



American Academy of Arts and Sciences

280 Newton Street

Brookline Station, Boston, Massachusetts 02146

Telephone 522-2400

3 February 1969

To: Academy P-COSWA Committees

From: B. T. Feld

Re: Proposals for Sochi agenda

Since it is likely that there will be a meeting of the Executive Committee of the P-COSWA Continuing Committee in Moscow on Feb. 25-28, and that I shall attend, I would appreciate your comments on the following proposals for topics to be included in the Agenda for the Sochi Conference:

I. Disarmament.

A. Containing the nuclear arms race

1. Levels of missile deployment required for deterrence and stability of the nuclear balance.
2. Problems of a freeze on offensive and defensive systems.
3. Strategic relevance of nuclear weapons for the "small" powers.
4. Effects of new technological developments on the arms race.

B. Controlling the growth of conventional arms; feasibility of budget and military manpower limitations

C. BW and CW controls (SIPRI report).

II. Evolution of Methods for Settling International Disputes

A. UN and peacekeeping

B. Big-power cooperation

C. Other approaches -- the Danish proposal

III. International Cooperation for the reduction of tensions

A. Technological cooperation in Central Europe as an integrational process (see Report of European Study Group in Proceedings of the Sopot Conf., pp 76-87).

B. Cooperation in other areas of the world (Southeast Asia, Middle East, Africa).

File Pugwash

IV. Technological Sharing as an aid in the Development Process

- A. Recent progress in the production of new strains of cereals for averting the food crisis.
- B. East-West cooperation in the introduction of advanced technology.

V. Maintaining and improving the quality of the environment from an international standpoint.

- A. Major problems (air and water pollution, depletion of natural resources, weather modifications, etc.)
- B. Developing new international machinery for controlling the direct and side-effects of technology.

I'd especially appreciate your views on the relative priorities which should be given to the above items (and any others you think should be added).

I also enclose a revised Agenda for the London Symposium (April 12-17) on Economic Aspects of Energy Production. An attempt has been made to limit the scope of the Symposium in accordance with our and other criticisms of the earlier draft agenda.

If you have not already done so, please respond as soon as possible to my earlier requests on available dates for our next meeting and on the US participant list for Sochi.

AS

I

A survey of data on world fuel resources, their availability, consumption of energy, and the economics of various methods of power production, will be precirculated in background papers.

II

1. Energy from conventional vs. nuclear fuels.

What are the real economic factors? What factors may override or imbalance economic consideration (e.g. political or military considerations) in short term or long term planning?

Under what conditions should nuclear power production be encouraged on a small or large scale?

2. The economic factors in large scale energy utilization.

Prediction and meeting demands on energy.

What is the optimum method of production and utilization of energy in countries with different economic structures and degree of industrialization?

Industrialization of new areas in the world as a by-product of cheap energy.

3. The social and ecological consequences of continuous increase of energy consumption.

How to control environmental pollution.

How to prevent the indiscriminate use of natural fuels leading to their rapid exhaustion in certain areas.

4. International co-operation in providing energy economically, particularly for developing countries.

International grids and their management.

Policy on development and export of



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7 March 1969

To: Academy P-COSWA Committee

From: B. T. Feld

Re: March 14 meeting

I enclose a copy of the agenda for the Sochi Conference, worked out at the Executive Committee (of the Continuing Committee) meeting in Moscow last week. On the whole, it was a useful meeting, and I shall report to you in more detail on March 14. Also enclosed is a list of the Pugwash Symposia currently planned.

In addition, we shall need to start on more detailed planning for our 1970 Conference and our 1969 Symposium.

The meeting is at the Academy Headquarters, starting at 10 a.m. You are, of course, all also invited to the planning session on the study "Evolution of Science and Technology in the Light of Basic World Problems", which will be held at the Academy on March 15. Please let me know if you are planning to attend.

[Enc]

SOCHI CONFERENCE (22-27 October 1969)

Provisional Programme

		<u>a.m.</u>	<u>p.m.</u>
Wednesday	22.10	<u>First Plenary Session:</u> Formal opening Report on Marianske Lazne Symposium and discussion on the "Role of Science and Scientists in National and World Affairs".	<u>Second Plenary Session:</u> Report on London Symposium "Economic Aspects of Energy Production". Report on Helsinki Symposium "European Security Commission"
Thursday	23.10	Working Groups	Working Groups
Friday	24.10	"	"
Saturday	25.10	<u>Third Plenary Session:</u> Report on meeting of BW Study Group. Report on Elsinor Symposium on "Methods of collecting and Assimilating Information on Crises".	Free
Sunday	26.10	Working Groups	Working Groups
Monday	27.10	<u>Fourth Plenary Session:</u> Reports from Working Groups.	<u>Fifth Plenary Session:</u> Discussion on future symposia and in particular on maintaining the quality of the environment. Close of Conference.

Topics for Working Groups

measures

1. Current Military Conflicts, reasons for their termination, and keeping the peace:
 - a) termination of military intervention, and just, peaceful settlement in Vietnam;
 - b) peace in the Middle East - role of the Security Council and the Great Powers;
 - c) ending the civil war in Nigeria, prevention of mass starvation in the area, and the problem of separatist movements;
 - d) international co-operation for the prevention of war and keeping the peace.

2. European Security:
 - a) interconnection between the status quo and security in Europe, and the role of military pacts;
 - b) the German states and European security;
 - c) the responsibilities of the Great Powers in Europe;
 - d) role of all-European co-operation for European security;
 - e) (a discussion on Czechoslovakia, to be more closely defined at a later stage)

3. Reduction and Elimination of Nuclear Weapons and Delivery Systems:
 - a) non-proliferation of nuclear weapons;
 - b) the importance of concrete steps in nuclear disarmament, e.g. the comprehensive test-ban;
 - c) limiting and reducing offensive and defensive nuclear weapons systems;
 - d) effects of new developments in nuclear weapons technology and the urgency of disarmament agreements;
 - e) prevention of use of the ocean floor for military purposes;
 - f) new ideas in the field of nuclear disarmament.

4. Disarmament in the Non-Nuclear Field and Further Steps Towards General and Complete Disarmament:
 - a) obstacles in the path of general and complete disarmament**;
 - b) current possibilities for disarmament in conventional weapons;
 - d) new ideas in the field of non-nuclear disarmament;
 - c) necessary steps to eliminate the dangers of the use of biological and chemical weapons;
 - e) the position and responsibilities of scientists in inhibiting new weapons developments.

5. Modern Science and Development:
 - a) East-West concerted action in rendering assistance to developing countries;
 - b) preventing malnutrition and starvation;
 - c) the problem of populations;
 - d) developing international scientific and technical institutions, with emphasis on new ideas.

** this item may be discussed in a joint session with Working Group 3.

SYMPOSIA 1969

London (4th)	12 - 17 April	Economic Aspects of Energy Production (with particular reference to nuclear power)
Czechoslovakia (5th)	19 - 25 May	Role of Science and Scientists in National and World Affairs.
Finland (6th)	June	Security Commission for Europe.
Poland (7th)	26 - 29 August	Regional Arms Control and Disarmament Measures in Europe.
Denmark (8th)	7 - 12 September	International Centre to Study Conflicts (Minister Petersen's proposal)
U.S.A.	Central Office not involved	Effects of New Technological Developments on the Nuclear Arms Race, and on Prospects for Arms Control.
Netherlands	December	European Institute of Science and Technology (with East/West Collaboration)

POSSIBLE SYMPOSIA 1969

Rumania	November	
Yugoslavia	almost certainly postponed to 1970	

POSSIBLE SYMPOSIA 1970

Italy	Social Consequences of Technological Change
Belgium	
Nigeria	
Bulgaria	
F.G.R.	
Yugoslavia	

ANNUAL CONFERENCE 1969

Soviet Union	22 - 28 October
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10 March 1969

To: Academy P-COSWA Committee

From: B. T. Feld

Re: Meeting in Moscow (Feb. 26, 27) of Executive Committee of Continuing Committee

In addition to the proposed Sochi Agenda, of which a copy has been sent to you, a number of other items were taken up at the meeting. The main results are summarized below:

1. Program of Symposia for 1969. Generally speaking, the problem of the inadequate preparation of Symposia, though raised by me, was not satisfactorily resolved; I believe we will need to raise this question again at the Marianske Lazne meeting of the Continuing Committee. Specifically, the Czech group (Sorm in particular) seems to be very anxious to use Marianske Lazne, through the Symposium on the Role of Science and Scientists in National and World Affairs, as a means of demonstrating their independence (for example, they have included ex-foreign minister Hajek in their group), and I think we must support them as far as possible, even at the risk of a second rate Symposium. On this basis, we also included this subject as the topic for the first plenary session at Sochi. The Americans invited (so far) are Commoner, Davidon, Doty, and Rich; in addition, Long, Rabinowitch and I will all probably be at Marianske Lazne and could participate.

The proposed Finnish Symposium is based on the paper that Johann Galtung presented at Nice. There were serious doubts about how this one will go, but in order to encourage the participants in the European Security Study Group to devote some efforts to its preparation, we are asking the Polish group to postpone their proposed Symposium until the end of 1969 or early 1970.

2. Proposed participation at Sochi:

USSR 20

USA 15

UK 8

France, China 5

Czechoslovakia, Poland 4

Denmark, FGR, GDR, Hungary, Italy, Netherlands, Yugoslavia, India - 3

Bulgaria, Finland, Norway, Rumania, Sweden, Israel, Japan, UAR - 2

Austria, Belgium, Switzerland, Canada, Australia, Argentina, Brazil, Chile,

Afghanistan, Ceylong, Pakistan, Ethiopia, Ghana, Kenya, Nigeria,

Tanzania - 1

(Algiers, Iran, Iraq, Mexico, Turkey, Spain, Greece - 1 each if a suitable invitee can be found)

In addition, 10 observers from International Organizations, and 15 science writers, to be treated as full observers (and who, accordingly, should be carefully chosen).

3. Millionshchikov guarantees that all invitees will receive visas, provided applications are made in enough time to permit processing. In particular, he agreed that application by 1 September would be sufficient, even for the most difficult cases.

4. There will be an "International Youth Science Fortnight" in London this summer. Friday, 8 August will be devoted to Pugwash, and it is requested that one member of the U.S. Committee participate. (About 500 young people will be attending.)

5. Meeting in Marianske Lazne:

Cont. Comm.	May 20-21
CBW meeting	May 22-24
Symposium on Role of Science	May 19-24





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10 March 1969

Tentative Agenda for March 14 meeting of Academy P-COSWA Committee
(10 a.m. at Academy Headquarters)

1. Report on Moscow meeting -- B. T. Feld
2. Sochi agenda - discussion
3. Sochi participants
4. International Symposia
 - a. U.S. Plans
 - i. New Technology - F. A. Long
 - ii. Development - E. Rabinowitch
 - iii. Other - B. T. Feld
4. Planning for 1970
 - a. Site
 - b. Agenda
 - c. Financing
6. General financial situation.
7. Other -- next meeting, etc.

Condensed Sochi List

A

- H. A. Bethe
- P. M. Doty
- B. T. Feld
- R. Garwin
- C. Kaysen ✓
- G. B. Kistiakowsky ✓
- F. A. Long
- G. Rathjens
- A. Rich
- J. Ruina
- J. B. Wiesner
- H. York

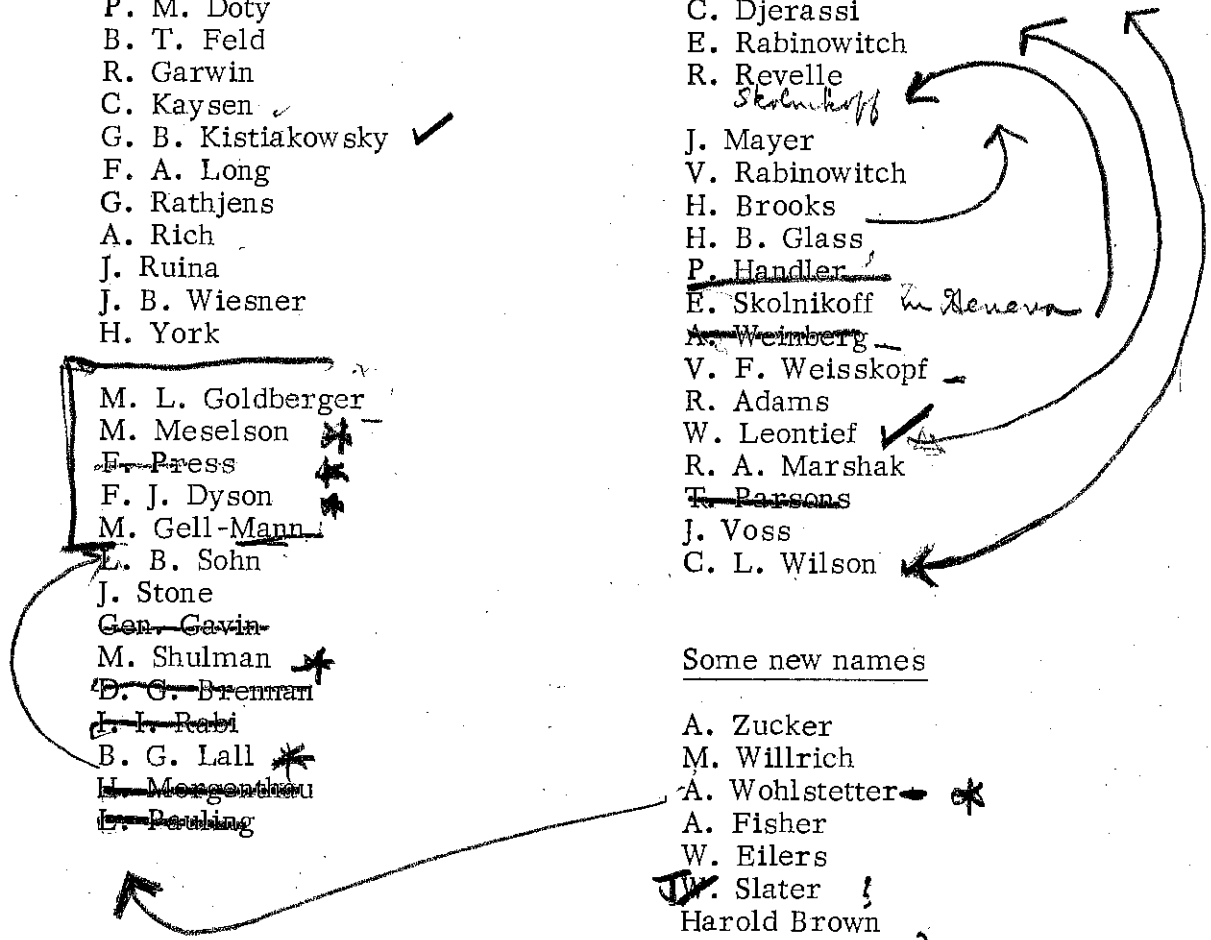
- M. L. Goldberger
 - M. Meselson *
 - ~~E. Press~~ *
 - F. J. Dyson *
 - M. Gell-Mann
- L. B. Sohn
 - J. Stone
 - ~~Gen. Gavin~~
 - M. Shulman *
 - ~~D. G. Brennan~~
 - ~~J. I. Rabi~~
 - B. G. Lall *
 - ~~H. Margenau~~
 - ~~J. Pauling~~

B

- ~~H. S. Brown~~
- C. Djerassi
- E. Rabinowitch
- R. Revelle
- ~~Skolnikoff~~
- J. Mayer
- V. Rabinowitch
- H. Brooks
- H. B. Glass
- ~~P. Handler~~
- E. Skolnikoff *in Geneva*
- ~~A. Weinberg~~
- V. F. Weisskopf
- R. Adams
- W. Leontief ✓
- R. A. Marshak
- ~~T. Parsons~~
- J. Voss
- C. L. Wilson

Some new names

- A. Zucker
- M. Willrich
- A. Wohlstetter *
- A. Fisher
- W. Eilers
- ~~W. Slater~~ ?
- Harold Brown
- Gen. Ridgeway ?
- A. Hollander





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28 May 1969

To: U.S. P-COSWA Committee and Sochi participants
From: B. T. Feld
Re: Meeting of Continuing Committee in Marianske Lazne, 20-21 May

1. Sochi meeting, 22-27 October: Revised agenda and program enclosed. Note that the Wednesday p.m. (2nd) plenary session is to be devoted to a series of talks on the ABM, aimed primarily at bringing the participants up to date on the technological aspects and arms control implications. Frank Long will organize this session; if you have suggestions, get in touch with him.

The US group of invitees now consists of Djerassi (5), Doty (3), Feld (1), Garwin (3 or 4), Goldberger (4 or 3), Handler (5), Kistiakowsky (3 or 4), Long (4), E. Rabinowitch (5 or 2), Rathjens (3), Revelle (5), Rich (1 or 2), Wiesner (3 or 4), Wohlstetter (2), York (4 or 3). (The number following each name is the suggested Working Group assignment.)

I suggest a meeting of the US group of participants (and a few alternates) on one or two days between now and the end of the month; please indicate your preference (availability) on the enclosed card and return immediately. We need to plan papers and other aspects at the earliest possible date.

Participants are expected to arrive in Moscow on 21 October, will be met and transferred as rapidly as possible to a Sochi flight (there are seven per day). The Soviet Embassy is being instructed to issue visas on the basis of the official conference invitation; be sure to apply by 1 September to permit sufficient time. Participants are guests of the Academy of the USSR during the Conference; post-conference tours and wives' stay (about \$20/day) can be arranged with Intourist after arrival. Buy ticket only to and from Moscow; rest will be taken care of on arrival. Please inform Rotblat of time of arrival in Moscow and number in your party.

Science writers: We are permitted to suggest two (2) for invitation on same basis as participants. Bring your suggestions with you to the group meeting in June, or send them to me in advance.

We have been asked if we could raise funds for the travel to Sochi of Varsavsky (Argentina), Baptiste (Ceylon), and Bassir (Nigeria). Suggestions for sources will be welcome.

2. Pugwash Symposia: Planned for the next year

a) Elsinor, Denmark, 7-12 September, "An International Agency for Collection and Dissemination of Information on Possible Crisis Situations".

b) Poland, period 5-15 December, "Regional Arms Control and Disarmament Measures in Europe"

c) Netherlands, Easter 1970, "International Cooperation in Science"

Sile Pugwash

- d) Italy, Summer 1970. "Social Consequences of Technological Change".
- e) USA, Winter 1970? "Impacts of New Technologies on Arms Control".

Note: The first Pugwash Monograph is out. It is "Preventing the Spread of Nuclear Weapons", F. Barnaby, ed., Souvenir Press (95 Mortimer St., London, W1) or the Ryerson Press (Toronto 1, Canada). Cost is around £3 1/2.

Also, SIPRI has now put out its report on seismic detection of underground explosions in the form of a pamphlet. To obtain, write Almqvist and Wiksell, Box 62, S-101 20 Stockholm, Sweden.

3. Organizational matters: The Continuing Committee has co-opted Ole Maaløe (subject to final agreement by West European Pugwash Groups) and Carlos Varsavsky (Latin America) to fill the two outstanding vacancies.

4. Any Pugwashites planning to be in the vicinity of London on 8 August would be welcome to participate in a program and series of panel discussions organized by Pugwash at this year's Youth Science Fortnight; about 500 chosen young science students from all over will be involved.

P/B

World Security, Disarmament and Development

19TH PUGWASH CONFERENCE

SOCHI, U.S.S.R., 22-27 October 1969

Topics for Working Groups

1. Measures for terminating current military conflicts and keeping the peace:
 - a) termination of military intervention in Vietnam; insuring peace and progress in Southeast Asia;
 - b) peace in the Middle East - role of the Security Council and the Great Powers;
 - c) ending the civil war and the consequent suffering in Nigeria;
 - d) international cooperation for the prevention of war and keeping the peace.

2. European security:
 - a) relationship between the status quo and security in Europe, and the role of military pacts;
 - b) the German states and European security;
 - c) the responsibilities of the Great Powers in Europe;
 - d) role of all-European cooperation for European security;
 - e) Czechoslovakia and European Security.

3. Reduction and elimination of nuclear weapons and delivery systems:
 - a) non-proliferation of nuclear weapons;
 - b) the importance of concrete steps in nuclear disarmament, e.g., a comprehensive test-ban and nuclear free zones;
 - c) limiting and reducing offensive and defensive nuclear weapons systems;
 - d) effects of new developments in nuclear weapons technology, and the urgency of disarmament agreements;
 - e) prevention of use of the ocean and sea beds for military purposes;
 - f) new ideas in the field of nuclear disarmament.

4. Disarmament in the non-nuclear field and further steps towards general and complete disarmament:
 - a) obstacles in the path of general and complete disarmament and measures to remove them.*
 - b) current possibilities for disarmament in conventional weapons;
 - c) new ideas in the field of non-nuclear disarmament;
 - d) necessary steps to eliminate the dangers of the use of biological and chemical weapons;
 - e) responsibilities of scientists in inhibiting new weapons developments.

5. Science and developing countries:
 - a) Concerted international action in rendering assistance to developing countries;
 - b) preventing malnutrition, starvation and disease;
 - c) problems of population growth;
 - d) further development of international scientific and technical institutions (including information centers) with emphasis on the needs of developing countries.
 - e) problems of power supplies for developing countries.

*This item may be discussed in a joint session with Working Group 3.

SOCHI CONFERENCE (22-27 October 1969)

Provisional Programme

	<u>a.m.</u>	<u>p.m.</u>
Wednesday 22.10	<u>First Plenary Session:</u> Formal opening Report on Marianske Lazne Symposium and discussion on the "Role of Science and Scientists in National and World Affairs".	<u>Second Plenary Session:</u> Symposium on the ABM
Thursday 23.10	Working Groups	Working Groups
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Saturday 25.10	<u>Third Plenary Session:</u> Report on London Symposium "Economic Aspects of Energy Production". Report on Elsinor Symposium on "Methods of collecting and Assimilating Information on Crises".	Free
Sunday 26.10	Working Groups	Working Groups
Monday 27.10	<u>Fourth Plenary Session:</u> Reports from Working Groups.	<u>Fifth Plenary Session:</u> Report on Projects for future symposia. Close of Conference.



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1 July 1969

To: U.S. Pugwash Committee Members

From: B. T. Feld

Re: Invitation of Science Writers to Sochi

At our meeting last Friday, we decided to poll the US committee on their opinions as to which US science writers should be invited to Sochi. Our quota is two, and the condition is that the writers attend as participants and observe the regular rules: Working Group meetings are entirely off-the-record; no positions ascribed to either individuals or national groups. Will you please respond by marking one of the first three plus the last boxes next to each name, signing and returning the ballot to me as soon as possible, but in any event by July 25?

I also enclose a sheet with brief comments on each candidate.

Bennis

Benzelsof

Sullivan

Nelson

Kellman

Pugwash

Irving S. Bengelsdorf, Science Editor, Los Angeles Times, since 1963. Ph.D., Chemistry, University of Chicago, 1951 (AEC predoctoral fellow). Research in Chemistry at Cal Tech (1951-52), UCLA (1952-54), GE (54-59), Texaco (59-60), US Borax (60-63). Writes current syndicated science news column "Of Atoms and Men". Suggested by Harrison Brown and Ned Munger; would like to attend.

Daniel Greenberg, European correspondent, Science, stationed in London. Obvious candidate, except for serious questions which have been raised about his attitude and possible lack of sympathy towards scientists in general and Pugwash-like activities in particular. He would like an invitation.

Robert Kleiman, Editorial staff, N.Y. Times. Attended Nice Conference and did a good piece which only appeared in European edition. Has interest and expertise in arms control (member of Doty's Joint Study Group).

Daniel Lang, New Yorker writer on scientific subjects. Attended Dubrovnik Conference and did a New Yorker piece on Pugwash.

Richard Lewis, Associate Editor, Bulletin of the Atomic Scientists. Would be an outstanding candidate, in my view, were it not for the fact that Eugene already represents us so well in the Bulletin.

Bryce Nelson, Washington reporter, Science. Much less experienced, but more sympathetic than Greenberg. Question is whether Science would send him, if he were invited, or insist on Greenberg.

Howard Simons, Former Science Editor, now a general Editor, Washington Post. Nieman fellow at Harvard during late 50's and early 60's, and involved in preparation of the famous Daedalus issue. Remains interested, but has drifted off from science writing.

Walter Sullivan, Science writer, N.Y. Times. Not only distinguished as a science writer, but very knowledgeable on Soviet science. Only drawback is his closeness to retirement, which means his invitation would represent a rather short-term investment.



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7 July 1969

To: U.S. Participants in Sochi Pugwash Conference

From: B. T. Feld

Re: Working Group and Paper Assignments

In our discussions last Friday on the preparations for the Sochi Conference, it was strongly felt that we should try to cover the main topics by papers, prepared and circulated in advance. We should aim at having the papers in Rotblat's hands by 1 October and, if possible, in my hands by 1 September, so that they may be circulated for discussion among the U.S. group before going to Rotblat.

The following are suggestions for working group participation and possible papers. Unless otherwise noted, these are suggestions. Other suggestions are solicited; nothing is frozen in concrete.

WG1: Doty, Feld, Rich

Propose paper by Goldberger on "Conditions for a Peaceful Settlement in Vietnam"

WG2: Shulman, Wohlstetter

Paper in preparation by Shulman on "Stages in the Future Evolution of Peaceful Coexistence"

WG 3 and 4: Garwin, Goldberger, Kistiakowsky, Long, Rathjens, Wiesner, York

Paper "volunteered" by Kistiakowsky, Rathjens, and Wiesner on "Spectrum of Possible Agreements on Nuclear Arms Limitation (Agenda for SALT)"

Proposed paper by Long on the "Status of the Underground Test Ban (threshold ban, inspection, plowshare)"

Paper to be prepared by Wiesner on "Problems and Prospects of GCD"

Paper suggested by Rich, possible collaboration with Garwin, on "Problems of Proposed Treaties for Limiting the Military uses of the Sea Beds (national territorial limitations, relevance to ASW)"

Proposed paper by Goldberger on "Responsibilities of Scientists in Inhibiting New Weapons Developments"

Paper by Munger on "Problems of Limiting Trade in Conventional Arms"

Proposed paper by Meselson on "Status of CBW Controls"

Rotblat

WG5: Djerassi, Rabinowitch, Revelle

Paper in preparation by Djerassi on "The Increasingly Dismal Prognosis for the Development of New Chemical Means of Contraception"

Proposed paper by Revelle on "Implementation of Policies on Population Control" (summary of Woods Hole Summer Study results)

Possible paper by Marshak on World University and/or International Science Foundation.

It was strongly felt that questions relating to China are notably omitted from the Sochi agenda. However, there are a number of agenda items where China problems can be brought in, not to speak of conversations in the corridors. It was suggested that we urge Rotblat to try to include some China experts in the invitees from other countries (e.g., Oldham, Wilson, Lin from Canada, Hodgkins, Sutherland from UK) and that, if we get another opening in our group, we consider adding Alan Whiting or Doak Barnett or John Lindbeck. Perhaps one or more of our papers should raise the problems of China and Arms Control (Wiesner, on GCD).

Can anyone suggest a prominent Nigerian scientists, reasonably close to his government and reasonably open-minded on Nigeria-Biafra issues, who could be invited to Sochi, who might come if invited, and who, if he came, might be willing to discuss informally with other Africans (including a Biafran) and scientists from the "great powers" problems of preventing mass starvation and malnutrition in Biafra?

BTCL

19th PUGWASH CONFERENCE ON SCIENCE AND WORLD AFFAIRS

"World Security, Disarmament and Development"

SOCHI, 22nd to 27th October 1969

REPORT OF WORKING GROUP 5

"Modern Science and Developing Countries"

I. A Comment on Pugwash's Goals

During the first plenary session of this 19th Pugwash Conference, the Secretary-General has posed to the participants the following question, raised in a letter from Mr. Cyrus Eaton: "Isn't it time for the entire Pugwash group to reaffirm the original goals of the founders?". Mr. Eaton goes on to say that the Conference "provides the perfect occasion for a forthright declaration to fire the imagination and enlist the support of the silent but concerned majority of the world".

The members of Working Group 5 have considered this question and wish to express to the Continuing Committee the following:

1. We believe that in reaffirming the original goals of Pugwash we should add that Pugwash is deeply concerned with the role of science and technology in development and that it wishes to dedicate a significant part of its effort to study means and ways by which the growing gap between the more and the less developed countries may be reduced, since such a gap is as much a threat to peace as the arms race.

2. We must call attention in this regard to the arms race of the developed ^{by} countries themselves - distracting their material and human resources from the urgent tasks of economic and social betterment. With regard to the increasing gap between the developed and developing countries, and the relative diminishment of assistance from the rich to the poor, we note the tragic irony of the fact that the food deficient non-communist developing countries (1.2 billion inhabitants) produced about \$60 billion of agricultural goods in 1967 - at the same time that the military expenditures of the U.S. and U.S.S.R. together is far in excess of 100 billion dollars.

3. We consider that the agenda of future Pugwash Conferences must always include one or more Working Groups dealing with problems of development (including the arms aspect), and that the organisers of future conferences should be so informed. Greater participation from developing

Pugwash

countries at these conferences is urged.

4. We wish that the Continuing Committee recommend to the US Pugwash Group that they hold a Symposium on some specific topic related to development in conjunction with the 20th Pugwash Conference. It is felt that representation from industrial and applied research sectors at such a Symposium might be of great value. Future symposia on topics dealing with development should be held regularly.

II. Some Pressing Problems in Developing Countries

Within its agenda, the Working Group investigated three problems which were felt to be of extreme interest in developing countries, but which affect developed countries as well. These problems are: inadequate food supplies and nutrition; population growth; water supplies.

1) Inadequate food supplies and nutrition. The Group considered several major aspects of this broad problem. The points were: (a) whereas the world view of malnutrition has centred increasingly on protein deficiency, it is clear that in fact an equally decisive factor is the insufficiency of calories in diets and the relationship of both of these deficiencies to the other social and economic problems of underdevelopment; (b) within the next critical 20-year period during which the population explosion will be essentially unchecked, there must be considerably more world-wide cooperative efforts to alleviate the world food shortage; on the one hand, greater production by natural means, namely higher yield and higher protein crops and greater meat production; on the other hand, unconventional protein production. Food preservation technology becomes of crucial importance in either situation; (c) questions of irreversible physiological damage arising from protein deficiency need more definitive scientific examination, in particular as regards impairing the learning ability of the affected children; (d) changing food habits is recognised as a major obstacle in changing the nutritional picture in depressed areas. It is felt, however, that insufficient effort has been made in investigating this question, both in terms of scientific research and social experimentation. The potential gains in meeting the food supply problems should be vigorously sought; (e) the introduction of the new high productivity agricultural technology has resulted in significant short term gains. However, it has also opened Pandora's Box in the sense that full utilization and extension of these new technologies will require massive expansion of research and development.

in all the related factors of production such as pest controls, fertilizers, etc., and in marketing and distribution systems. What is more, because the ecological, social and cultural impact will be so profound, the technology will have to be generated largely in the place of application.

It was felt that Pugwash should not only continue to explore these problems from an expert's point of view, but it should urge and direct the commitment of the world scientific community to these and other problems affecting the developing countries on a priority basis. We welcome, in this connection, the initiative of the Pugwash Group of the Federal German Republic, to hold a Symposium on the Protein Problem in preparation for the Second World Food Congress in which the Working Group expressed great interest.

Other major action by this Group will be considered in Section IV of this Report.

2) Population Growth. The increasingly inhibitory factors operating in the technologically advanced countries (notably the USA) for the development of new contraceptive approaches useful in developing countries has been emphasized in paper XIX - 1 "The Increasingly Dismal Progress^{nessis} for the Development of New Chemical Birth Control Agents". The Working Group supports the recommendation that while approval for public use of new contraceptive agents must be left in the hands of the regulatory agencies of each specific country, the approval for experimental clinical work should be taken out of their hands and given to an unbiased, international agency whose function it is to encourage the rapid development of new contraceptive approaches. The WHO, which already has two such committees with representation from developed and developing countries, appears to be the best agency for such a purpose and efforts should be made to have national government regulatory agencies accept the authority of the WHO on the matter of approving and monitoring clinical work on new birth control approaches.

The Working Group recommends that Pugwash mobilize public opinion on this hitherto neglected problem. Its urgency is underlined by the fact that a minimum of 10 years is required for the development of any new human contraceptive agent. In other words, the new contraceptive approaches of the 1980's should already now be under active investigation.

3) Water Resources for Arid Lands. Many of the developing and some of the developed, countries are facing, or will face, a serious shortage of water. The Group realizes that many international agencies are looking into this problem. It is felt, nevertheless, that Pugwash can make a significant contribution because, due to the fact that it is a non-governmental group, experts of all nations coming together under its auspices, can share their views and experience more fully and frankly than is possible in the atmosphere of official international agencies.

Africa
The French Pugwash Group will be covering a very important aspect of this problem in their planned Symposium in Dakar, where they will consider the problems of the training of the scientific and technical staff that developing countries will require to take advantage of the water programmes that are planned for them. Many similar efforts can be included in this problem, which is also closely connected with the ongoing studies on power supplies, about which another Symposium was held recently.

The Group recommends that Pugwash set up an International Study Group: (a) to review the available water resources; (b) to assess future needs, especially related to population growth, power availability, and arid land; (c) to recommend sources and uses of water for the period of water deficiency faced by numerous countries in the remainder of this century. It is stressed that it is not our intention to duplicate similar efforts by many other groups but rather use Pugwash's unique characteristics to ensure that a proper balance of all factors, technical, economic and sociological, is achieved.

Proposed
III. An International Foundation for Scientific and Technical Development

We recommend the establishment of an International Foundation (or Fund) for Scientific and Technical Development, to support research by scientists and engineers in developing nations in their own academic institutions and scientific laboratories. In making this recommendation we have in mind three objectives: (1) opportunities for younger scientists to do research at home would help to staunch the "Brain Drain"; (2) such opportunities would mobilize the abilities of many scientists and engineers for national development; (3) stimulation and support of research by university teachers would improve the quality of scientific and technical education.

We believe it would be feasible and useful to establish a Foundation along the following lines:

1. Research would be supported in those scientific fields which are (a) relevant to the problems of developing countries; (b) comparatively inexpensive in terms of equipment and highly trained manpower. Among such relevant and inexpensive fields are high polymer physics, semi-conductors and thin films, metallurgy, fluid mechanics, and physics of materials; most kinds of chemistry and biochemistry, many kinds of biology such as physiology, genetics, nutrition and ecology of plants and animals (including human beings); psychology; demography; geology and solid earth geophysics. Many other areas of research could be added to this list.
2. In applied science, emphasis should be placed on those kinds of research for which there is ^{no} particular need in the developed countries - for example, development of technologies which are most appropriate to local conditions, ^{physics and ecology of} tropical insects, etc.
3. Within the specified fields, the quality of the proposed research and the competence of the investigator, as evaluated by a review committee of scientists, should be the primary criterion for granting support.
4. The special need for continuity of support of scientists and technicians in developing countries should be recognised. Grants of funds should ordinarily be made for an initial period of three years, with assurance of renewal, provided review and evaluation at the end of two years is favourable.
5. The average size of grants should be relatively small, and there should be an upper limit on any single grant. Tentatively, we suggest an average of \$8000 per year, or \$24000 for three years, and an upper limit of \$50000 for three years.
6. Encouragement should be given to groups of three or four scientists at a single institution to submit joint or combined proposals for research in a single field or in closely allied fields, in order to build the "critical mass" which is necessary for a centre of excellence.
7. In many institutions the infrastructure for high quality research is lacking. It will be necessary to provide support for technical

assistants to the research workers, including glass blowers, electronic technicians, instrument makers, maintenance men, in addition to scientific and shop equipment, books and journals.

8. Applications will be favoured from scientists and engineers who will provide research opportunities for students.

9. Up to half the salary of a faculty member in an academic institution could be included in a grant, to make it possible to release him from a commensurate part of his teaching and administrative duties when this is desirable.

10. Any research proposal from an individual or group of investigators would need to be approved by the responsible officials of their own institution before it could be considered by the Foundation. All grants would be made to the institution and not directly to the investigators, unless the institution requests otherwise. The money would be spent according to the requirements of the investigators, in accordance with the usual practices of the institution.

11. Many research projects would occasionally require access to expensive and complex equipment, such as mass and X-ray spectrometers, magnetic resonance instruments and large computers. The Foundation should facilitate arrangements with institutions possessing these equipment, to provide services to grantees. This would have the great advantage of stimulating cooperation between scientists of different institutions. Alternatively, regional centres for expensive instruments might be established in the developing areas.

12. The Foundation should be able to seek funds for its operations from interested governments ~~xxxxxxx~~ and intergovernmental agencies as well as from industries and foundations in both developed and developing countries. Support might be sought, for example, from chemical, oil, and mining companies, electronic, computer and other high-technology industries in the developed countries, and their subsidiaries in developing countries, and major public and private sector industries in the developing countries. Support could be in cash or in "kind".

13. The Foundation should be initiated on an experimental, relatively small-scale basis, and should concentrate at first on one or a small number of research fields. The initial budget should be large

enough, however, so that the administrative expenses of the Foundation will be a relatively small fraction of its funds. We suggest a level of \$2 million per year for the first three years, with administrative expenses not to exceed \$250,000. This would be enough for a staff of 5 professional scientists, plus supporting personnel, adequate travel funds for the staff and expenses of meetings and site visits by review committees.

14. The Foundation should be given an appropriate legal status. A widely experienced and broadly representative governing board for the Foundation would be a basic prerequisite for success. We suggest, for example, that the members of the Advisory Committee on Science and Technology in Development, of the Economic and Social Council of the United Nations, may be a suitable group of persons to serve on the governing board.

15. The composition and mode of formation of review committees to evaluate research proposals is also critical. The International Scientific Unions, National Scientific Societies, and National Academies or Research Councils, might be asked to nominate panels of reviewers. Review Committees should have members from both developed and developing countries, and there should be wide geographical distribution.

It should be emphasized that the proposed Foundation will be, and indeed should be, only one of several sources of research support. Research supported by the industries, different agencies and governments should be major parts of the total research effort.

IV. Future Action of the Working Group

The Working Group felt that in the past the action of Pugwash in the field of development has not been very effective because of lack of continuity and adequate preparation. Therefore, it wishes to suggest to the continuing Committee that the Working Group may propose an agenda for the next Conference, and maintain informally a core of people that will keep in touch between Conferences to ensure that the proposals made by the Working Group are followed up and reported at the next Conference. In particular, the Group suggests to the organizers of the 20th Conference the following items for the agenda:

- a) International Foundation (Fund) for Scientific and Technical Development.
- b) Population Problems.
- c) Problems of Food Supply
- d) Past Experience With and Future Prospects for Scientific and Technical Aid to Developing Countries.

Economic aspects should be considered in every one of these problems.

Further, the Working Group hopes that the organizers of the 20th Conference will prepare a symposium to be held close in time to the Conference itself on a subject related to the problems of developing countries. The suggested title is: Priorities of Research and Development for the Seventies in Developing Countries".

To ensure that there will be close cooperation between the organizers of the 20th Conference and the members of Working Group 5, it was suggested to appoint a very informal committee whose job will be to work out the detailed agenda for Working Group 5 during the 20th Conference, and for the Symposium just mentioned. The names suggested for this committee are as follows: Hansen, Parthasarathi, Varsavsky, Engelhardt; they will cooperate with the Pugwash Sub-Committee on Development of the American Academy of Arts and Sciences.



American Academy of Arts and Sciences

280 Newton Street

Brookline Station, Boston, Massachusetts 02146

Telephone 522-2400

11 November 1969

To: U. S. Pugwash Alumni

From: B. T. Feld, Chairman, Academy Committee on P-COSWA

Re: Annual report

This occasion, of sending you the statement issued by the Continuing Committee at the conclusion of the recent Pugwash Conference in Sochi, provides me with the opportunity to report to you on our activities of the past year and our plans for this next one.

As usual, we have mainly been concerned with arranging appropriate American participation in Pugwash Conferences and Symposia -- in London in April, on "Economic Aspects of Energy Production", in Marianske Lazne, in May, on "Role of Science and Scientists in National and World Affairs" (also, a meeting of the CBW Study Group and of the Continuing Committee, held at the same time), and in Elsinore in September on "An International Agency for the Collection and Dissemination of Information on Potential Crises". Reports on these Symposia have appeared in recent issues of the Pugwash Newsletter.

You will note from the enclosed list of attendees at the Sochi Conference that we were able to send 15 participants and 3 science writers. The calibre of the latter helps to account for the high level of press coverage achieved.

Those of us who attended the Sochi Conference feel that it was one of the most productive and interesting conferences of recent years. We hope that the intensity and constructiveness of the discussions will be repeated at next year's Conference, to be held at the Abbey Inn, on Lake Geneva, Wisconsin, on Sept. 9-14, 1970.

The title of this Conference will be "Peace and International Cooperation: A Program for the Seventies". We plan to divide into five Working Groups: on International Security Problems, Problems of Disarmament, Problems Arising from New Technological Developments in Armaments, Problems of International Cooperation and the Development of Appropriate Institutions, and Technological Aspects of Development.

Since the US group will be host to the 20th Pugwash Conference next September, it was our privilege to nominate the President of the Pugwash Conferences for 1969-1970. Prof. Eugene Rabinowitch has been elected by the Continuing Committee to this post.

Symposia planned by various national Pugwash groups for the next year include:

1. "Arms Control and Disarmament Measures in Europe" - Poland, Dec. 9-12, 1969.
2. "Protein Problems" - West Germany, May 19-23, 1970.
3. "International Cooperation in Science in Europe" - Netherlands, June 5-8, 1970.
4. "Economic Consequences of GCD" - East Germany, April 10-12, 1970.
5. "Problems of Human Ecology" - Prague, May, 1970.
6. "Water Resources and Education of Technical Personnel" - West Africa (French group), Dec., 1970.

7. "Impacts of New Technological Developments on Arms Control", USA, early summer, 1970.
8. "Priorities of Research and Development for the Seventies in Developing Countries", USA, summer, 1970.

Of these, only the first three can be considered as definitely scheduled at this time. Nevertheless, I would appreciate hearing from you concerning your possible interest in participation in any of these, as well as in the 20th Conference next September, and also any suggestions you may have for other possible participants, especially from among the "younger generation" of American scientists.

Which brings me to the perennial problem of finances. Our regular budget is around \$40,000/year, of which half is provided (this year and next) by a grant from the Ford Foundation. For the other half, for which we depend on help from the American Academy, other Foundations, and generous individuals, we have so far only managed to raise around \$10,000 this year.

In addition, over and above our regular budget, we need to cover the expenses of the 1970 Conferences. We are fortunate that the Adlai Stevenson Institute has agreed to act as co-host for this Conference, and has assumed the responsibility for raising the bulk of the necessary funds. There remains around \$15,000 more which we shall need to raise to cover all of the expenses of preparing and running the 20th Conference.

Beyond this, we have incurred a special expense of \$5,000 in connection with the Sochi Conference: this involved the bringing to Sochi on our initiative of two scientists from Biafra and one from Nigeria to participate in the discussions of this problem in the Working Group on Current Conflicts. These discussions, both in the group and in private, turned out to be most encouraging; I believe that the participants on both sides, if they are able to communicate successfully to their governments both the flavor and substance of the exchanges which took place, could contribute markedly to progress in bringing an end to that conflict. If so, our monetary investment will have been extremely worthwhile. But in any case, we shall need to find a way of reimbursing the Academy for money advanced.

The main source of funds which can be used for such purposes, as well as for some of the other needs mentioned above, is through contributions from individuals made to the American Academy of Arts and Sciences for support of the activities of its Committee on P-COSWA. Pugwash alumni have been generous in the past in responding to my annual appeal for such contributions; I urge you to be even more generous this year in view of our special needs. Furthermore, if you know of any other individuals who might be approached toward this end, either directly by you or by me with your help, such information (and action) would be greatly appreciated. Contributions should be made to the American Academy of Arts and Sciences and sent to me (26-425, MIT, Cambridge, Mass. 02139). They are tax exempt.

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STATEMENT

on the 19th Pugwash Conference on Science and World Affairs

issued by the Continuing Committee

The 19th Pugwash Conference on Science and World Affairs met in Sochi from the 22nd to the 27th October 1969, at the invitation of the Pugwash Group of the USSR. The Conference was attended by 101 scientists from 29 countries; in addition there were 10 observers from international organizations and 8 science writers.

The Conference took place at a time when the world situation remains very serious. The arms race is increasing in intensity; weapons of mass destruction multiply and new weapons systems are being introduced. Most countries are increasing their arms expenditures not only without adding to their security but also to the detriment of badly needed investment to raise their standards of life, particularly in the developing parts of the world. Armed conflicts are actually going on in several areas of the world; in addition to the suffering that they bring to the peoples involved, they present serious dangers of escalation into a global conflagration.

Under the title "World Security, Disarmament and Development" all these problems have been discussed at the Conference.

Most of the work of the Conference took place in five Working Groups which discussed the following topics: 1) Measures for terminating current military conflicts and keeping the peace; 2) European security; 3) Reduction and elimination of nuclear weapons and delivery systems; 4) Biological and chemical weapons; 5) Science and developing countries.

The reports of the Working Groups were presented and discussed at plenary sessions of the Conference. The statement that follows has been prepared by the Continuing Committee on the basis of these reports.

1. MEASURES FOR TERMINATING CURRENT MILITARY CONFLICTS, AND KEEPING THE PEACE.

Since the 18th Pugwash Conference in Nice, in 1968, the state of the local armed conflicts in Vietnam, Nigeria, and the Middle East has become even more dangerous and tragic. Regarding Vietnam, even though the Paris talks continue, and even though the military operations during the past few months have been at a relatively lower level, no significant results towards a peaceful settlement seem to have been achieved. In Nigeria, the conflict still continues. No agreement has been achieved for relief of the millions of innocent people who suffer and die of malnutrition and disease. In the Middle East the cease-fire has become an undeclared but growing war.

Vietnam

The Group discussing these problems considered that complete withdrawal, as quickly as possible, of American troops from South Vietnam is a necessary condition for the establishment of peace in that country. It also felt that a very substantial and very rapid reduction in the strength of American forces would facilitate achieving a cease-fire, and aid in the negotiations for a political agreement among the parties in South Vietnam. To facilitate a settlement of the Vietnam conflict, it is necessary to promote the setting up of a coalition government in the South.

It was stressed that the goal must be an end to the war, and not the so-called "Vietnam-ization" of the war. Only when this senseless and tragic conflict comes to an end will it be possible to devote attention to the necessary and pressing tasks of political, social and material reconstruction.

Nigeria

It was agreed that an immediate cease-fire without prejudice to the military position on either side could and should be achieved. This cease-fire ought to be internationally supervised by a group of countries or body acceptable to both sides.

It was felt that this cease-fire would create an atmosphere in which meaningful discussions for a political settlement could take place; it is important that such a political settlement should be achieved at the earliest possible date.

It was emphasized that such a cease-fire would greatly facilitate agreement for bringing medicine and food in to relieve the widespread suffering now going on.

Middle East

The Group noted the fact that the resolution of the Security Council of 22nd November, 1967, has been accepted as a whole, without modification, by most Arab countries and by Israel. The Group urges the remaining Arab countries to declare their acceptance of this resolution. Discussions took place on the ways by which this resolution could be unambiguously interpreted and effectively implemented.

In considering the grave situation in the Middle East, the Working Group proceeded from the statement adopted in the 18th Pugwash Conference in Nice:

"The Working Group has considered the Middle East question and taking into account the need to eliminate acts of war and to secure a just and lasting peace:

1. urges speedy implementation of Security Council Resolution No. 242 of 22nd November 1967;
2. urges the parties to cooperate fully with the Jarring mission to obtain this implementation;
3. suggests, as a guarantee of a peaceful settlement under the auspices of the United Nations, the temporary demilitarization of certain sensitive zones along the borders following the withdrawal of Israeli troops in implementation of the Security Council resolution;
4. suggests that restrictions on the supply of arms to contending parties, following the implementation of the resolution, should be considered."

The Group emphasizes its deep regret at the delay in implementing the UN resolution and urges fast action towards its complete implementation.

On this problem, as well as on the problem of Nigeria, the frank exchange of views which took place was made more fruitful by the presence of scientists from the two sides of the conflicts.

2. EUROPEAN SECURITY

The present situation in Europe, characterized by the existence of two military blocs, is highly unsatisfactory because of the danger of military conflict and the political tensions involved. The aim must be the creation of a system for European security and the dissolution of the military blocs. The creation of such a system is not an easy task which could be realized in a short time. However, meanwhile many important steps can be taken which would reduce the danger of conflict and lessen mutual fear and suspicion. Such measures might include the conclusion of agreements banning the use of force, and mutual reduction of the levels of military forces and weapons in Europe. Thus the problem is two-fold: to search for, and work towards a system for European security without military blocs, and meanwhile to take all possible steps to improve the situation in the short term.

The Group supported the idea of a European security conference between governments and welcomes initiatives for such a conference by any government. Such a conference could contribute to the solution of both problems. Some members felt that this conference should lead to the establishment of a permanent body, which might possibly take the form of a regional Security Commission for Europe, perhaps under the United Nations. It was stressed by some participants that in their opinion such a conference could be held only with the full participation of the USA and Canada. Others stressed that the question of the participation of the US or Canada was a matter for decision by the participating European states. The Group also supported the idea of non-governmental conferences on European security and cooperation.

The Group reaffirmed the statement made at the Pugwash Conference in Ronneby in 1967 that all existing European borders, including the borders between the two German states and West Berlin should be recognized; that both German states should be admitted to the United Nations; and that it would be important for European security if all states would recognize the German Democratic Republic, without prejudice to the possible future unification of the two German states. The Group further declared itself in favour of the initiation of negotiations between the governments of the Federal German Republic and the German Democratic Republic to establish normal and equitable relations between those two states.

As has been stressed repeatedly by Pugwash, friendly contacts between East and West in different fields should be encouraged and developed.

One aspect of such contacts is the movement of people, goods and information. Some participants strongly felt that total abolition of censorship would considerably decrease the tension in Europe and help to promote mutual understanding. More particularly, when there is an international conflict all countries should make the views of the other parties fully known to their citizens through the media of mass communication. Others, while fully agreeing with the principle of expanding in every way the exchange of information contributing to the mutual understanding among the peoples of Europe, do not share, at the same time, the view that the principle should apply to propaganda for war, racism, fascism, and other concepts undermining the foundation of peace, international security, and cooperation among nations.

The Group pointed to the need for abolishing discrimination in trade practiced by some states in relation to others.

If contacts between East and West are to contribute to peace and cooperation they should take into account the existing realities, social, political and ideological, in countries belonging to different systems, otherwise they may create additional tension and arouse suspicion.

There are many ways of developing fruitful cooperation on an all-European scale. One proposal which found general support was to expand the agenda of the European Security Conference to include the elaboration of arrangements for European cooperation in all fields. A suggestion was made that consultation on economic policy may forestall economic crises whose repercussions could extend through the whole of Europe. Cooperation might be useful on such problems as pollution, not only by exchange of information and techniques, but also joint action in such case as water pollution in which the effects can transcend national boundaries.

For cooperation in these and many other fields it may be desirable to set up European regional organizations either ad hoc or under the existing UN agencies. Moreover, the Group felt that such agencies could not be developed as extensions of the existing Western European agencies such as OECD.

At the request of the Czechoslovak Pugwash Committee the Group unanimously deleted "Czechoslovakia and European Security" as a separate item from the agenda. References to this topic, expressing very conflicting views, were made in the discussion on some other items of European security.

3. REDUCTION AND ELIMINATION OF NUCLEAR WEAPONS AND DELIVERY SYSTEMS

The prospect of another escalation in the strategic armaments levels of the US and the USSR is now a particularly acute problem because of the possibility of Anti-Ballistic Missile (ABM) and Multiple Independently Targetable Re-entry Vehicles (MIRV) deployment, which will lead to a new and very dangerous stage in the steeply ascending spiral of the strategic arms race. Deployment of either of these weapons systems would almost certainly have the effect of introducing large uncertainties into the calculations made by both sides of the level of strategic armaments required to deter a nuclear attack. It would seem virtually certain that strategic force levels would be greatly expanded; this is due to the combination of the assumption by each side that the capabilities of the other would be at the highest possible level, with the assumption that its own capabilities are at the lowest level of the range of uncertainty. Such an approach has been used in the past as a pretext to justify very great arms increases. Experience shows that this approach, instead of making the world safer, has resulted in a diminution of the security of all nations. An expansion of armaments will not only increase the waste of resources and the danger of accidental or unauthorized launching of nuclear-armed missiles, but will also increase the probability of nuclear war, since one or another of the major nuclear powers might conclude that there are advantages to be gained by striking first rather than accepting the risk of a first blow by its adversary.

With these considerations in mind, the Group concluded that early negotiation of an agreement to limit strategic armaments was a matter of highest priority, and that indeed the urgency was particularly great with respect to the deployment of ABMs and MIRVs and the testing of the latter. Action on this problem should be at the top of the agenda of the Soviet-American Strategic Arms Limitation Talks (SALT). The Group heartily welcomed the announcement that these talks are to begin on 17th November in Helsinki.

Effective deterrence can be obtained with a drastically reduced level of nuclear stockpiles. Movement towards such reduced levels would provide opportunities for making progress toward general and complete disarmament.

Recognizing the danger of further proliferation of nuclear weapons capabilities, the Group believes that early ratification and implementation of the Nonproliferation Treaty, with the participation of the greatest number of states, including all the nuclear and potential nuclear weapons states, is a matter of great urgency. Hope was expressed that progress in the Strategic Arms Limitations Talks will encourage adherence to the Nonproliferation Treaty by all nations.

The possibilities of preventing the placement of weapons of mass destruction on the seabed, and extending the Nuclear Test Ban Treaty to cover all environments, were discussed, and the Group favoured the implementation of treaties to achieve these purposes.

It was urged that countries that have not yet subscribed to the partial Test-Ban Treaty should do so now. Concern was expressed about the extent of present underground nuclear testing. There was a consensus that difficulties in detection of underground tests have been reduced to the point where they are no longer a serious impediment to extending the Test-Ban to include underground testing.

It was felt that there is considerable and unwarranted complacency on the part of the general public and among many officials about the seriousness of the present situation in the nuclear arms race. The enormity of the destruction that would result from a full scale nuclear war with present stockpiles of nuclear weapons is simply not comprehended by the general public. Scientists have a great responsibility to help educate the public about this.

(The full text of the Report by this Working Group is attached, Appendix A.)

4. BIOLOGICAL AND CHEMICAL WEAPONS

The Group reviewed the data now available in relation to means of eliminating the use of chemical and biological (CB) weapons.

The UN report on the possible effects of the use of CB weapons, emphasizing the need for an effective international ban on the development, production and stockpiling of these weapons adopted by delegates from 14 nations seemed to hold great promise for the negotiation of such a ban. The technical reports on CB weapons from the Stockholm International Peace Research Institute (SIPRI) and WHO will also help in preparing an effective ban.

The Geneva Protocol of 1925 has been an effective instrument of conventional law, and all nations should be urged to ratify it. Steps beyond the Protocol, which only bans first use of CB weapons, are urgently needed. Dangers of weakening the Protocol can be foreseen if new adherents were to interpret it as permitting the use of chemical agents in war of which the customary peacetime use is restricted to riot control, and use in agriculture. In war-time, for example, riot control agents can be used to increase the lethality of conventional weapons. Ways of defining acceptable peace-time uses of chemical and biological agents therefore needs careful study.

In addition to the Protocol, efforts must be made to ban development, production, stockpiling on home or foreign territories, and transfer of technical expertise on weapons development between nations. Since biological weapons are not now used, it may be possible to outlaw them completely, but separating biological from chemical weapons might outweigh the advantages of this partial measure. Efforts might better be concentrated on banning simultaneously further development of both types of agents. In the meantime, any unilateral action by a nation to ban production and, where relevant, eliminate stockpiles of any of these weapons would be a positive contribution towards a total ban.

The Group considered the two CBW-disarmament-related topics that SIPRI had undertaken on the recommendation of Pugwash. A progress report was heard on the BW inspection experiment. It was felt that this experiment had yielded fruitful results both as regards the technical problems of verifying observance of nonproduction agreements, and as regards arousing the interest and active participation of several countries, both East and West. The Group recommended that Pugwash/SIPRI convene an international symposium to consider (a) to include an evasion exercise, and (b) to explore the problems of verifying observance

of agreements outlawing chemical weapons.

A progress report was made on the work in Sweden on rapid detection and identification methods for BW agents. The Group felt that this work, which was still in its early stages, was potentially very useful, and reiterated the recommendation of the Pugwash CBW Study Group that a workshop be convened to discuss the results to date, and to explore further the technical problems involved. It was felt to be essential that experts from national CBW defence laboratories should participate in the workshop.

5. SCIENCE AND DEVELOPING COUNTRIES

The Group concerned with this subject expressed the belief that Pugwash should be deeply concerned with the ways in which science and technology may help to narrow the gap between the more developed and the less developed countries, since this gap is as much a threat to peace as the arms race between the developed countries. Attention was called by it to the increasing expenditures on arms by the developing countries, detrimental to their economic and social betterment. Three problems, felt to be of extreme interest for the developing countries, but also affecting developed countries were discussed in some detail: inadequate food supplies and malnutrition; population growth, and water supply, particularly in arid lands.

Food Supplies. The relative roles of protein deficiency and calorie deficiency in the developing countries were discussed; the interdependence and importance of both of them was recognized. The possibility of irreversible damage to children's mental development caused by protein deficiency in early age, even after the first six months of their lives, was considered as calling for further study. The favourable result of the introduction of new high-yield strains of cereals was noted, but so were the complex problems that have to be solved to make proper use of the potentialities of these crops, such as fertilizer supply, pest control, marketing distribution, etc. It was pointed out that all these techniques will have to be developed in the country itself and could not be imported.

Population. The problems of developing contraceptive methods adequate for use in developing countries were discussed. The slowness with which this development can proceed in advanced countries because of stringent regulations imposed on clinical experimentation was pointed out, and the need for the developing countries for testing procedures fast enough to permit application in the next decade was stressed. The possibility of transferring the control of clinical testing -- as distinct from that of actual distribution -- to an international agency was discussed.

Water. The problem of water supplies is already being considered by many international agencies. One point that seems to have been overlooked is the need of the developing countries to acquire the technical infrastructure necessary to take utmost advantage of the programmes on development of water resources prepared by the international agencies, and possibilities of Pugwash playing a role in this field were discussed.

International Foundation for Scientific and Technical Development. With the aim of supporting research by scientists and technologists of developing countries in their own academic institutions and laboratories, the Working Group suggested as worthy of study the proposal of an International Foundation (or Fund) for Scientific and Technical Development, already recommended in two previous Pugwash Conferences. A rather detailed outline of the structure of this Foundation and of the types of research to be supported by it, was proposed. The Group suggested that funds should come to this Foundation not only from governments and intergovernmental agencies, but also industries, foundations and individuals. The legal structure of the Foundation should be such as to ensure a highly competent governing body, and review committees from respected scientists from both developed and developing countries.

Finally, the Group made recommendations tending to ensure the continuity of the action of Pugwash in the field of development.

(A shortened version of the Report of this Working Group is attached, Appendix B.)

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In the discussions, both in the plenary sessions and in the Working Groups, the urgent need for all scientists to concern themselves with these life-or-death problems has been repeatedly stressed. The importance of reaffirming the original goals of Pugwash -- as expressed in the Russell-Einstein Manifesto, issued in 1955 -- was emphasized, and the need was expressed to expand these to include problems which have since arisen, particularly in relation to the developing nations. It is no longer sufficient, as has mainly been the case until now in Pugwash, to bring in senior scientists; involvement of the younger generation of scientists and students is vital for the attainment of our aims. It is, after all, the young who will have the task of preserving and securing our heritage.

APPENDIX A

19th PUGWASH CONFERENCE ON SCIENCE AND WORLD AFFAIRS

"World Security, Disarmament and Development"

SOCHI, 22-27th October, 1969

REPORT OF WORKING GROUP 3

"Reduction and elimination of nuclear weapons and delivery systems"

Problems of Strategic Arms Limitations

The discussion relating to problems of limiting the strategic arms race was an extension of that which developed in the plenary session on the ABM. It included an elaboration of views expressed in several of the papers presented to the Conference.

The prevention of further escalation of the strategic arms race is a task of the greatest urgency. All participants welcomed the fact that a date and place for the beginning of negotiations between the Soviet Union and the United States on strategic arms limitations has been announced.

Several developments, notably the further development of Multiple Independently Targetable Re-Entry Vehicles (MIRVs) and ABM defences, unless stopped, will almost certainly lead to a new spiral in the arms race with adverse consequences for the US, the USSR, and the world as a whole. If that were to happen, at best, we might expect strategic forces ultimately to level off at a much higher level with the dangers of nuclear war increased, the problems of reducing strategic armaments made vastly more difficult, and with substantial resources having been wasted. At worst, a nuclear war might occur because one or other of the major nuclear powers might conclude that there are advantages to be gained by striking first rather than accept the risk of a first blow by its adversary.

The majority of the Group felt that continuing growth in Soviet and American strategic armaments would have an adverse effect on the policies of other nations. They might be less willing to refrain from the development of their own independent nuclear weapons capabilities. Efforts to reach early agreement in the SALT talks would be the most important evidence of the willingness of the Soviet Union and the United States to comply with the obligations accepted by them in Article 6 of the Non-proliferation Treaty.

The Group felt that a limitation of the present strategic forces would be of the greatest importance in developing momentum towards reductions in strategic arms levels and other disarmament and arms control measures.

The task of halting the arms race is a political problem in its own right, not simply a problem for technicians, and its solution would contribute to the alleviation of other political difficulties. However, political conflicts, which must be resolved, should not be permitted to interfere with efforts to halt the strategic arms race, which has become to a large degree a self-generating phenomenon with a life of its own.

Attention was drawn to the negative consequences of employing worst-case analysis methods to military problems: i.e., the combining of assumptions that adversary capabilities will be at the extreme upper limits of their possible range with assumptions that one's own capabilities will be at the minimum level of the range of uncertainty. Application of these principles has been used as a pretext to justify very great arms increases to establish a reliable "level of security". Experience shows that the use of this method has not in fact made

the world more safe, but rather has resulted in a diminution in security for all nations.

Development of MIRVs and deployment of ABM systems are particularly likely to introduce large uncertainties into the determination of force requirements, and so are likely to lead to extreme examples of "worst case" analysis, and hence to a considerable escalation in force levels.

The deployment of ABM defences and testing and deployment of MIRVs needs to be stopped urgently. This could be accomplished in one of several ways: as the first order of business for SALT, by tacit agreement, by simultaneous declarations, or by an initiative to halt such activities on the assumption that reciprocal action by the other side will follow. Immediacy is indicated because once a MIRV-ABM era begins it would be extremely difficult to limit strategic arms, and because the difficulties of monitoring a MIRV ban would increase rapidly with additional tests. An early moratorium of limited duration on MIRV testing and ABM deployment could be of great value for this reason and also because it would provide time to negotiate comprehensive agreements in the SALT talks.

In recent public discussion attention has been focussed primarily on measures to stop deployment of strategic weapons. But each step in the arms race starts with research, development and testing. In principle, action should be imposed to constrain these processes as well. However, in research and development, it is hard to distinguish between military and non-military programmes and between those that are desirable and those that are not. Moreover, it is also difficult if not impossible to impose effective monitoring and control. But field testing, which in most cases can be monitored unilaterally, seems a particularly effective point at which to take action -- action which could have a major effect in slowing down the arms race.

A comprehensive ban, discussed later, on the testing on nuclear warheads would be one constraint of this kind.

Members of the Group have arrived at the conclusion that the existing level of strategic armaments, tens of thousands of megatons, cannot be justified by considerations of deterrence, security or by any other rational motives. It was estimated that a full scale nuclear war would kill a large percentage of the population of the Northern hemisphere, a region representing more than 90% of mankind. Furthermore, it is likely that this havoc would set in motion abnormal psychological and physiological events that could take the lives of most of the survivors.

Effective deterrence can be obtained with a drastically reduced nuclear stockpile level. Movement toward such levels would provide opportunities for making progress toward general and complete disarmament. Ultimately, substantial progress towards general and complete disarmament will require the participation of all of the nuclear powers and other large nations as well. However, the Group felt that the development of nuclear capabilities by other nations and the fact that some have not yet been participants in discussions of arms control and disarmament need not be serious impediments to progress on partial arms control and disarmament measures affecting the strategic forces of the major powers.

Dangers of Nuclear Proliferation

Recognizing the danger of further proliferation of nuclear weapons capabilities, the Group believes that the early entry of the Non-proliferation Treaty into force with the participation of the greatest number of states, including all the nuclear and potential nuclear weapon states, is a matter of great urgency.

The Group examined the adverse consequences for the proliferation of nuclear weapons represented by the development of gas centrifuges for the separation of uranium isotopes. It was felt that the threat of proliferation was of the same order as that due to the widespread use of nuclear reactors, and therefore that a system of safeguards similar to that already proposed for the control of plutonium should be developed and applied to gas centrifuges or other methods of uranium separation if and when they are brought into production. It was also felt that the IAEA should be consulted during the design stage about the early incorporation of safeguard facilities into any centrifuge production plant.

Prohibition on the Emplacement of Weapons of Mass Destruction on the Seabed

Although its immediate effect may be limited, the Group recognized that the Seabed Treaty would be a useful arms control measure and a practical first step towards the complete demilitarization of the seabed. Some concern was expressed about possible ambiguities which may arise in the Treaty which presently prohibits the emplacement of instruments of mass destruction on the seabed if they are not navigable. One can foresee the possible development of moveable instruments on the sea bottom which contain nuclear missiles or other weapons of mass destruction. We believe the Treaty would be strengthened considerably if it specifically prohibited the emplacement of unmanned weapons of mass destruction including those which might be navigable. Such a formulation would not affect manned submarines, but would have the effect of making less likely the development of new types of undersea weapons systems, such as "crawlers" on the sea bottom.

Nuclear Test Ban Treaty

Concern was expressed about the extent of present underground nuclear testing and about the possibility that some tests have apparently been conducted in such a way as to result in venting of radioactive materials in possible violation of the present treaty.

It was urged that countries that have not subscribed to the present Treaty do so.

There was a consensus that difficulties in detection and identification of underground tests using unilateral systems have been reduced to the point where this need no longer be a serious impediment to extending the test ban treaty to prohibit underground testing for weapons development.

Some members suggested that extension of the test ban to cover underground testing would be desirable as a part of SALT or as a parallel measure. Indeed, it was suggested that a comprehensive test ban might be politically feasible only in the context of SALT -- or if there were otherwise an agreement on ABM deployment. Others argued that an effort to achieve a comprehensive test ban would be desirable in any case.

Nuclear Accidents and Unauthorized Launch of Nuclear Weapons

It was concluded that in view of the very large number of nuclear weapons and delivery systems deployed throughout the world, there is a very real prospect of an accident occurring which might have catastrophic consequences. The risks will probably increase if MIRVs and ABM are developed and deployed. In reaching this conclusion we are mindful of the argument that ABM systems may be useful in coping with missiles launched accidentally or without authorization. However, we are sceptical about ABM systems being effective in this role because of the difficulties of obtaining authorization to launch interceptor missiles at the time required. Moreover, we feel that the adverse effects on the arms race and the disadvantages of ABM missiles themselves being launched accidentally will more than offset whatever utility ABM deployment may have in dealing with accidentally launched offensive missiles.

The Social Responsibility of Scientists

It was felt that there is considerable and unwarranted complacency on the part of the general public and among many officials about the seriousness of the present military situation, a complacency which is in part the result of our having had certain limited successes in arms control such as the Partial Test Ban Treaty, but which is primarily the result of our having lived with nuclear weapons without their having been used for over two decades. The enormity of the destruction that would result from a full scale nuclear war with present stockpiles of nuclear weapons is simply not comprehended by the general public. Scientists have a great responsibility to help educate the public about this.

The group was concerned that the credibility of scientists could be severely damaged by scientifically irresponsible statements by individuals even if those statements are motivated by the highest moral considerations.

There was a discussion about whether ethical standards among scientists with respect to particular areas of scientific investigation are the responsibility of the social and professional communities of which scientists are a part, or exclusively that of the individuals. The problem arose particularly in the context of consideration of whether scientists should work on military projects, for example, CB weapons. A special Pugwash symposium on this problem was suggested.

The UN has in recent years appointed groups of experts to enquire into the consequences of the use of nuclear and chemical and biological weapons. In each instance the General Assembly has passed a resolution calling on governments to disseminate the report as widely as possible to their people. In many countries governments have failed lamentably to do this. The public remains ignorant and the work of the group of experts is in danger of being wasted in obscurity.

The Group felt strongly that all governments which have not already done so should be urged to disseminate these reports, translating them where necessary.

Concern was expressed that our discussions on strategic arms problems are conducted in a frame of reference that might be very alien to that of many of the younger generation and to the people of the developing countries. It was suggested that we, and presumably students and other younger people, might benefit if some were invited to future Pugwash meetings.

It was also suggested that it was important to encourage young people to take informed opposition to the arms race, and that perhaps a special manifesto to enlist their support would be desirable.

APPENDIX B

19th PUGWASH CONFERENCE ON SCIENCE AND WORLD AFFAIRS

"World Security, Disarmament and Development"

SOCHI, 22-27th October, 1969

REPORT OF WORKING GROUP 5 (shortened version)

"Science and developing countries"

We believe that Pugwash should be deeply concerned with the role of science and technology in development and dedicate a significant part of its effort to study means by which the growing gap between the developed and the developing countries may be reduced, since such a gap is as much a threat to peace as the arms race.

We call attention to the arms expenditures of the developing countries themselves -- detracting their material and human resources from the urgent tasks of economic and social betterment.

Some Pressing Problems in Developing Countries

The Working Group investigated three problems which were felt to be of extreme interest to developing countries, but which affect developed countries as well: inadequate food supplies and nutrition; population growth; and water supplies.

Inadequate food supplies and nutrition. The Group considered several major aspects of this problem, such as: (a) The world concern with malnutrition has centred increasingly on protein deficiency, but an equally decisive factor is calorie insufficiency of the diets, and the relationship of both of these deficiencies to the social and economic problems of underdevelopment, (b) Within the next 20-year period, during which the population explosion will be essentially unchecked, there must be considerably more intensive world-wide cooperative efforts to alleviate the world food shortage than there is now. Both greater food production by natural means -- growing higher yield and higher protein content crops and greater meat production -- and unconventional means of protein production, such as yeast grown on various materials, must be pursued. Food preservation technology acquires a crucial importance. (c) Questions of irreversible physiological damage arising from protein deficiency need closer scientific examination, in particular in regard to impairing the learning ability of children affected by the deficiency after the age of six months. (d) Changing food habits is a major obstacle to changing the nutritional picture in many depressed areas. It was felt that insufficient effort has been made in studying this question, both in terms of scientific research and those of social experimentation. (e) Introduction of new high-productivity agricultural techniques has resulted in significant gains. However, it has also opened Pandora's Box; full utilization and extension of these new technologies will require massive expansion of research and development in many related areas such as pest control, fertilizers, etc., as well as in marketing and distribution systems. The new technologies will have to be generated largely in the area of their application, and not imported from abroad.

It was felt that Pugwash should not only continue exploring these problems but should urge and organize the commitment of the world's scientific communities to these and other problems affecting the developing countries.

Population Growth. The inhibitory factors affecting, in the technologically advanced countries, the development of new contraceptive techniques were emphasized. Yet this development, of no great urgency for the developed countries, is of critical importance for the developing ones. To accelerate it one should -- while leaving approval for public use of new contraceptive agents within a country in the hands of its present regulatory agencies -- transfer the responsibility for the approval of experimental clinical work in this field to an international agency whose function will be to encourage rapid development of new contraceptive techniques. The WHO, which already has two smaller bodies with representation from developed and developing countries, appears to be the best agency for this purpose; national regulatory agencies should accept the authority of WHO in the matter of approving and monitoring clinical work on new birth control techniques.

Pugwash should alert public opinion to this hitherto neglected problem. Its urgency is underlined by the fact that a minimum of 10 years is required for the development of a new human contraceptive agent, so that contraceptive techniques to be used in the 1980's should already now be under active clinical investigation.

Water Resources for Arid Lands. Many developing and some developed countries are facing, or will soon face, a serious shortage of water. Many international agencies are looking into this problem. It was felt, nevertheless, that Pugwash could make a significant contribution to this problem because, being an unofficial body, it can help experts of all nations to come together to share their views and experience more fully and frankly than is possible in the atmosphere of official international agencies. It can help in bringing together scientifically, technologically, economically, and sociologically oriented specialists.

An International Foundation for Scientific and Technical Development. The establishment of an International Science Foundation to support scientific and technological research in developing nations in their own academic institutions and scientific laboratories was recommended in two previous Pugwash Conferences. This plan was explored by the group in considerably greater detail than before. It was suggested that the foundation be called International Foundation for Scientific and Technological Development. Its purposes would be: (1) to provide opportunities for younger scientists to do research in their home country, thus helping to staunch the "brain drain"; (2) to mobilize the abilities of many scientists and engineers for national development; (3) to stimulate and support research by university teachers to improve the quality of scientific and technical education.

The following characteristics of the proposed institution were suggested.

1. Research should be supported in those scientific fields which are (a) relevant to the problems of developing countries; (b) comparatively inexpensive in terms of equipment and highly trained man power.

In applied science, emphasis should be placed on those kinds of research for which there is no great need in the developed countries -- for example, development of technologies which are most appropriate to local conditions and raw materials, physiology and ecology of tropical insects, etc.

2. Within the selected fields the quality of the proposed research and the competence of the investigator, as evaluated by a review committee of scientists, should be the primary criterion for granting support.

3. The average size of grants should be relatively small; that is, the Foundation would not be expected to support "big science". On the other hand, the special need for continuity of support of scientists and technicians in developing countries should be recognized.

4. Encouragement should be given to groups of three or four scientists at a single institution to submit joint proposals in order to insure the necessary "critical mass".

Support for technical assistants to the research workers, scientific and ship equipment, books and journals, could be included in the applications.

5. Applications should be favoured from applicants who will provide research opportunities for students.

6. Research proposals from individuals or groups would need to be approved by their own institution before being considered by the Foundation.

7. Some research projects would require access to expensive and complex equipment. The Foundation should facilitate arrangements with institutions possessing such equipment to provide services to grantees; this would stimulate cooperation between scientists of different institutions. Alternatively, regional centres for expensive instruments might be established in the developing areas.

8. The Foundation should be entitled to seek funds for its operations from interested governments and intergovernmental agencies as well as from industries, foundations and individuals in both developed and developing countries. Support could be in cash or in "kind".

9. The Foundation should be given an appropriate legal status, and a widely experienced and broadly representative governing board should be provided.

The formation of review committees to evaluate research proposals is also critical. The International Scientific Unions, National Scientific Societies, and National Academies or Research Councils, could be asked to nominate panels of reviewers, with members from both developed and developing countries.

The above outline is very tentative, and it should be again discussed in forthcoming Pugwash Symposia or Conferences.

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SOCHI, 22nd to 27th October 1969

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