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

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C O N T E N T S

PUGWASH EVENTS

STUDY GROUP ON EUROPEAN SECURITY

The second meeting of the Study Group on European Security was held in Hälsingborg, Sweden, from the 2nd to the 5th March, 1966. The meeting was organized by the Danish Pugwash Committee and was initially scheduled for Copenhagen; for practical reasons it was held in Hälsingborg.

The following took part: R. Sexl (Austria); V. Hajdu, L. Liska, T. Nemec, and A. Snejdarek (Czechoslovakia); D. J. Adler, I. Højme, O. Kofoed-Hansen, J. Wilhjelm (Denmark) H. Afheldt (F. G. R.); P. Hess, J. Peck, H. Wünsche (G. D. R.); J. P. Pronk, P. Valkenburgh (Netherlands); L. Reczei (Hungary); T. Opsahl (Norway); A. Klafkowski (Poland); R. Björnerstedt and A. Sparring (Sweden). The Secretary-General also attended.

The work of the meeting centred around the three main topics of the Group: the German question, European Security, and Integrational Processes in Europe.

A number of papers on all of these topics were prepared and discussions on them took place in an open and cordial atmosphere. Arising out of these discussions, ideas have emerged for new reports to be prepared for the next meeting.

It was agreed that the Group should meet next on 20th-22nd May, in Geneva, and that the final meeting before the Sopot Conference be held in Poland just prior to the Conference.

INTERNATIONAL SUMMER SCHOOL ON DISARMAMENT AND ARMS CONTROL

The Italian Pugwash Committee is organizing an International Summer School on disarmament. It will be held at the Villa Falconieri, Frascati, Rome, from the 13th to 25th June, 1966.

The School is intended for people who either already have a professional interest in this field or who, being specialist in related fields, would like to play a more active and technically competent role in this direction. It will have an inter-disciplinary character, and extend its subject matter from the technical and scientific aspects of the problems to their sociological and political implications. The subject matter of the School will be:

Effects of nuclear weapons and nuclear war; armaments and strategy in the nuclear age; history of disarmament negotiations and the present situation; the problem of inspection and controls; peace keeping and international law; sociological and psychological problems of nuclear war; economic aspects of disarmament.

Applications for participation should be addressed to the Secretary, Prof. C. Shaerf, Laboratori Nazionali Frascati, Casella Postale 70, Frascati (Roma).

15th PUGWASH CONFERENCE ON SCIENCE AND WORLD AFFAIRS

Addis Ababa, 29th December 1965 - 3rd January 1966

REPORT OF WORKING GROUP 4

SPECIAL PROBLEMS OF DEVELOPING COUNTRIES

1. Introduction

1.1. Development is a multidimensional process in which natural and social scientists must work together to obtain a full understanding of its problems and to arrive at a meaningful strategy. The natural scientists must evaluate a nation's resources and determine feasible technologies for their exploitation. The social scientists analyse these possibilities, in the light of the nation's economic resources, test the economic and social consequences of alternative technologies, and calculate probable costs and benefits from any suggested development decision. Both natural and social scientists are expected to put forward to the politicians the direct and indirect costs of various alternative choices. The responsibility of the politicians to make a choice from amongst alternatives is clear.

1.2. Developing countries need to establish the following lines of policy for rapid and orderly progress:

in politics: an efficient system of administration which can win the respect and loyalty of the citizens and can mobilize their efforts and enthusiasm;

in economic policy: a development plan that is based on scientific research and social reform, and has the capacity to make the most productive use of resources;

in social policy: a programme that ensures equality of opportunity for education and social welfare, and an equitable distribution of income;

in international relations: a policy of non-alignment.

There are often possible conflicts between rational economic decisions and social forces, and between the economic realities of international economic interdependence and the pursuit of non-alignment. Efforts must be made to solve these problems through a pragmatic rather than a doctrinaire approach.

2. International Aspects of Development

2.1. The relaxation of international tensions, with the subsequent reduction in armaments, would not only lead to the creation of better conditions for rapid progress in the developing nations, but also would make possible the transfer of much needed resources, both

financial and physical, from the destructive purposes of armaments to the constructive task of world development.

2.2. The needs of developing countries for international aid and technical assistance will continue for years to come. Donor countries should: (a) give greater consideration to the type and quality of their assistance in the light of developing countries' needs: (b) expand their capacity to provide the right kind of technical assistance skills by arrangements with government agencies, universities, institutions, and firms: (c) develop training facilities designed to meet the specific requirements of developing countries.

2.3. Development is a fundamental structural change in attitudes, values and way of life. The people of the developing countries must want to take initiatives, to make decisions and to participate in the development effort. These can be brought about only by internal efforts. A marginal addition of experts, through international aid and technical assistance, to a developing country's stock of skilled manpower is not a magic formula for development. International assistance will be useful only if the right climate and structure of change are being established in the country.

2.4. One of the most important elements of economic and technical assistance to the young states is the transfer of the rich industrial and technical experience accumulated by the developed countries. This includes transferring industrial equipment, constructing industrial enterprises, providing technical documentation, and teaching national cadres. In the past such transfers have rarely brought the full gains they are capable of. In part at least this has been due to the failure of foreign consultants, particularly those with equipment to sell, to evaluate projects in terms of a developing countrys' needs, technological equipment and economic costs.

2.5. Because the production problems of the developed countries often differ sharply from those of developing countries, the latter cannot afford simply to rely on the technical and economic advice of the former. They need to evaluate industrial projects independently from their own point of view and to adapt existing industrial technology to their own requirements. Aiding countries should recognize that in the short run investment in building up the indigenous expertise of developing countries is perhaps the most productive form of assistance they can give; in the long run it will contribute to the world pool of science and technology.

2.6. The growth process in fast developing countries is almost always accompanied by increasing deficits in their balance of payments. The increasing inability of these countries to pay for the capital and industrial goods they need is aggravated by the unfavourable terms of trade they are facing.

Prices of exportable raw materials and agricultural products from developing countries are falling, and in the long run will probably continue to fall in relation to the price of manufactured goods.

Efforts to remedy these conditions must be supported at the highest levels,

and a compensatory machinery must be brought into operation through existing international institutions or new ones, established solely for this purpose.

3. Development Planning

3.1. Planning agencies in many developing nations have tended to shy away from positive development action and to concentrate on the aggregate profile of the economy. As a result, the absorption of advanced technology is slow, and the evaluation of indigenous technology, to take into account local comparative advantages and the scarcity and abundance of the different factors of production, has not taken place.

3.2. Even when the overall objectives and targets for the national economy have been charted, and the permissible region of action has been defined in terms of the political and social realities, the decisional elements of development action remain to be tackled. To supplement overall plans, and to ensure the application of technology in the preparation of development projects, the establishment of appropriate institutions on a national or regional basis is of great importance. The functions of these organizations would be:

(a) to assess the resources of the country or region and analyse the possibilities of their augmentation;

(b) to determine the ways and means of exploiting these resources in the most suitable technological processes and in a manner capable of producing maximum benefits;

(c) to draw up the blueprint of the development action required, pursue its implementation and follow up its progress. A successful building of institutions to carry out the entrepreneurial function is a prerequisite for development.

3.3. The Asswan Development Centre may provide a useful example. The Asswan Project has operated on the thesis that, to be fully productive, development activities must be based on factual, techno-economic research. The first steps taken by the Project were the organizing and staffing of seven development centres - in minerals, industry, agriculture, water resources, human resources, transport, and rural and urban planning. Each of the centres was responsible for surveying, cataloguing and evaluating the resource potential in its sector, for analysing present methods and for preparing detailed development projects to make optimum use of those resources which held the greatest productive promise.

4. Industrialization

4.1. Industrialization is vital for raising standards of living, for providing full employment and for changing the social and political environment and structure in the developing countries. Its progress in the past decade in most of these countries has been disappointingly slow. The growth of industry has often in the past failed to be integrated with the resources, mineral and agricultural, of a developing country, for the sake of the relatively easy production of import-replacing consumer goods behind high tariff walls. In small countries with limited markets this has led to public or private monopolies,

or oligopoly group production at low levels of efficiency and high cost. This has failed to spread the gains of industrialization broadly among the population and has not led to self-generating industrial growth. In general, this has again usually been the result of inadequate evaluation of projects from a developing country's point of view, and in particular there has been a failure to consider the needs of increasing the supply of agricultural inputs such as fertilizers, pesticides and agricultural implements, and a lack of consideration for the processing of agricultural products.

4.2. Small countries face particularly grave problems in their efforts to industrialize, because their human and physical resources and their markets are often inadequate for modern large-scale industries. In these countries a concentration of initial effort in one or a few industrial areas and the formation of regional resource pools and market integration agreements, whenever technically and economically practicable, could speed up industrial growth and help to spread its benefits.

4.3. Industrialization is not, however, simply a matter of technology and economics. It is in itself a process of educating and training the reservoir of underemployed labour migrating into urban centres. Production inefficiency in the first stages of newly established industries may be compensated by the gain in training workers and managers. Inadequate attention to the need of changing the social outlook and habits of agricultural societies, both in potential entrepreneurs and in the labour force, has been perhaps as important a factor in the failure to develop industries quickly as technical and economic shortcomings. Speedy and fundamental changes in education are needed.

4.4. Modern industrial growth inevitably leads to urbanization. Although there are no short cuts to the creation of functional and pleasant town and cities, increases in productivity make their creation possible, and they can then greatly enrich the life of a nation and its people.

4.5. Political factors cannot be ignored in industrial growth, for industrial development has both immediate and long-term implications for the political structure of a country and vice versa. Thus, both social and political issues must be taken into account in planning and promoting industries. It is clear that technical and economic optima may not always coincide with social and political aims.

5. Food and People

5.1. A major crisis confronting mankind for the balance of this century is the need to provide food for the world's people. We are already faced with the spectre of serious malnutrition, and hunger and starvation will increase unless we can rapidly raise food production to meet our needs. Even at the present very inadequate levels of nutrition there will probably be an overall food deficit in underdeveloped countries of fifty million tons (grain equivalent) by 1980, compared with twentyseven million tons in 1964-65. If nutritional levels are to be raised by 10%, which is essential to reduce the present serious malnutrition, the food deficit in 1980 will

be approximately one hundred and fifty million tons per year. These estimated deficits are based on the assumptions that the rate of population growth will somewhat diminish while present rates of increase in food production will continue unchanged. Even a 10% increase in nutritional levels would not be sufficient to overcome the most serious deficiency in the diet of the poor - the lack of high quality protein, that is, protein having the right proportions of amino acids.

5.2. What can be done to combat this tragic situation? We believe that the problem must be attacked on four fronts: increased production of food in underdeveloped countries; continued provision of food aid by countries with surplus productive capacity; the production of dietary supplements containing high quality protein and other essential components now lacking in the diets of the poor; and human fertility control where it is needed.

If the underdeveloped countries are to reach self-sufficiency in food production by 1980 at least on a regional basis, and if a 10% increase in levels of nutrition is to be attained, production must rise by about 300 million tons, almost 50% above the 1965 production level of 650 million tons. In order to raise the production by this amount both the area under cultivation and yields per hectare must be increased. Additional land could be put under cultivation in South America and Africa, whilst in South and East Asia dependence must be placed on increasing yields.

5.3. The physical factors needed to increase yields are well recognized; sufficient water to meet the evapo-transpiration requirements of the crops and to maintain salinity control; chemical fertilizers; high yielding seeds; pest and disease control; improved agricultural practices, e.g. better seed bed preparation and soil conditioning made possible by improved farm tools and mechanization. What is not generally recognized is that all these inputs must be used in combination. Chemical fertilizers will give little benefit and may actually be harmful unless sufficient water is available at the right time. Only limited amounts of chemical fertilizer can be used on wheat or rice unless non-lodging high yielding crop varieties are employed. The high yields obtained with chemical fertilizers applied to improved crop varieties are an open invitation to pests of all kinds, and the yield increases cannot be retained for human use unless effective pest control measures are used.

5.4. Agricultural research is urgently needed in many fields. The important problems now lie in physiology, pathology, genetics, ecology and soil research. Tropical rain forests, until now used only for shifting cultivation, require special attention.

5.5. To increase the food production by 300 million tons it will be necessary to carry out an integrated programme of capital investment in fertilizer plants, irrigation development, production of improved seeds, pest control, mechanization and agricultural research and training. But fundamental social and economic changes will also be required. These include ownership of the land by the cultivators themselves; consolidation of smallholdings into viable plots through development of co-operatives and in other ways; adequate returns to the farmers for

their labour and investment; availability of consumer goods to the cultivators and their families; widespread dissemination of primary and secondary education; and vastly improved transport and communication. Among the capital investment required will be the construction of roads, effective storage facilities, processing plants to conserve perishable products and institutes of agricultural research and education.

5.6. We estimate that the capital investment required to increase production by 300 million tons of grain equivalent would be 80 thousand million dollars over the next 15 years, with a foreign exchange component of about 20 thousand million dollars. The value of the food produced from this investment would be about 31 thousand million dollars per year so that the capital output ratio would be 2.6. On the other hand, if production is not increased sufficiently, the cost of meeting the food deficit would be 60 thousand million dollars over the next 15 years, if there is no increase in the level of nutrition, and about 110 thousand million dollars with a 10% increase in nutritional levels.

5.7. A severe food shortage exists at the present time in parts of the underdeveloped world, most tragically in India. This shortage may continue for many years to come. It will be necessary, therefore, to continue food aid from countries which have an excess production capacity. Because actual food surpluses, in contrast to surplus productive capacity, in developed countries are being rapidly decreased, the character of food aid programmes must be changed. In the future it will be necessary to incorporate food aid as an integral part of overall assistance programmes from the developed to the under-developed countries.

5.8. We suggest that much greater use be made of multilateral mechanisms for this purpose. In this way it would be possible to gain a greater degree of co-operation from all producing countries to provide for greater stability and continuity in the programmes and, most important of all, to gain increased assurances that the receiving countries will use the funds obtained from the sale of imported foods to increase their own agricultural production.

5.9. About 2,400 million people now live in the less developed countries. Unless extensive fertility control can be attained in some of them, they will contain nearly 3,500 million human beings 15 years from now, an increase of 43% or 2.4% per year. This rapid rate of increase results in a very high proportion of children in the total population, approximately 45% under 15 years old, and hence a high dependency burden on the producing adults in the society. The rapid rate of increase in human numbers also means that even a relatively high rate of economic growth gives very little improvement in per capita income and, therefore, very little increase in ability to save for capital investment. Education, health and other services demand a larger proportion of the total national income than is the case in countries with a low rate of population increase and a relatively small proportion of children in the population.

5.10. Clearly the natural resources of the earth are sufficient to support a very much larger number of people than are now alive, but this will only

be true if technology and human effort can be combined with capital investment, greatly to increase agricultural and industrial production. The needed increases in production are severely inhibited by rapid rates of population growth. Experience with modern methods of fertility control is already being gained in several developing countries, and this makes it possible to have some confidence that the average rate of increase could be reduced below 2% per year over the next two decades, if an all-out effort were made in administration, organization and education. It must be remembered, however, that fertility control is a matter of individual decision by men and women, and the role of governments must be confined to encouraging and helping them to carry out these decisions. Of fundamental importance is the necessity to decrease rates of infant and child mortality so that parents can feel assured that their children will survive. Improvement in education and communication, and a rise in the status of women, are also necessary if a really adequate degree of fertility control is to be attained.

5.11. We wish to emphasize that fertility control is not one of the main solutions for changing the economic and social conditions of developing nations. It cannot materially reduce malnutrition, so that reliance must be placed on increased production in developing countries and aid from developed countries.

6. Protein and Nutrition

6.1. Human hunger in the world today is not only quantitative but also qualitative. Current vegetable production, even if successfully enlarged to supply necessary calories, provides, with the exception of some leguminous plant, products deficient in proteins of required quality. Not only does protein deficiency cause grave diseases, but it also reduces physical and mental activity, and consequently the efficiency required for economic and social development. The present deficit in developing countries is estimated to exceed 10 million tons of high-quality protein, and nearly 20 and 36 million tons for 1980 and 2000 respectively.

6.2. For many reasons, the classic production of animal protein cannot be the primary means of overcoming protein deficiency. Vegetative, fish, chemical, and microbic sources offer more promising opportunities. A major effort should be devoted to increasing the productivity of crops which are rich in proteins, such as soya beans, cotton seed, and peanuts. These, together with marine fish and possibly fresh water fish, should be processed as concentrates and used to fortify human diets, especially of children. Thorough study should be devoted to designing the most efficient and economical protein-rich dietary supplement, as well as to examining the best ways of processing these resources, especially fish, to make them digestible and tasteful.

6.3. In recent years new protein-rich sources have been developed in producing yeast cells, not only from sugar sources but also from crude petroleum. Protein production by yeast cells can be relatively easily developed as an efficient part of the usual industrial processing of crude petroleum. This source alone might economically provide millions of tons of high-quality protein. Countries from which petroleum is extracted and in which crude

petroleum is refined should, therefore, take steps to ensure immediate concentration on pertinent research, and inclusion of a scheme not only of preparing nitrogen fertilizers, but also of preparing proteins from yeast. All these methods, supplemented by production of specific amino acids (such as lysine and methionine), could help solve the problem of dietary deficiency in a relatively short time.

6.4. Other possible sources of high-quality protein include fish, particularly in artificial, newly-formed lakes and the use of wild mammals, especially from tropical regions, for meat production. For example, artificial lakes behind dams may provide new habitats for fish and, hence, form a future source of protein. Detailed and thorough ecological studies of these aquatic environments should be encouraged. Possible control of the chemistry of the water, the kinds and numbers of primary and secondary producers, and the adaptation of particular fish to the environment should be investigated.

Because large populations of game mammals are better adapted to their natural environments than are domestic stock, continued emphasis on utilization of native mammalian populations as a source of protein is strongly encouraged.

6.5. Education in the utilization of food is extremely important to a speedy improvement in nutrition.

7. Water development.

7.1. Increase and control of water supplies for irrigation agriculture, and multi-purpose programmes of river basin development for hydro-electric power, water supplies, flood control, navigation, improved fisheries, improved public health and tourism are dramatic and widely accepted types of economic development. We believe that these programmes could also be used to improve the relationships between nations. River basins recognize no national boundaries, and neighbouring countries can often gain great national benefits from integrated development of these common rivers. Specifically we recommend:

(a) a Nile valley authority or commission should be established, to serve two functions: a collection of meterological, hydrological and ecological data throughout the course of the Nile and its tributaries; and analysis and planning of schemes for increasing the beneficial use of the Nile waters. Eventually, if agreed by respective countries, an international agency to carry out these schemes could be formed to share the benefits and costs.

(b) it would benefit both India and Pakistan to join in the co-operative development of irrigation, hydroelectric power, and flood control in the Ganges-Brahmaputra basin. In this area some 150 million people now live at a bare subsistence level, and their numbers are rapidly increasing. For the most part they depend upon a single crop planted during the monsoon season, and during the long dry part of the year there is serious under-employment in this overwhelmingly rural region. Development of surface and underground water for irrigation would make it possible to grow two and perhaps even three crops

each year. This would double or treble agricultural productivity. Because the river flows are so enormous and so difficult to control the required capital investment would be very large, even though the expected ratio of benefits to costs would be very high.

The prospects and possibilities for such projects could be studied in co-operation with the United Nations and its specialized agencies.

7.2. Water management also involves the provision of a safe water supply for villages and towns. This in turn would be a most important contribution towards the control, and even the eventual abolition, of some infectious and parasitic diseases which now, in extreme cases, decimate whole people, especially children. Where these diseases do not lead to high mortality rates they undermine the mental and physical vitality of the people.

7.3. The problems of settling nomadic peoples often arise with changes in land and water use, and necessitate a profound change in social and economic adjustment which requires a great deal of attention.

8. Conservation

The mountains and valleys, the deserts and plains, the lakes and rivers, the animals and plants, in short, all the characteristic natural features of any country, are inseparable from its economy. As a means of maintaining these features, national conservation practices are essential. Financing of these practices might be facilitated by developing tourism and recreation based on the attraction of natural wild life and scenery.

Since the aims and goals of the International Biological Programme and International Hydrological Decade are devoted to problems of productivity and conservation, it is recommended that every effort should be made to co-ordinate and co-operate with both schemes and plans. Furthermore, all possible effort should be made to see that investigators in developing countries collaborate with colleagues in developed nations so that both can participate efficiently in solving the problems for all mankind.

REPORT OF WORKING GROUP 5

SECURITY PROBLEMS OF DEVELOPING COUNTRIES

Security problems in the developing countries and regions form an integral part of the world security problems. They are influenced by the latter and at the same time they influence, in no small measure, the security and peace of the whole world.

1. The Attitudes of Developing Countries towards Security Problems

As a result of eliciting the views of participants from developing countries, the Group concluded that the security of developing nations is gravely endangered by acts of interference, covert or overt, in their internal affairs, as well as by colonialism and neo-colonialism. Many developing countries had a frontier problem as a result of the division of tribes by boundaries drawn by the colonial powers. Every encouragement should be given to the peaceful settlement of such disputes. They felt that while there might be differences of psychological attitude in developing countries to military matters, the fundamental distinction between the different national policies derived from their assessment of whether there was a threat to security and territorial integrity or not. While some developing countries feel the need for defence forces of some scale, others, where there is no important external threat to security, feel they do not. A view was expressed that foreign military bases constitute a threat to peace and security of developing countries. On the other hand, all countries felt the need for police forces to maintain law and order. A participant from a developing country suggested that they were sometimes used for maintaining national unity. The present size of military forces in some areas, as for example in some Latin American countries, was questioned in relation to their internal and external needs.

The view was expressed that even though there was no immediate threat it is necessary for a country to maintain a certain level of arms to meet contingencies arising from external pressures. In some cases a country may be called upon to make provision for a contribution to a U. N. peace-keeping force, or some form of regional collective security, but this should not be used as a pretext to maintain unnecessarily large standing military forces. The question of scale is, therefore, an individual matter in the light of local circumstances, but it is clearly necessary to limit armaments. Economic development clearly must have first priority, but a substantial body of opinion felt that this could be endangered by inadequate security arrangements.

2. Economic Burden of Armaments on Developing Countries

The Working Group has taken into account the percentage of development expenditure spent on the armed forces and the fact that only in some cases is a substantial portion of this expenditure channelled back into the domestic economies. Although the armed forces in some countries are performing valuable services, such as road and bridge building and illiteracy campaigns, it was felt that this could be done better and more economically by means of appropriate civilian organizations, youth services, etc. Thus, even a small defence expenditure is a serious drain not only on financial resources, especially foreign exchange, but also ultimately on the limited reservoir of technically trained manpower. Any considerable expenditure on the armed forces is liable to threaten a national development plan and bring about a risk of inflation. Even the increased taxation involved will

inhibit economic progress by making more difficult large-scale local capital formation. In these circumstances, it is clear that the developing countries and the major powers need the stimulus of mutual example. In the view of the Working Group, this would be most productive if it could take the form of a reduction of defence expenditures, beginning from the major powers with a diversion of an agreed proportion of the defence expenditure to the economic development of the less developed states, who in turn would be expected to set a ceiling to their own armed forces in strict accordance with their internal security needs.

3. Current Conflicts

Before continuing with an examination of the overall problems, it was decided to examine such causes of current conflict between nations as members of the Group thought significant for the general discussion. India/Pakistan, Malaysia/Indonesia and the Dominican Republic were brought forward. The Group expressed the hope that the initiative of holding negotiations in Tashkent, between the Prime Minister of India and the President of Pakistan, will be instrumental in bringing about a peaceful settlement of the conflict between the two countries. Thereafter, the Group devoted the greater part of the time for discussion to Vietnam and Rhodesia. Their conclusions were as follows:

(a) Vietnam

The escalation of the war in Vietnam is inflicting terrible suffering on the Vietnamese people, and constitutes a threat to the peace and security of the entire world.

With regard to the nature of the conflict and the ways and means for its settlement, different opinions have been expressed which make it impossible to come out with a general statement on this issue.
It is suggested, therefore, that all the participants should inform their respective governments of the views expressed, indicating to them the urgent necessity of taking energetic measures to restore peace in Vietnam. This can be achieved by adhering to the Geneva Agreements of 1954 which would provide the Vietnamese people with the possibility of deciding their own destiny.

(b) Rhodesia

The question of Rhodesia, though of a different nature from that of Vietnam, was considered at length. It was agreed that the present situation was unjust and oppressive for the majority of the population of Rhodesia and that strong steps should be taken to bring the illegal Smith regime to book, with a view to early majority rule.

Some participants felt that Britain had been less than sincere in its attempt to prevent U. D. I., others that Britain had been sincere but had failed, and still others that the effectiveness of the economic sanctions so far taken and proposed would have to be evaluated in the near future.

The Group agreed that the African people of Rhodesia should be given all possible help and support in its just

struggle for independence and national rights. But whereas some participants felt this was still primarily the responsibility of Britain, others felt the matter should now be handled entirely within the framework of the United Nations. Strong support was expressed to the U. N. resolutions adopted by the 20th Session of the General Assembly on the question of Rhodesia.

One major question discussed was the appropriateness of military force as a solution to this problem. Some participants urged that our Conferences have the duty to emphasize the necessity for finding peaceful solutions in all conflict situations. Most members felt that in the case of Rhodesia, if peaceful measures failed, military action in compliance with the Charter of the U. N. should not be precluded.

4. Role of the U. N. in the Security of Developing Countries

The 13th Pugwash Conference discussed the problems of collective security. It considered measures for increasing the effectiveness of the U. N. in keeping the peace, the financing of the U. N. peace-keeping operation, the special security problem of the non-aligned nations, and the declarations excluding the use of force. Many of the observations made then are still pertinent today.

The Working Group recognized that during the last year the U. N. has partially recovered from the paralysis of many of its functions arising from differences concerning payments for past peace-keeping operations. The continuation of this recovery is urgent, as peace is today threatened by a continuing arms race and the use of force in several parts of the world. The absence of effective measures for collective security is promoting an accelerating arms race leading to nuclear proliferation. While major disputes affecting big powers are unlikely to be controlled by action through the U. N., the Group recognized that the big powers, acting in concert with developing nations through the U. N., in conformity with its Charter, can play a crucial role in helping to resolve other disputes, in stopping local conflicts and in the reduction of the burden of armaments in developing countries.

The Group welcomed the Declaration of December 20, 1965, adopted by the 20th Session of the General Assembly of the U. N., entitled "The Inadmissibility of Intervention in the Domestic Affairs of States and the Protection of their Independence and Sovereignty", which provides a Charter for the non-intervention by one state in the affairs of another, and for the peaceful co-existence of states. It states "No state has the right to intervene, directly or indirectly, for any reason whatever, in the internal or external affairs of any other state. Consequently, armed intervention as well as all other forms of interference or attempted threats against the personality of the state or against its political, economic and cultural elements, are condemned". The Group urges the members of the U. N., and particularly the big powers which have a special role to play within the Security Council,

to activate all provisions of the U. N. Charter, including Chapter VIII, designed to provide effective support for the security of countries against whom force is threatened or used by another country. Some participants felt that, in particular, it is necessary to provide for the immediate verification of the facts on which a complaint is lodged by a country, and the Security Council naming the aggressor in accordance with the Charter if the complaint is verified. This should be promptly followed by appropriate action according to the Charter to vacate the aggression. It should be realized that there are several steps short of armed intervention by U. N. forces which are available initially.

Some participants emphasized the need for implementing this proposal with responsibility, for the time being, firmly resting in the Security Council, even though differences may still not be resolved between the big powers concerning the role of the General Assembly and the Security Council for taking action, or the extent of powers to be delegated to the Secretary-General or the nature of revision necessary in the Charter of the U. N. A suggestion was made that implementation would need an adequately equipped (with helicopters) but unarmed observation group available for immediate deployment at the request of a country, and stand-by military forces available to the Security Council for use at short notice. It was suggested that the cost of this permanent organization and operations could be recovered by a percentage levy on the military expenditure of all members of U. N., or by U. N., regulating and taxing the use of oceans, atmosphere and outer space for communications or telecommunications and the exploitation of mineral resources under the oceans.

International peace-keeping forces should be as universally comprehensive as possible and organized according to the United Nations Charter.

5. Regional Organizations and Security Problems

The Working Group recognized the great value of regional organizations for promoting peace, economic and social development and for aiding the resolution of political questions. Some members of the Group felt that there were times when action by regional organizations for maintaining security could be taken under the leadership of U. N., and others felt that it was unwise for the U. N., to use them for this purpose. It took note of the valuable role played by the Organization of African Unity in its Charter, by securing recognition to existing boundaries, supporting African countries and in mediating in the dispute between Morocco and Algeria.

The Group believed, however, that the U. N. rather than regional organizations should play the role of providing collective security. This is because the positive development role of regional organizations may be impaired and the unity of the organizations subject to excessive strains if the organizations were called upon to undertake military action. As to the Dominican Republic, some members of the Group questioned

whether the interference was justified but, in any case, most participants felt that if the presence of international peace-keeping forces is considered necessary in the Dominican Republic, then it is recommended that the present Organization of American States forces are withdrawn as soon as possible and United Nations forces substituted for them. Moreover, if regional organizations assume military aims, there is the real danger of ending up with a world divided by powerful and antagonistic regional organizations greatly impairing the security of the world as a whole.

6. The Role and Responsibilities of Nations for promoting Security

The Working Group firmly believed that all states, both developed and developing, are directly responsible for peace and security in the world, since an armed conflict in one area endangers the security of other nations. There is the need for agreement among big powers not to exploit local disputes between countries. While this is a necessary condition for promoting security, it is not a sufficient condition, and it is equally imperative for the developing countries to take up a responsible position in relation to their mutual disputes and to desist from playing up to the rivalries between the big powers.

The group believed that the role of the great powers in providing international security can be made more effective if conflicts aggravating relations between them are gradually settled. The developing nations may have some positive influence on the great powers in this respect. The contribution of the developing countries to the cause of strengthening peace could be made immeasurably greater if they solved the conflicts and contradictions between them by peaceful means. At the same time, no state or a group of states should be allowed to interfere in the affairs of other states. The Group noted that at the present time there are some big powers which usurp rights by establishing "spheres of interest" which subordinate the role of the U. N. in safeguarding the security of the concerned region. This is clearly contrary to the growth of global responsibility for ensuring peace.

The Declaration of the U. N. of December 20th, 1965, mentioned in section 4, provides a code of conduct for all countries, big and small. The Group welcomed attempts within U. N. to evolve a definition of aggression. While the Declaration already contains many guidelines to define aggression, early finalization of the definition was urged. If the Declaration is to help to stabilize peace, it becomes the responsibility of countries not to adopt a position of neutrality in disputes where the provisions of the Declaration have been violated. It was proposed that countries which contravene the provisions should be denied economic and technical aid by the organizations of the U. N., and that countries adhering to the Declaration should conclude non-aggression pacts and should support U. N. action against the offending countries by suspending trade and by withholding economic, technical or

military assistance.

The Group reaffirmed that in the long run the security of all nations requires the achievement of an agreement on General and Complete Disarmament (G. C. D.) under strict international control. It is recommended that the Eighteen Nation Disarmament Committee begin serious and detailed consideration of the G. C. D. treaty, possibly starting from those aspects, in the later stages of both the Soviet and American draft treaties, in which a fair measure of agreement now exists.

In the meanwhile, pending agreement on G. C. D., partial measures should be undertaken for reducing armaments and strengthening the peace. The Group drew attention to the positive role of co-operation and mutual interdependence of countries in promoting security. Sharing the benefits of a common proj ect on which the economies of two countries are vitally dependent may be a strong deterrent to armed conflict between them.

The Group discussed the problems arising from the provision to other countries of arms, armaments technology, and training in the use of arms. It was realized that scientific collaboration and the peaceful applications of many technological developments which are required to be promoted internationally can also be misused through military applications as by-products. The Group did not consider it appropriate to limit the widest possible collaboration in scientific research or in peaceful applications of the new technology. However, effective and appropriate safeguards should be considered in each case to prevent military applications which may arise.

Some members pointed out instances where arms supplied to nations for one purpose were diverted for use in other disputes, thus endangering security and promoting an arms race. It was proposed also that safeguards be provided to prevent misuse, and appropriate sanctions (economic and others) be applied where misuse has occurred.

Some members of the Group were of the view that military aid to developing countries should be discontinued and the amount spent on it be diverted to economic and developmental aid. By this means considerable support could be given to removing poverty and long-range factors leading to instability in the world, particularly the problems of adequate food supply.

Some members of the Group deplored the considerable role played by small but industrially developed nations in supplying sophisticated arms to developing countries and rejected the validity of the rationalization that the small states had no right to deny to other countries the results of sophisticated developments which they themselves enjoy.

There was a division of opinion amongst the Group as to whether the U. N. should introduce a measure by

which all transfer of arms by one country to another would be reported.

7. Non-proliferation of Nuclear Weapons

The Working Group discussed various aspects of the non-proliferation of nuclear weapons. There has been a consensus of opinion reached to the effect that the further spread of nuclear weapons is fraught with grave dangers to the security of all nations. Data have been quoted demonstrating that a number of countries have potential possibilities to acquire and manufacture nuclear weapons within the short span of the coming years. Some members of the Group felt strongly that the most dangerous situation in this respect arose in connection with West German expressions of their will to change the territorial "status quo" in Europe, while at the same time considering a nuclear capacity for their army; the danger being especially acute as the Federal German Republic (F. G. R.) is already in possession of a large war industry and is reported to produce Medium Range Ballistic Missiles as well as large amounts of nuclear material in her many nuclear reactors. It was noted, at the same time, that projects in F. G. R. for centrifugal enrichment of uranium, possibly to weapons grade, do not come under any of the existing safeguard systems. Others felt that, while important, the German situation should not be singled out and that there were some other areas of danger. The Group was agreed that if such a spread of nuclear weapons does take place, the overall danger of a major nuclear war will be immeasurably increased.

Therefore, the Group firmly believed that it is high time to take resolute action aimed at concluding a non-proliferation treaty which would have no provisions that could, directly or indirectly, lead to the spread of nuclear weapons. Urgent steps are also called for to increase the number of signatories to the Moscow Test Ban Treaty and to extend it to testing underground. Effective measures must also be taken to establish nuclear-free zones. Some members called attention to recent progress in this direction by the Latin American States. In consideration of the location of the Conference, attention is called to the desirability of a nuclear-free zone in Africa and the Middle East. The Pugwash Conferences have consistently opposed French nuclear testing in the Sahara and in this connection the Group now considers it desirable that all special installations for testing French nuclear weapons and launching rockets in the Sahara desert, which are soon to be transferred to Algeria, be used exclusively for peaceful purposes under appropriate international supervision. The question of guarantees of security of non-proliferation treaty signatories could be settled within the framework of the U. N. and in compliance with its Charter.

ABSTRACTS OF PAPERS PRESENTED AT THE 15th PUGWASH CONFERENCE IN ADDIS ABABA

V. Y. Aboltin

RAPID DEVELOPMENT OF SCIENCE AND EDUCATION - IS IT POSSIBLE IN THE DEVELOPING COUNTRIES?

The progress of mankind can be greatly accelerated if all peoples of the world are able considerably to increase their contribution to the more rapid development of science and education, to the perfection of world civilization. It is essential to reduce the gap between the development levels of the industrially advanced and the developing countries. The "vicious circle" in which the developing countries allegedly find themselves exists only in the minds of those who have as their starting point the stability of the present capitalist system and the existence for good of the colonial exploitation of the less developed countries. The people of those countries that enter upon the path of socialist development break all "vicious circles" and create conditions necessary for rapid development of economy, science and technology.

Progress in those countries where the people are not yet ready to enter upon the path of socialism can be accelerated if the young states obtain economic independence and preserve through this the funds which are pumped out of the developing countries by foreign capital (some 15 thousand million dollars per annum) and which can be used for the development of their nations.

GCD can also contribute greatly to the cause of progress in those countries, because it will enable them to channel, for productive purposes, the funds, all or some, which are spent now on non-productive military expenditure (some 7-8 thousand million dollars per annum). GCD can also result in more money invested by the advanced countries in industry, agriculture and education of the developing nations.

The existing plans for the development of education in the countries of Asia, Africa and Latin America are far from adequate. According to the existing plan, Africa, for example, is to extend the 32 existing universities and to increase the number of students in Central Africa up to 280 thousand. If we compare these figures with the number of students and universities existing in the U. S. S. R. or the U. S. A., one can clearly see the inadequacy of the existing plans

Only fundamental socio-economic transformations can solve the problem of accelerating progress in the developing countries. International division of labour which condemns hundreds of millions of people in the less developed countries to life under economic colonial exploitation should be done away with.

O. Bassir

THE TRAINING OF SCIENTISTS AND TECHNOLOGISTS OF THE DEVELOPING NATIONS

The sad fact is that only one or two of the under-developed countries of Africa have become aware of the magnitude of the problem of the shortage and inadequacy of scientific and technological personnel.

Most of the English-speaking countries of Africa have plans for the production of University graduates in science, agriculture, medicine, and engineering. Some of them have set up national University advisory boards to determine orders of priority for the different academic disciplines. Nevertheless, the relative numbers of science and technology students and staff sadly lag behind the modest targets set by the local university advisory boards.

The type of personnel whose need is most acutely felt in West Africa is the post-school trained technologist. Breweries, soap factories, telephone installation and maintenance department, railway workshops, university laboratories, clinical technology schools badly need trained technicians. Since university degrees have a high currency in the developing countries, it seems as if one way of encouraging the training of scientific personnel would be to integrate appropriate courses into the University curricula in Africa.

In this context, one can visualize the conversion of Trades Schools, Technical Colleges and Institutes into degree-granting Institutions of science and technology. It ought to be possible to link the training in such institutions with work done in factories, farms, hospitals, and so on, so that a degree comes truly within the reach of everyone.

Unless there is a central system for financing the training of scientific and technological personnel, it tends to be haphazard.

It does seem, therefore, of particular importance to earmark a special high-level Government agency for the co-ordinating and planning of the financial measures which are involved in both Government and private-sponsored schemes for scientific and technological training. These would necessarily involve the co-operation of universities, scientific research institutes, technical colleges, trade institutes, agricultural settlements, etc.

It seems that the economically developed nations have a great opportunity here to give real meaning to the concept of international co-operation by sponsoring the exchange of scientists at all levels, educational media, technological documentation and research samples.

S. Dedijer

SOCIAL SCIENCES AND SOCIAL DEVELOPMENT

In the newest phase of the current scientific-technological revolution, all of the world's major problems - peace, population control, food, disparity of development, and other similar aspects of the process of formation of a world

culture - are now being recognized and treated as social and behavioural science problems, as problems of formulation and implementation of scientifically based social policies. Each particular social system can effectively develop today within the world system only with the help of a continous social science re-appraisal within the constraints of the world environment of its own values and objectives, of its own social evolution, of its own mechanism of social heredity and of its own current policies for social and cultural change and development.

Endalkatchew Makonnen

Undeveloped countries are still on the whole passive bystanders in the scientific and technological revolution. Furthermore, they develop social sciences slower than basic and applied natural sciences. The paper considers some major aspects of the following questions: why social sciences should be given a high priority in the less developed countries; what factors contribute to the low demand and slow development of their social sciences; how should social sciences be developed there and how their results should be used to prepare and guide policy actions.

SOME PROBLEMS OF DEVELOPMENT IN THE DEVELOPING COUNTRIES

This paper, which is a broad review of events and experience within the world's developing regions, attempts to deal with some of the major political, economic and social problems of development facing developing countries today, and tries to analyse these problems as they are to be found in their manifold diversity in the different developing regions.

The paper shows how these problems are being faced at the national and regional levels and points to the need for relating and co-ordinating this effort with international effort at large.

For, if there is one factor which underlines the international relations of our time, it is surely the encouraging change of world attitude towards problems of development.

There is a new philosophy of mutual concern and a new sense of responsibility in international approach to problems of world development which has come to replace the old and negative attitude of indifference to the problems of other countries and peoples.

This new and hopeful approach to international development is itself a direct consequence of Modern Science which by making the World a small place has made it inter-dependent.

The spread of education and the rapid discrimination of ideas and of information had made peoples realize that they are together for better or for worse.

B. T. Feld

SECURITY PROBLEMS IN THE DEVELOPING COUNTRIES

The security of the world, which is being threatened by the arms race

of the major powers, depends on the maintenance of peace by all nations in co-operative effort. The non-nuclear nations can greatly influence this effort through their role in international disarmament discussions, especially the Eighteen Nation Disarmament Conference. In addition to protecting themselves against nuclear war by promoting disarmament, the developing non-nuclear nations can in so doing promote their own economic development if even a small fraction of the funds diverted from arms spending were channelled into peaceful activity. A head start on world disarmament could be achieved now by efforts to develop institutions through which the smaller nations could solve conflicts between themselves peacefully, thus reducing the need for committing an excessive fraction of available resources to conventional armaments. Thus, one of the most important immediate tasks before the world is to devise machinery for the effective utilization of the United Nations in its peacekeeping efforts, including means of adjusting conflicts before they become battles, and for the peaceful relief of peoples from injustices which continue to fester in many parts of the world. A major step toward peace can be taken independently by those nations who are able to establish nuclear free zones, such as Africa, the Middle East, and possibly, East and South East Asia; an important start has been made in Latin America, as outlined in the report of the second session of the Preparatory Commission for the Denuclearization of Latin America. The nations in the developing regions of the world could render a tremendous service to themselves and to the rest of the world by boldly, without further delay, taking the first significant steps towards making disarmament a reality.

R. V. Garcia

SOME PRACTICAL PROBLEMS CONNECTED WITH THE ORGANIZATION OF RESEARCH IN DEVELOPING COUNTRIES.

The organization of scientific and technological research in developing countries has to be considered from three different angles: (a) as a political problem; (b) as a problem connected with the economy of the country; (c) as an academic problem. In all three problems the universities play a decisive role.

(a) The organization of research in less advanced countries could only be referred to countries which have somehow decided to cease being just "banana countries" or mere pipe-lines for oil. In these countries, one quite often finds scientific elites which become a dead weight rather than an asset in the struggle for social and economic development.

(b) Scientific research, in particular applied research, cannot go far without due consideration to the stages of economic development.

But, in turn, this development may be, and should be, guided by the type of technology which could be used in the country. There must, therefore, be a continuous interaction between both scientific and economic development, and this interaction can only take place

if both are planned together.

(c) With reference to the academic problems of research, the paper deals with the selection of subjects, the difficulties connected with the training abroad of young scientists and the lack of balance between the "production" of the universities and the capacity of the country to absorb it.

In regard to technological research, it is maintained that universities in less developed countries should play a most important role without a counterpart in advanced countries.

M. D. Millionshchikov

SCIENCE AND THE DEVELOPING COUNTRIES

The Soviet Union ardently supports the peoples of the developing countries in their struggle for complete liberation from colonial rule, and is ready to further in any way the development of science and education in these countries.

In view of the increasing gap in the amount of national income per capita of the population between the advanced and the developing countries, the author points out that a most important prerequisite for rapid economic, cultural and scientific development of the newly-emerged states lies in the total abolition of their dependence on foreign powers.

The experience of the Soviet national republics after the socialist revolution shows that the Soviet people found ways and means to remove rapidly economic, cultural and scientific backwardness. As far as the development of the national economy and science is concerned, peoples of these republics have reached the same level as the Russian people. These republics have also set up their Academies of Sciences which have been successful in many fields of research. This shows the tremendous and rapid changes that can be achieved by former colonial countries which stepped upon the path of socialism and enjoyed the support of fraternal socialist countries.

At present the Soviet Union renders versatile assistance to the developing countries in building hydroelectric power stations, plants, factories, universities, colleges etc. Thousands of students from the developing countries study in the institutes of higher learning of the U. S. S. R., including over 3 thousand from 80 countries that study in the Lumumba University.

The U. S. S. R. Academy of Sciences is always ready to share its experience, to co-operate with the scientists of the developing countries. The achievements of world science should be used not for the creation of means of mass destruction but for the development of culture, war on poverty, better living conditions of the peoples.

In order to ensure independence and security of all people the U. S. aggression in Vietnam and the Dominican republic should be stopped and the Geneva Agreements of 1954 observed. The Soviet scientists, as well as all Soviet people, demand that the bombing raids on the Democratic Republic of Vietnam should be stopped, and the U. S. troops, and the troops of its allies, be withdrawn from Vietnam.

A. Rich

SCIENCE EDUCATION ASSISTANCE IN DEVELOPING COUNTRIES: A COMPARISON OF TWO PROGRAMMES

Two types of educational assistance programmes are necessary to decrease the discrepancy between the developed and underdeveloped countries. One is oriented towards the goal of developing a broadly based system of primary and secondary education, while the other is more specifically directed towards the development of centres of higher technological education and training. This paper consists of a brief description and comparison of two of these programmes which are carried out by groups in the United States.

The African Education Programme is in the field of primary and secondary education. Its history is unique in that it developed out of the private initiative of a few persons and initially concentrated largely on developing mathematics text books and revising the methods of teaching mathematics in an African setting. A private, non-profit group organized this programme initially with only private funds and had as a goal the evolution of an appropriate educational syllabus to be created jointly by African educators and mathematicians working with their American counterparts. Coupled with this is a teachers training programme in handling the new curriculum material. At the present time ten of the English speaking African countries are involved in this educational programme and to date over 50 volumes of textbooks have been produced covering most of the primary and secondary school curriculum.

The programme has now branched out considerably so that it is supported in large part by the United States A. I. D. programme.

At the other end of the spectrum, there is a direct attempt by the United States government to assist the Indian government in creating a centre of excellence in the field of high technological education. This has been done by establishing a branch of the Indian Institute of Technology at Kanpur. This programme is run by a consortium of ten American engineering schools in an attempt to reproduce a teaching and research centre which is on a par with the best of these organizations in the United States. This Institute has now been running for almost five years and the project seems to be successful as judged by the large number of applicants for teaching positions in this Institution from Indian scientists who are working in technical education overseas. Like most American engineering schools, teaching in Kanpur has a heavy bias on the use of large computers and laboratory oriented teaching courses.

These two programmes working at opposite ends of the educational spectrum, compliment each other in many ways. An important characteristic of both of these programmes is the fact that even though they are now financed largely by governmental money, they are administered almost entirely by private non-governmental groups largely drawn from university and educational systems.

V. A. Sarabhai

SECURITY OF DEVELOPING COUNTRIES

"Non-alignment" has often been erroneously recognized as describing the political status of a nation, like neutrality, rather than the position of a country vis-a-vis the classical East-West conflict. The real structure of implicit alliances is based not so much on treaties, but through parallel interests of nations.

The big powers often maintain neutrality in disputes between the non-aligned nations. At the same time, through large programmes of military and economic assistance, they are instrumental in creating the potential through which developing nations could resort to the use of force in settling their mutual disputes. The neutrality of the permanent members of the Security Council in disputes between developing nations is clearly inconsistent with the crucial role which they are called upon to play for ensuring collective security. During the recent India-Pakistan conflict, there was a clear failure of the United Nations in identifying the aggressor.

The burden of armaments in developing countries is steadily rising. There is a growing attraction for nations to possess nuclear arms. If arms control is to operate in disputes between developing countries, there must clearly be a deterrent exercised by the United Nations with the big powers acting in consort with the weaker nations.

Consequences of failure of arms control must be known before-hand to both parties. There is much that can, therefore, be done to create conditions for increasing security and for arms control by measures within the United Nations. the U. N. declaration of December 20, 1965 concerning "The Inadmissibility of Intervention in the Domestic Affairs of States and the Protection of their Independence and Sovereignty" is a significant step in the right direction.

Super powers as well as developing countries find themselves at cross roads at which they have the option of taking the path of ensuring collective security within the U. N. or participate in a new and dangerous arms race. The type of self-restraint which super powers are called upon to exercise in desisting from deploying A. B. M. installations is also the type of self-restraint which many countries in the world, such as Japan, India, U. A. R. and Israel are called upon to exercise in denying themselves the acquisition of an independent nuclear capability. This self-restraint must arise out of an act of faith in the political wisdom and maturity of nations of the world acting collectively. The Committee on Arms Control and Disarmament of the National Citizens' Commission of the United States has recently made specific proposals which merit close consideration, not only within the United Nations, but by nations participating in the disarmament talks at Geneva.

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