sichern. Durch die gestraffte Ausbildung ist es außerdem möglich, das Grundwissen in kürzerer Zeit zu vermitteln."

Diese überbetrieblichen Lehrwerkstätten sollen, verlangt die SJ, durch einen Berufsausbildungsfonds erhalten werden, der von Unternehmerseite zu finanzieren wäre. Bereits ab der 6. Pflichtschulstufe soll dann ein Unterrichtsgegenstand „Arbeitslehre" eingeführt werden. In den überbetrieblichen Lehrwerstätten sollte dann nur die Vermittlung des Grundwissens erfolgen, Berufs- und Spezialausbildung gemeinsam höchstens drei Jahre dauern.

Überdies verlangt die SJ die Abschaffung der Lehrabschlußprüfung. Um weiter dem Lehrling die Möglichkeit zu geben, ohne größere Schwierigkeiten höhere Schulen zu besuchen, soll während der Ausbildung Englisch und das Lehrfach politische Bildung unterrichtet werden.

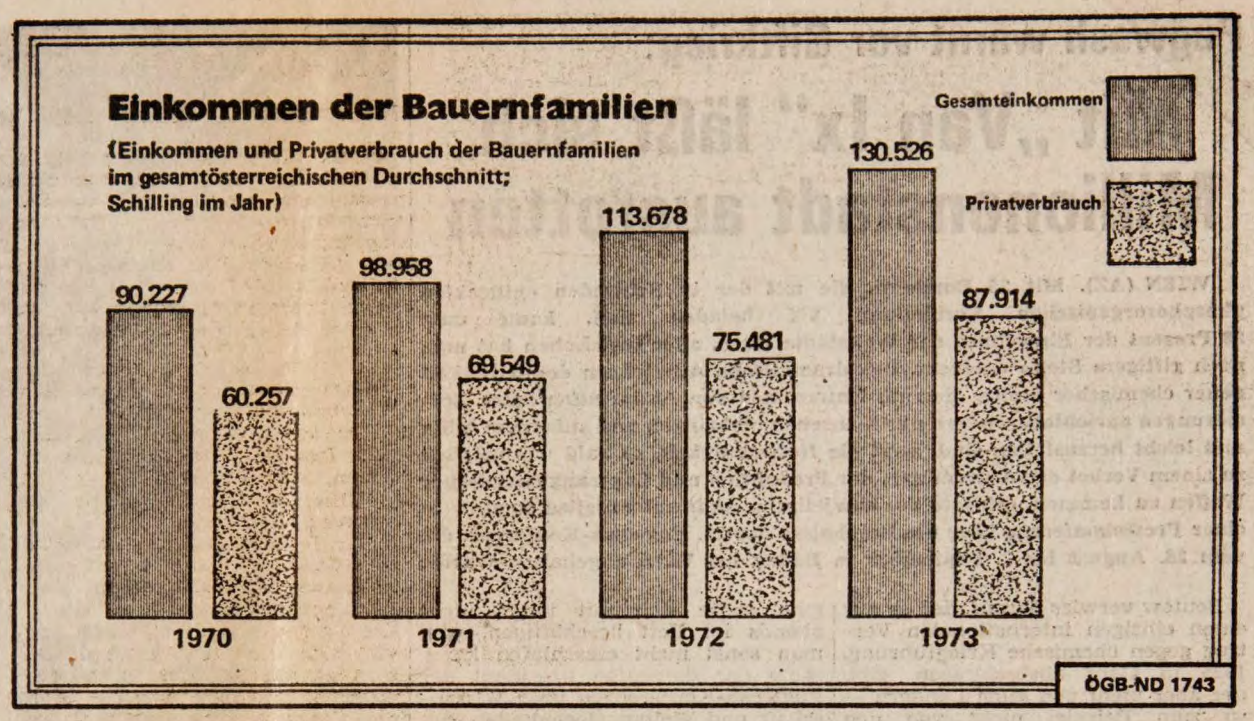
Schließlich sollen die bestehenden Gesetze bezüglich Inspektion von Lehrbetrieben rigoroser angewendet und Betriebe, die Lehrlinge ausbilden wollen, genauer unter die Lupe genommen werden.

IBFG: Aktion gegen die Chile-Junta

Angesichts der ständig wiederkehrenden Meldungen über eine erneute und verstärkte Verfolgung von Gewerkschaftern durch die chilenische Junta hat der Internationale Bund Freier Gewerkschaften in Absprache mit der chilenischen Gewerkschaftszentrale im Exil, der CUT, den Generaldirektor des internationalen Arbeitsamtes, Francis Blanchard, dringend gebeten, unverzüglich einen hohen Vertreter nach Chile zu entsenden, um die Verletzungen der Gewerkschaftsfreiheit und der menschlichen Grundrechte an Ort und Stelle zu untersuchen.

Auf Initiative der Arbeitnehmergruppe in der IAO hatte die Internationale Arbeitskonferenz eine Untersuchung der Lage in Chile beschlossen, die nach den geltenden Verfahren der IAO durchgeführt werden sollte. Demnach hätte frühestens im November 1974 eine Mission nach Chile reisen können.

Unter den gegebenen Verhältnissen war IBFG-Generalsekretär Otto Kersten allerdings überzeugt, daß eine „schnellere Aktion absolut notwendig ist, um die öffentliche Weltmeinung wachzurütteln und dieser systematischen Terrorherrschaft gegenüber dem chilenischen Volk ein Ende zu bereiten".



Die Daten über die Entwicklung der Gesamteinkommen und des Privatverbrauches der österreichischen Bauernfamilien sind dem „Grünen Bericht" entnommen. Sie beruhen auf den Erhebungen der Landesbuchführungsgesellschaft, die bei einem repräsentativen Querschnitt der österreichischen Bauern alljährlich genaue Buchführungsergebnisse auswertet.

Wie die Darstellung zeigt, sind die Einkommen der Bauernfamilien in den letzten Jahren stark gestiegen. Auch der private Verbrauch hat spürbar zugenommen, wobei bedacht werden muß, daß die aus dem eigenen Betrieb entnommenen Lebensmittel zu Erzeugerpreisen bewertet werden und die Kosten der Pkw-Haltung überwiegend dem betrieblichen Aufwand und somit nicht dem Privatverbrauch zugezählt werden.

Bei den angeführten Zahlen handelt es sich um Durchschnittswerte. Vielfach wird übersehen, daß es innerhalb der Landwirtschaft selbst extreme Einkommensunterschiede gibt. So hatten 1973 22,1 Prozent der Bauernfamilien ein Gesamteinkommen von mehr als 200.000 Schilling im Jahr, während sich anderseits 15,7 Prozent der Bauernfamilien mit weniger als 75.000 Schilling im Jahr begnügen mußten.

Für Arbeitslose sorgt der Staat

Wer sich im Paragraphendickicht der Arbeitslosenversicherung verstrickt, fragt am besten beim zuständigen Landesarbeitsamt nach

VON PAUL FLIEDER

VW bezahlt jedem Arbeiter, der freiwillig aus dem Werk scheidet, eine Prämie von 10.000 D-Mark. Der Rest der Arbeiterschaft muß sich mit Kurzarbeit und zusätzlichem Urlaub anfreunden — das Damoklesschwert der Entlassungen hat schon sichtbar zum Hieb ausgeholt. Obwohl die deutsche Krisenwoge an Österreichs Grenzen derzeit noch vorbeifließt, tauchte damit zum erstenmal seit langem das Gespenst der Arbeitslosigkeit wieder auf. Vielleicht ein Grund, sich einmal näher mit der Arbeitslosigkeit und der Arbeitslosenversicherung im speziellen zu befassen.

Im Juni gab es in Wien 5371 Leistungsbezieher der Arbeitslosenversicherung, wie es so schön heißt — Arbeitslose für den Normalsprachgebrauch. Davon 1026 Männer und 4345 Frauen. Diesen hohen Unterschied zwischen beiden Zahlen erklärt Frau Hofrat Dr. Gerda Süssenbeck, zuständig für die Arbeitslosenversicherung in der Arbeitsmarktverwaltung, damit, daß Frauen einfach schwerer wo unterzubringen sind. „Schwer unterzubringen sind auch Angestellte, vor allem höhere!"

Wer ist nun nicht unterzubringen? Wann hat ein Arbeiter oder Angestellter Anspruch auf Arbeitslosenversicherung? „Zuerst einmal muß der Betreffende arbeitslos sein, dann arbeitsfähig und arbeitswillig", führt Hofrat Süssenbeck aus. Unter arbeitswillig versteht man, daß der Arbeitslose eine ihm vom Arbeitsamt zugewiesene Beschäftigung annimmt. Das ist allerdings nur zumutbar, wenn sie den körperlichen Fähigkeiten angemessen ist, nicht die Sittlichkeit verletzt und auch angemessen entlohnt ist.

Als angemessen gilt der Kollektivvertrag. Weiter darf die Arbeit den Betreffenden nicht daran hindern, seinen früheren Beruf wieder auszuüben. Ein Uhrmacher wird also keine Arbeit annehmen müssen, bei der er unter Umständen seine Fingerfertigkeit einbüßen könnte.

Vom Segen der Arbeitslosenversicherung ausgeschlossen sind Arbeiter im Betrieb der Eltern, wenn sie eingesperrt waren oder eine Schule besuchen beziehungsweise an einem geregelten Lehrgang teilnehmen, beispielsweise Universität. Da aber erstens hiebei nicht so heiß gegessen wie gekocht wird und zweitens die Bestimmungen in manchen Fällen liberale Auslegungen zulassen, sollte sich jeder, für den der eine oder andere oben zitierte Umstand zutrifft, genau erkundigen. Hofrat Süssenbeck: „Wenn ein Arbeiter beispielsweise extern maturiert hat und nun an der Universität studiert und dann plötzlich seinen Job verliert, gewähren wir das Arbeitslosengeld. Überhaupt dann, wenn er den positiven Studienerfolg nachweisen kann oder vielleicht gerade an einer Dissertation arbeitet."

Arbeitslosengeld beanspruchen kann außerdem nur der, der auch Arbeitslosenversicherung bezahlt, also gearbeitet hat. Und zwar muß er für die letzten 24 Monate 52 Wochen Beschäftigung nachweisen. Er erhält dann für 20 Wochen das Arbeitslosengeld. Kann er in den letzten fünf Jahren 156 Wochen Arbeit nachweisen, bekommt er das Geld 30 Wochen.

Hat der Arbeitslose in dieser Zeit noch immer keine Arbeit gefunden, kann er die Notstandshilfe beanspruchen. Sie macht bei Frau und Kind genausoviel aus wie das Arbeitslosengeld, ohne Kind beträgt sie 92 Prozent. Für Bezieher des Arbeitslosengeldes oder der Notstandsbeihilfe ist es natürlich streng verboten, schwarz zu arbeiten — also Arbeit nicht sofort zu melden. Außerdem zahlt sich die Sache nicht aus. Es gibt da nämlich eigene Beamte, die einen beispiellosen Riecher dafür haben, ob jemand nicht vielleicht etwas über die Vehältnisse, in denen ein Arbeitsloser sich üblicherweise befindet, lebt. Ein plötzlich zurückgezahlter Kredit, ein neues Auto oder ein schicker Urlaub werden dann zum Fallstrick.

Reich wird man durch das Arbeitslosengeld und die Notstandshilfe nicht, aber es läßt sich recht und schlecht leben damit. Errechnet wird sie aus dem früheren Gehalt des Arbeiters. Zur Errechnung hat man 39 Lohnklassen aufgestellt. Die niederste, Lohnklasse 1, wird mit einem Gehalt von 1560 Schilling angenommen. Das Arbeitslosengeld macht 792 Schilling aus. Die höchste, die 39er, wird mit 6370 Schilling und darüber errechnet. Der Arbeitslose erhält dann 2574 Schilling. Hinzu kommen noch für die Frau und pro Kind 240 Schilling. (Die meisten Gehaltsempfänger sind in den 30iger Klassen zu finden. Frauen liegen durchschnittlich niedriger.)

Derzeit verzeichnet Österreich praktisch eine Supervollbeschäftigung. Selbst bei einer Arbeitslosenquote von bis zu 5 Prozent spräche man noch immer von Vollbeschäftigung. Jedoch vor dem Jahr 1938 gab es in Wien 600.000 Arbeitslose. Frau Hofrat Süssenbeck, in diesem Zusammenhang auf das Problem der Aussteuerung angesprochen: „Aussteuerung aus Mangel an Mitteln aus der Arbeitslosenversicherung gibt es nicht. Es müßte dann der Staat einspringen. Dieser könnte allerdings die Bestimmungen verschärfen."

Derzeit müssen die Arbeitsämter eher die Nachfragen der Firmen nach Arbeitskräften befriedigen. Der Amtsbus „umwirbt" Arbeiter

Metallarbeiterinnen: Mitglieder sollen besser erfaßt werden

Die Frauensektion Niederösterreich der Gewerkschaft der Metall- und Bergarbeiter hat sich in der letzten Sitzung am 21. August mit organisatorischen Fragen beschäftigt. Wichtigstes Ergebnis: Die Betreuung der Mitglieder und Funktionärinnen soll intensiviert werden. Die Metallarbeitergewerkschaft hat in Niederösterreich mehr als 8200 weibliche Mitglieder; in 94 Betrieben sind 250 Kolleginnen als Betriebsräte beziehungsweise Ersatzbetriebsräte in Funktion.

In Zusammenarbeit zwischen Frauensektion, Landessekretariat und den Bezirkssekretariaten soll nun die Betreuung der Funktionärinnen und der weiblichen Mitglieder auf eine neue Basis gestellt werden. In Zukunft werden die verantwortlichen Kolleginnen der Frauensektion gemeinsam mit den Bezirkssekretären die Funktionärinnen in den einzelnen zum Bezirk gehörenden Betrieben direkt betreuen. Ständige Kontaktgespräche sollen bewirken, daß die weiblichen Betriebsräte laufend und rasch informiert werden und ihrerseits Anliegen aus dem Kreis der Kolleginnen auf kurzem Wege der Bezirks- beziehungsweise Landesleitung übermittelt werden.

Weiter haben sich die niederösterreichischen Funktionärinnen zur Aufgabe gestellt, mit den Arbeiterinnen jener Betriebe, die nicht oder nur teilweise organisiert sind, Kontakt aufzunehmen. Dadurch könnten weitere Mitglieder und darüber hinaus Betriebsrätinnen geworben werden.

Durch den intensiveren Kontakt werden regionale und fachliche Probleme leichter erkannt und gelöst werden können. Besondere Aktionen sollen im kommenden Jahr, das von den Vereinten Nationen zum Jahr der Frau deklariert wurde, gesetzt werden.

Abendschule der AK Wien: Werkmeisterlehrgang für Elektronik

75,6 Prozent aller Befragten sprachen sich für „Berufsausbildung" als wichtige Aufgabe der Kammer für Arbeiter und Angestellte aus. Dieses Ergebnis erbrachte eine repräsentative Umfrage der Wiener AK unter den Wiener Arbeitnehmern. Die AK kommt diesem Wunsch ihrer Mitglieder schon lange entgegen, indem sie Möglichkeiten zur beruflichen Weiterbildung anbietet. Eine dieser Einrichtungen ist die Technisch-gewerbliche Abendschule, die für das Wintersemester 1974/75 wieder Teilnehmer in ihre Kurse und Lehrgänge aufnimmt.

Seit Ende August sind Einschreibungen in folgende Kurse möglich:

- Zweijährige Werkmeisterabendlehrgänge für Maschinenbau, Elektrotechnik, Industrielle Elektronik, Kraftfahrzeugtechnik und das Baugewerbe.
- Kurse für Betriebsleiter, Industrielle Elektronik, Netzplantechnik, Heizer, Maschinen- und Motorenwärter, Kraftfahrzeugelektrik und Mathematik.

Nähere Auskünfte und Einschreibungen täglich in der Zeit von 17 bis 19 Uhr im Sekretariat der Technisch-gewerblichen Abendschule, Wien 4, Plößlgasse 13, Telephon 65 35 50. Schulbeginn war am 2. September 1974.

Aufgabe und Ziel der Technisch-gewerblichen Abendschule ist es, Gesellen und Facharbeiter, die an der Erweiterung der in der Praxis bisher erworbenen Kenntnisse Interesse haben, eine theoretische und praktische Weiterbildung nach neuesten Methoden zu bieten. Das erworbene Wissen soll die Schüler befähigen, als mittlere technische Führungskräfte in gewerblichen oder industriellen Betrieben tätig zu sein. Die Schüler der Lehrgänge mit Öffentlichkeitsrecht erhalten zum Abschluß ihrer Studienjahre nach Ablegung einer Abschlußprüfung ein staatsgültiges Zeugnis.

30th Pugwash Conference
Breukelen, Netherlands, 20-25 August 1980

REPORT OF THE MEDICAL WORKING GROUP

AS DOCTORS OF MEDICINE AND SCIENTISTS IN HEALTH-RELATED FIELDS FROM MANY COUNTRIES PRESENT AT THE 30th PUGWASH CONFERENCE INCLUDING: BRAZIL, CHILE, CZECHOSLOVAKIA, EGYPT, FINLAND, FRANCE, KENYA, THE NETHERLANDS, NIGERIA, POLAND, U.K., U.S.A., U.S.S.R., AND VENEZUELA, WE ISSUE A WARNING, BASED ON MEDICAL AND OTHER SCIENTIFIC DATA, THAT SHOULD BECOME WIDELY KNOWN:

1. THAT MEDICAL DISASTER-PLANNING FOR A NUCLEAR WAR IS FUTILE.

   A nuclear war would result in human death, injury, and disease on a scale that has no precedent in history, dwarfing all previous plagues and wars. There is no possible effective medical response after a nuclear attack -- in one major city alone, in addition to the hundreds of thousands of sudden deaths, there would be hundreds of thousands of people with severe burns, trauma, and radiation sickness -- all demanding intensive care. Even if all medical resources were intact, the care of these immediate survivors would be next to impossible. In fact, most hospitals would be destroyed, medical personnel among the dead and injured, most transportation, communication and energy systems inoperable, and most medical supplies unavailable. As a result, most of those requiring medical attention would die.

   Medical problems that would be minor and curable in normal times -- infections and fractures for example -- would prove fatal for many. Numerous deaths would also occur from the interaction of multiple, simultaneous injuries which would be trivial if each occurred singly. Large numbers of those who escaped an acute death would suffer mutilating injuries. Furthermore, under the conditions of rampant chaos and terror, the incidence of psychiatric disorders would sharply rise. The risk of long term effects, such as cancer, would increase during their entire lifetime for many survivors, and possibly for their offspring as well.

2. THAT EFFECTIVE CIVIL DEFENCE AGAINST A NUCLEAR ATTACK IS IMPOSSIBLE.

   Bomb shelters in cities under nuclear attack would be useless owing to the blast, heat, and radiation effects. Shelters as far as ten kilometers from the centre of even a one megaton surface nuclear explosion would become ovens for their occupants -- the great surface fires would cook and asphyxiate them. At greater distances, shelters would provide only temporary protection against the high levels of radioactive fallout. In a nuclear war, one would emerge from a shelter into an environment that was a nightmare -- water would be undrinkable, food contaminated, and the economic, ecologic, and social fabric, on which human life depends, destroyed. For the survivors, the risk of epidemics would be great, as a result of: the unburied human and animal corpses everywhere; multiplication of viruses, bacteria, fungi, and insects, which are highly resistant to radiation; and the high sensitivity to radiation of the human body's ability to fight infection.

IN SUM, THERE ARE NO DEFENCES AGAINST THE LETHAL EFFECTS OF NUCLEAR WEAPONS, AND THERE IS NO EFFECTIVE TREATMENT FOR THOSE WHO INITIALLY SURVIVED A NUCLEAR ATTACK. UNDER ALL CONDITIONS, MEDICALLY, NUCLEAR WAR WOULD BE AN UNPARALLELED CATASTROPHE.

AS DOCTORS OF MEDICINE AND SCIENTISTS IN HEALTH-RELATED FIELDS, WE CONCLUDE, THEREFORE, THAT NUCLEAR WEAPONS ARE SO DESTRUCTIVE TO HUMAN HEALTH AND LIFE THAT THEY MUST NEVER BE USED. PREVENTION OF NUCLEAR WAR OFFERS THE ONLY POSSIBILITY FOR PROTECTING PEOPLE FROM ITS MEDICAL CONSEQUENCES. THERE IS NO ALTERNATIVE.

26th Pugwash Conference
"Disarmament, Security and Development"
Mühlhausen, German Democratic Republic, 26-31 August 1976

NUCLEAR RISKS AND SAFEGUARDS

Theodore B. Taylor
Princeton University

Presented at the National Energy Forum
at the University of Akron
Akron, Ohio
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The main subject of this talk is the safeguarding of nuclear facilities and nuclear materials against purposeful abuse for destructive purposes, whether by terrorists or other types of criminals, or by national governments. I am convinced that new actions by the nuclear industry, by various levels of government in the United States, and by multinational and international organizations could reduce such risks substantially below what they would be if the actions are not taken, and with a high sense of urgency. But I am also convinced that the risks of purposeful nuclear violence cannot be reduced absolutely to zero. To view these risks in perspective, therefore, it is necessary also to consider energy alternatives to nuclear fission, not only in terms of economics and technical practicality, but also in terms of environmental impact, risks of accidents, international political and military stability, and a number of other factors.

As has been clear from this series so far, all forms of energy technology, especially when used on a large scale, carry with them some risks. Mining of coal or uranium, or extraction of oil or natural gas can kill or disable people, and pollute the environment. Combustion of fossil fuels causes sickness and regional and possibly global

changes in climate, changes that, conceivably, may lead to catastrophic expansion or melting of arctic masses of ice. Nuclear power plants cores, though they cannot in any sense explode like an A-bomb, can accidentally melt and release dangerous quantities of radioactive materials. Nations can divert nuclear fuels from peaceful purposes to stockpiles of nuclear weapons that they may sometime use in war. They can also "divert" coal or petroleum products for making chemical explosives and ammunition. Terrorists or extortionists may someday use fission bombs made with stolen plutonium to serve their purposes. They now use bombs made from fossil fuels. Even solar energy, if collected on a large scale in areas that normally reflect much of the incident sunlight, may regionally change the heat balance in ways that make regional weather more unstable.

I contend that no group of people in this country or any other knows as much as should or could be known about the risks and possible benefits associated with any major present or prospective source of energy to be able to formulate an evidently sensible energy policy for either short range or long range implementation. When we consider coal, or petroleum, or natural gas, or fission, or fusion, or solar or geothermal or ocean thermal energy, we simply don't know what large scale further or new development of any of these will do to our environment, our economy, and our social structure, all within very wide limits of uncertainty. These uncertainties can never be reduced to zero, nor can the risks associated with any energy source. But I am convinced that we must do a great deal more than we are now doing or planning to do, to try to reduce these uncertainties, and then set forth our energy policies accordingly, or run high risks of doing irreversible economic, environmental, and social damage on a very big scale. The setting up of state, national, and international programs to assess the impact of large scale implimentations of each of several dozen different types of energy systems, from initial extractions through the ultimate disposal of waste heat, should be undertaken with an extremely high source of urgency. I have estimated that an allocation by the Energy Research and Development Administration of a total

of approximately $1 billion for the next five years, for this purpose, would be reasonable at the national level.

I shall now present a brief overview of some of the risks of purposeful abuse of nuclear materials and facilities for destructive purposes and of actions that could reduce these risks substantially. Various technical and non-technical aspects of this subject are covered in much greater detail in a number of recent publications.[1-9]

Given roughly ten kilograms (roughly twenty pounds) of reactor-grade plutonium oxide or about twenty kilograms of highly enriched uranium oxide, and using information that is widely published and materials and equipment available from commercial sources, it is quite conceivable that a criminal or terrorist group, or even one person working alone, could design and build a crude fission bomb that could be carried in a small automobile and that would be likely to explode with a yield equivalent to at least 100 tons of high explosive. Such an explosion in an especially densely populated area, such as lower Manhattan, could kill more than 100,000 people.

More efficient, reliable, higher yield, and compact nuclear explosives for military purposes could be designed and built by any country that has reactor grade plutonium within its borders, using information and equipment that is generally obtainable worldwide. As long as five major nuclear weapons powers continue to behave as though they feel more secure with nuclear weapons than without them, I think we can expect other countries to follow suit. Technically, at least, just about any country that really wants nuclear weapons can have them, one way or another.

Plutonium, if dispersed in micron-size or smaller particles suspended in air, could also be used as means for causing large numbers of human casualties and considerable property damage in a densely populated enclosed area. As little as a few grams of plutonium more or less uniformly distributed in the air inside an office or residential building area of several thousand square feet for fifteen minutes could deliver an inhalation dose to the occupants that would be likely to cause death from cancer some 10 to 30 years later. Dispersal of plutonium in <u>outside air</u>, on the

other hand, is likely to require considerably larger amounts of plutonium to lead to the same number of eventual fatalities as in an enclosed area. In either case, however, the potential threat of dispersal of plutonium in populated areas appears to be substantially less than the potential threats of use of any of a large number of dispersed, poisonous chemical or biological agents or radioactive materials other than plutonium for blackmail or terrorist purposes.

Nuclear power plants, shipments of spent fuel discharged from power plants, nuclear fuel reprocessing plants, and high level radioactive waste storage facilities all have sufficiently large inventories of radioactive materials so that, if released and dispersed in populated areas by acts of sabotage, they could produce large numbers of human casualties and property damage. Studies of these types of risks have been underway for some time in the Energy Research and Development Administration (ERDA). Much of the substance of these studies is classified and is likely to remain so. I do not want to give the impression, however, that these studies are classified because the risks appear to be especially high, and difficult to reduce substantially. On the contrary, I find it difficult to conceive of ways of sabotaging nuclear facilities or shipments in ways that would cause as much damage as the release of relatively accessible chemical or biological poisons, or the sabotage of some types of non-nuclear facilities containing large quantities of chemical explosives or combustibles.

Of these types of risks associated with nuclear power systems, the ones I am most concerned about are the first two, that is, the use of stolen or diverted plutonium or highly enriched uranium in nuclear explosives for terrorist or other criminal purposes or by countries that want to join the nuclear weapons club. I shall therefore concentrate on these types of risk, and what can be done to reduce them, in the rest of my talk.

Although the present rate of production of plutonium in U.S. power reactors is already very large--more than 10,000 kilograms per year--no commercial nuclear fuel reprocessing plants for separating this plutonium from fission products and uranium are operating in the U.S., nor are any expected to start operations for at least several years. Until this happens,

the plutonium in the unprocessed fuel will not only be very dilute, and in a form not usable in fission explosives, but also will be impressively self-protecting because of the intense, highly penetrating radioactivity of the contained fission products. This situation will change markedly when fuel starts being reprocessed, and the separated plutonium is extracted and stored as plutonium nitrate solution. The chemistry for conversion of this solution to plutonium oxide, which could be used directly in a fission bomb, is straightforward and widely published. Since even minute quantities of plutonium are toxic, especially if inhaled, such an operation can be done safely only if people working with the material are protected from the plutonium by an air-tight barrier or by inhalation masks. But heavy shielding is not required.

The time at which any commercially extracted plutonium nitrate will be converted to plutonium oxide powder, for subsequent incorporation into fresh fuel for plutonium recycling, is uncertain. It depends to a large extent on the timing of decisions by the Nuclear Regulatory Commission (NRC) concerning additional safety and safeguards related regulations that may be imposed on recycled plutonium. The earliest possible time at which plutonium may be routinely recycled in the U.S. is about 1980, and this may well be delayed into the mid 1980's. In Western Europe and Japan, however, it is quite possible that routine recycle of plutonium may start sooner than in the United States.

Contrary to rather widespread belief, separation of plutonium from irradiated nuclear fuel, and its subsequent incorporation into nuclear weapons suitable for military purposes, is not potentially beyond the capability of most countries. A commercially competitive nuclear fuel reprocessing plant that produces separated plutonium and uranium that meets the stringent quality control specifications required by the nuclear industry is a highly complex, sophisticated, several hundred million dollar (at least) facility. But a reprocessing facility designed to extract plutonium for only nuclear weapons could be considerably smaller, simpler, and less expensive. It is possible to describe such a facility in a form

that would require only a few months for construction, and an operating crew of less than a dozen appropriately skilled people, using information that is widely published, and materials and equipment that are commercially available worldwide.

Until very recently and, as far as I can determine, through the present time, U. S. safeguards applied to commercial plutonium and highly enriched uranium are not adequate to prevent theft by heavily armed groups with resources and motivation comparable to the Brinks gang and other groups of professional criminals that have carried out successful major robberies in the past.[10] Though not routinely recycled in power plants, plutonium for R&D purposes is now stored and transported in substantial quantities, annual shipments amounting to at least several hundred kilograms per year. Systematic studies are now being carried out by NRC, however, to determine the comparative costs and benefits of a wide variety of possible more stringent physical security and materials accounting measures. These studies are likely to provide much of the information required for further NRC decisions concerning regulations.

I have no evidence that physical security safeguards for fission product-free plutonium or highly enriched uranium are significantly more stringent in foreign countries than in the United States. Something like fifty countries either now have or have announced plans for building power reactors that produce several hundred kilograms or more of plutonium per year. Nuclear theft is therefore clearly an international risk. The International Atomic Energy Agency has responsibilities for international safeguards to detect diversion of nuclear materials from peaceful purposes to the illicit construction of nuclear weapons, but is not responsible for physical security measures to prevent theft. This is left to national governments to do. The IAEA has, however, made recommendations for such physical security measures.

A guiding principle, called the "principle of containment" has been proposed for the design and assessment of security systems for the protection of special nuclear materials.[11] According to this principle, all materials that could be used to make fission explosives and that are

used, produced, or processed in the nuclear power industry would be contained in areas circumscribed by a well defined set of barriers. These barriers would exclude unauthorized persons. A minimum number of authorized channels for the flow of such materials through the barriers would be established. All other channels would be continuously monitored, by means of the best available technology, to detect any unauthorized flow of materials. In addition to the physical barriers, and other deterrents to theft, a network of alarms, communications, and security forces would be set up in such a way that no credible attempt to remove nuclear materials from authorized channels, whether by employees, outsiders, or a combination, would be successful.

Some of the specific security measures that might effectively by used in applying this principle and that are under study by NRC are the following:

- Use of specially designed motor vehicles and shipment vans to protect shipments of special nuclear materials from rather massive and sophisticated attempts to penetrate the van or commandeer the vehicle for sufficiently long times to allow large law enforcement, or even military forces to arrive at the scene of an attempted hijacking before it can be completed.
- As an alternative to the above measure, the use of rail transport of all special nuclear materials inside shipping containers similar to the roughly 100 ton containers contemplated for use in shipping irradiated fuel from reactors to reprocessing plants.
- Colocation of fuel reprocessing and fuel fabrication plants, to avoid shipment of concentrated, fission product-free special nuclear materials between the two.
- Dilution of separated plutonium by slightly enriched or natural uranium at the output stages of reprocessing plants, to produce the mixed oxide fuel materials before transfer to a fuel fabrication plant. In equilibrium, the concentration of plutonium in mixed oxide fuel would be about 0.6% to

1% if all refabricated fuel for a light water reactor power system consisted of mixed oxides.[12] This would not only lead to a requirement for chemical separation of the plutonium from stolen fuel material before it could be used for making fission explosives, but also, and perhaps more importantly, increase by about a factor of 100 the total weight of fuel material that would have to be stolen to provide a given weight of contained plutonium. These advantages, from a physical security point of view, must be weighed against the likely additional costs of fabricating mixed oxide fuels, compared to the current plan for using much higher concentrations of plutonium (from 3% to 7%) in a much smaller fraction of the fuel rods contained in a reactor fuel assembly. The high toxicity of plutonium generally requires the use of air-tight process enclosures, which adds substantially to the cost of fabricating fuel rods that contain plutonium.

- Recycling of fuel with as high a concentration of plutonium as possible through a small fraction of the power plants that produce plutonium--essentially the opposite of the preceding possibility. The purpose in doing this would be to reduce to a minimum the number of power plants that receive fuel that contains plutonium, as well as the total number of shipments of plutonium. Under such conditions, all plutonium could be recycled, but less than half, and perhaps as few as about one fifth of all power plants would use recycled plutonium. The value of plutonium produced in reactors that did not receive fuel with recycled plutonium could be exchanged for money or for discounts on fresh uranium fuel.
- The establishment of a Federal protective service for the explicit purpose of safeguarding nuclear materials in transit and also at fixed sites. This possibility has been assessed by the Nuclear Regulatory Commission and, for reasons I find unconvincing, has been at least temporarily discarded.

A common reaction to these and other proposed major new safeguards measures is that, taken together, their costs are likely to make nuclear power economically uncompetitive with alternative sources of energy. Preliminary studies of the capital and operating costs of considerable more effective safeguards than those called for by present regulations, however, strongly suggest that this is not the case. One such set of estimates, for example, leads to the conclusion that the operating costs of a rather massive security system applied to light water reactor fuel cycles, with routine recycle of plutonium, would correspond to less than 1% of the cost of nuclear electric power produced by the system.[13] The total number of physical security personnel employed for the safeguarding of an 80,000 MW(e) light water reactor fuel cycle, with 20 separately sited power plants, was taken to be about 800, of whom approximately 150 would be on duty at any particular time.

Thus, from technical and economic standpoints, it appears to be possible to design physical security systems that would require skills and resources greater than those used for major thefts of valuables in the past for successful theft of potentially dangerous quantities of special nuclear materials. Whether or not the institutional and political obstacles confronting efforts to implement such effective safeguards against theft, by criminals or terrorists worldwide can be overcome within the next few years, however, remains to be seen.

As for preventing nations that do not now have nuclear weapons from getting them, I am much less sanguine, even from a strictly technical and economic point of view. I'm afraid it is becoming a fact of life that just about any country that really wants nuclear weapons will be able to have them, one way or another, whatever forms international nuclear power take, and whatever is done to try to prevent further national nuclear weapon proliferation. Nuclear power plants can be used to produce plutonium for nuclear weapons if the plants are not safeguarded effectively, or if a nation is willing to break agreements under what it believes to be high pressures to maintain or increase its national security. This option will persist even

if all plutonium is extracted and refabricated in internationally operated regional centers. If a country has no nuclear reactors, it will have at least three options for acquiring nuclear materials for weapons: First, construct a plutonium production reactor using natural uranium and either heavy water or pure graphite, using information that is widely published and skills that can be developed or bought. Second, build a facility for enriching indigenous uranium. This is now very difficult and costly, but likely to become much less so as time goes by. Third, the country could arrange to steal high enriched uranium or plutonium from some other country.

Nevertheless, it is clear that actions could be taken to make national nuclear weapon proliferation more immediately detectable, and more difficult and costly than without taking new actions internationally. Among such possibilities are the following:

- IAEA technical safeguards to detect transfers of nuclear weapon materials from where they are authorized to where they are not, in very short times after such diversion, are technically possible, at very low costs compared to the costs of nuclear power.
- By international agreement, the separation of any plutonium from spent reactor fuel could be postponed for a number of years, to give the world time to determine, in a concerted way, how best to deal with plutonium in the long run. This would not prevent national proliferation, but would require a national decision to build a reprocessing facility to use plutonium made in its power plants. This will take some time, though not long, and is likely to be a visible act, if only through national intelligence systems. Until plutonium breeder power plants exist in substantial numbers, the economic penalty for not recycling this plutonium would appear to be a few percent of the cost of nuclear power, at most. Another major benefit of not separating plutonium from spent fuel is that it would avoid the presence of plutonium not protected by massive gamma radiation levels,

at all points in the fuel cycle (as it is now), greatly reducing the risks of theft of the plutonium by criminals.

- An alternative to recycling plutonium in low enrichment reactors and, later, in plutonium fast breeders, is to shift gradually to the ^{233}U-thorium cycle. From a proliferation standpoint, this would offer the opportunity for "denaturing" the ^{235}U or ^{233}U - that is, mixing it with enough ^{238}U to keep the enrichment below about 20%, rendering it useless for any practical nuclear explosions, unless it is further enriched. This possibility is excluded for plutonium, since no "denaturing" isotope of plutonium will exist in significant quantities. If the concentration of fissile material (^{235}U or ^{233}U) with respect to thorium is of the order of 5% or so, such a fuel would produce substantially more ^{233}U than plutonium. The ^{233}U could be separated at effectively safeguarded regional centers, and recycled in fresh fuel for national power plants. The relatively small amount of plutonium could be consumed in reactors at the regional center, and not nationally recycled. Such a system would allow recycling of produced nuclear fuels, but not as weapons - grade material, and the relatively small amount of produced plutonium would be highly self-protecting, in spent fuel, against theft by criminals.

  If such a cycle were eventually to be attractive from a fuel reserves point of view, a method for achieving a self-sustaining cycle with respect to thorium would be required. The presence of ^{238}U in this cycle, for denaturing purposes, will probably not allow the converted light water or heavy water reactors to be true breeders. Highly preliminary estimates suggest that the overall conversion ratio of the thorium cycle in thermal neutron breeders or conversion reactors would be reduced by about 0.1 by including the ^{238}U in the fuel mix. There are several possibilities for producing enough "makeup" U^{233} from some additional source,

however, to make the overall cycle self sustaining. One is to use plutonium fast breeders of the regional centers to convert plutonium in the cores to ^{233}U in thorium blankets. Another, more speculative possibility is to use neutrons from fusion reactors to make ^{233}U in a thorium blanket. This may conceivably become economically attractive before fusion for direct power production does.

- Still another possibility would be an orderly phase out of nuclear power, relying on alternative energy sources. From a long range point of view, coal and solar energy are probably the only practical non-nuclear alternatives. The former is fraught with very troublesome environmental issues, as well as being very non-uniformly distributed. The latter has yet to be proven out commercially for widely distributed heating and cooling applications, and is even more in doubt for process heat and electric power production. One can expect major technological advances on both fronts within the next decade, however.

In short, whatever may now be the risks of nuclear weapon proliferation, by countries or by non-national groups, they will not go to zero whatever is done to control them. But I have a strong conviction that we can and should delay firm commitments to a long range plutonium economy until the possible alternatives are thoroughly examined.

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PUGWASH

A HISTORY OF THE CONFERENCES ON SCIENCE AND WORLD AFFAIRS

J. ROTBLAT

SECRETARY-GENERAL
PUGWASH CONTINUING COMMITTEE

1967

CZECHOSLOVAK ACADEMY OF SCIENCES

distribution of the participants of the First Conference was as follows: seven from the U.S.A., three each from the U.S.S.R. and Japan, two each from Great Britain and Canada, and one each from Australia, Austria, China, France and Poland. Ruth Adams (Rabinowitch's assistant in editing the Bulletin of the Atomic Scientists) and Burhop helped with the secretarial work. In the absence of Russell, whose age did not permit him to make a long journey but who sent a stimulating message, Powell presided at the plenary sessions. The meetings were conducted in English and Russian, with Vladimir Pavlichenko, Topchiev's secretary, acting as interpreter.

Although the first formal session of the Conference did not start until the afternoon of July 7, many of the participants arrived earlier and they spent the whole of July 6 on informal talks. Leo Szilard took a leading part in these talks, with his recollections of the first attempts by scientists in the U.S.A. to influence the government's policy in relation to the discovery of atomic energy, and the subsequent actions and attitudes of scientists towards the deployment of the first atom bomb. Several of those present at Pugwash had taken an active part in the development of the atom bomb, but for many of the participants these first-hand accounts provided a useful background to the discussions at the Conference.

The programme of the Conference was essentially the same as the one which Haddow, Rabinowitch and Rotblat had prepared for the Parliamentarian Conference in London in 1955. After a general discussion at the first plenary session, the Conference divided into three committees, corresponding to those set up at the 1955 Conference, viz. (1) hazards arising from the use of atomic energy in peace and war; (2) control of nuclear weapons; and (3) the social responsibility of scientists. Most of the work of the Conference was carried out in these committees which met in parallel and sat till very late at night. At the plenary sessions, which met in the mornings or afternoons, there were general discussions on the same topics, usually based on papers presented by participants.

Most progress was made by the first committee, on radiation hazards. At that time little was yet known about the physical and biological processes associated with the testing of nuclear weapons, and the findings of this committee probably comprise the first agreement to be reached between scientists from East and West on the effects of tests. The fact that the topic of discussion for this committee was largely technical in nature, no doubt explains the large measure of agreement even on matters of detail. By contrast, the second committee, on the control of nuclear weapons, very quickly came to the conclusion that the problem was too complex and controversial to enable the members to reach agreement on specific proposals in the time available. The committee had, therefore, to be content with outlining the general objective of disarmament, leaving the working out of a detailed plan to future meetings. This topic became in fact the major item of discussion at subsequent Pugwash Conferences. The third committee, on the social responsibilities of scientists, met with surprising success, considering the divergence of views held by scientists on this subject. The committee summarized its findings in the form of eleven items of common belief; subsequently these became the basis for the Vienna Declaration (§ 10).

All three committees prepared reports which were discussed at the plenary sessions on the last day and incorporated in the statement published at the end. The statement (the text of which is enclosed as Appendix 2), was adopted by all present, with the exception of John Foster of Canada and Leo Szilard. The latter, the most stimulating of the participants, was also the most individualistic, and for these reasons he often abstained from conference statements, although substantially helping in their preparation.

§ 6. Significance of the First Pugwash Conference

The fact that a long statement, dealing in some detail with the most controversial issues of the day, and setting out the role and responsibility of scientists, was accepted almost unanimously by such a diverse group of scientists, was in itself of great significance. This was probably the first time that a truly international conference, organized by scientists, with participants from East and West, was convened not to discuss specific technical matters, but the social implications of scientific discovery. In the state of political distrust and tension which existed at the time, it seemed an even chance that the Conference might break up in disagreement. Indeed, after the preliminary exchange of views, it appeared that there was a considerable divergence of opinion between scientists from East and West, even on purely technical matters, such as the evaluation of radiation hazards. However, it soon became clear that many of these apparent differences resulted from different ways of looking at the same problem. Since scientists are used to rational discussions and are ready to accept a sound argument, and - above all - since they came to the Conference as individuals and not as representatives of governments, it was not long before agreement was reached on many issues. On some issues it was evident that agreement could not be reached without a great deal of further intense study. What the Conference did accomplish in relation to these items was a definition and outlining of areas of divergence. A certain measure of mutual understanding of each other's opinions was also achieved.

The character of the Conference itself helped greatly in this respect. Unlike other conferences whose participants meet only in formal sessions, here all members lived together, ate together, and talked to each other continuously, in small or large groups. The informal talks proved to be of immense value in helping towards a better understanding of each other's views. The generous hospitality of the host, Cyrus Eaton, and the stimulating conversations with the hostess Mrs. Anne Jones (who later became Mrs. Eaton), all contributed to the setting up of a friendly and congenial atmosphere. This was, of course, facilitated by the fact that many participants had known each other professionally if not personally, and had respect for each other's scientific integrity.

This first Pugwash Conference proved that scientists have a common purpose which can transcend national frontiers without violating basic loyalties. It had shown that by virtue of their training and their knowledge scientists are capable of discussing objectively the complex problems which have arisen