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PUGWASH NEWSLETTER

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CONTENTS

From Munich to Varna

Pugwash operations for the next quinquennium got off to a busy start. The first meeting following Munich was the 28th Pugwash Symposium held in Oslo from 21-24 November 1977. This Symposium dealt with a conceptual area difficult to pin down - militarism and national security - and further exploration of the subject within and outside of Pugwash is necessary before concrete results can be expected. Perhaps the report and background documentation (see pp. 96-101) will stimulate scholars and research workers in universities and peace research institutes to additional work in this field. The Norwegian Pugwash Group, hosts to the Symposium, made excellent local arrangements for the discussions in a lodge on the snowy mountainside on the outskirts of Oslo. A blizzard on the last day almost caused me to miss my Paris flight connecting for Rio de Janeiro where I was to participate in a virology meeting.

Taking the usual advantage of my professional trips for other organizations I was able to hold stimulating and productive meetings with Pugwash scientists in Rio and Sao Paulo. A strong Pugwash nucleus is developing in Brazil and it is hoped that the Brazilian Association for the Advancement of Science will disseminate information about Pugwash in their official publications, thanks to the interest of the current president Professor Oscar Sala (physicist) and other prominent members of the Association.

Thence to Mexico City where I had the pleasure of visiting the Third World Center for Development where the 29th Pugwash Conference will be held in August 1979. The Center, which was established a few years ago, has excellent facilities for a Pugwash Conference and in a meeting with its Director-General, Dr. B. F. Osorio-Tafall, and several Mexican scientists including Pugwash Council and Executive Committee member Miguel Wionczek, plans were discussed for preparations for the Conference by the Mexican Pugwash Group.

The Pugwash Executive Committee met in Geneva on December 17 and 18 where important decisions were made on activities during the next several months. These included submissions to the UN Special Session on Disarmament (UNSSD), May/June 1978, and the UN Conference on Science and Technology for Development (UNCSTD), in Vienna September 1979. Two Pugwash submissions are planned for the UNSSD: a draft treaty for the renunciation of nuclear weapons, which is now in the final stages of drafting by a group coordinated by Bernie Feld (see Pugwash Newsletter May 1977, p. 123 for an early draft); and a statement on chemical warfare (CW) by the CW steering group coordinated by Jorma Miettinen.

Work has started on Pugwash inputs to the UNCSTD in 1979. One of these inputs will be the result of a Pugwash Workshop on Guidelines for International Scientific Cooperation for Development held near Delhi, India, on January 10-14, 1978. Further development of the guidelines and a background document are in the hands of a steering committee established at the Workshop (see below), and comments will be solicited at a Pugwash Workshop on the UNCSTD to be held in Morocco 20-22 April of this year.

The Executive Committee in its December 1977 meeting also discussed the wider dissemination of Pugwash publications and a streamlining of contributions of working papers for Pugwash meetings. It was candidly recognized that some of the working papers submitted by participants to

Pugwash meetings were not of sufficient quality, originality and brevity. These characteristics will be taken into account in deciding which papers will be accepted for reproduction for meetings and for publication. Deadlines for such submissions will be strictly adhered to.

The Executive Committee also recognized the particular difficulty we an encountering in ensuring high quality participation for meetings in the heavy schedule facing Pugwash this year (see Calendar p. 103). National Groups are being called upon to submit nominations for the various meetings as soon as possible so that orderly preparations can be made.

Preparations are well advanced for the Workshops and Symposia during the next few months to be held in Poland, Morocco, Canada, Ghana, and USA (see Calendar and agendas pp. 103 & 104).

Thus we are in full swing on the way to Varna following the mandate for Pugwash operations laid down at Munich. This mandate imposes heavy obligations on all of us, and the burden carried by the Council, Executive Committee and our very small secretariat must be shared if we are to maintain and increase our influence and impact on disarmament and development - our major concerns.

M. M. K.

WORKSHOP ON GUIDELINES FOR INTERNATIONAL SCIENTIFIC COOPERATION FOR DEVELOPMENT

Badkhal Lake, Faridabad, India, 11-14 January 1978

This Workshop, hosted by the Indian Pugwash group, was held 11-14 January 1978 at Badkhal Lake, Faridabad, which is some 25 miles south of Delhi, India. Badkhal Lake provided an excellent venue for the Workshop - privacy, comfortable quarters, excellent food, delightfully cool clear weather, and nothing to do apart from the working sessions. Our Indian hosts, as at the Madras Conference, managed all logistic and secretarial needs with great efficiency. A background working document was prepared by Prof. B. Udgaonkar which served as a basis for the spirited discussions. Because of the importance of the subject and the need to have a finished document as a Pugwash input for the 1979 UN Conference on Science and Technology for Development (UNCSTD) a steering committee consisting of Galal, Kaplan, Oldham, Udgaonkar and Wionczek was designated to carry the work forward. Drafts of the guidelines and a background document will be submitted for comments to the Pugwash Workshop on the 1979 UNCSTD (Morocco, 20-22 April 1978) and the steering committee will continue to work on at the Varna Conference and final versions should be ready for the Executive Committee in December 1978 for official Pugwash transmission to the UNCSTD.

Participants in the Workshop were:

M. Innas Ali (Bangladesh)
E. E. Galal (Egypt)
Dorothy Hodgkin (President)
M. M. Kaplan (Director-General)
P. J. Lavakare (India)
H. Marcovich (France)
M. G. K. Menon (India)
Y. Nayudamma (India)
C. H. G. Oldham (U. K.)
A. Parthasarathi (India)
V. Ramalingaswami (India)
S. Siddiqui (Pakistan)
B. M. Udgaonkar (India)
M. S. Wionczek (Mexico)

NATIONAL PUGWASH GROUPS

REPORTS OF ACTIVITIES DURING 1972-77

In connection with the discussion on the future organization and activities of Pugwash at the Quinquennial Pugwash Conference in Munich in August 1977, the Director-General asked the Chairmen and Secretaries of National Pugwash Groups to provide him with reports on the organization and activities of each Group during the past five years. In particular, he asked for information about the following:

(a) the structure and organization of the Group (membership, governing body, type and frequency of meetings, etc.);

(b) any association with other scientific organizations in the country, e.g. Academy of Sciences;

(c) a report of activities over the past five years.

Edited versions of the replies received from twelve National Pugwash Groups are printed below. The reports from other Groups will be published in the next issue.

Austria

(a) Pugwash is represnted in Austria by the Vereinigung österreichischer Wissenschaftler(Union of Austrian Scientists). VöW is a public body which can be joined by any scientific worker. It now has about 200 members, the majority working in the natural sciences. There is a small membership fee. No particular recruiting actions are taken.

The work of VöW is organized by a committee which, according to Austrian law, is elected every three years. It consists of ten members and meets, as need arises, about four times a year.

(b) VöW is not formally connected with any other organization in Austria, but on a personal basis it has excellent relationships with officials of other organizations, including the Austrian Academy of Sciences. These contacts have been helpful in improving the financial status. Funds are largely provided by the Federal Government, but this did not in any way influence the principles and activities of the Group.

(c) VöW holds about three or four public meetings a year. Generally, discussions are held on subjects of concern to the Pugwash Movement. Recent examples are: dangers to the environment, and concepts for science in Austria.

There were also two reports, on the tasks and aims of the International Institute for Applied System Analysis (IIASA), and on the limitations of weapons systems and questions of disarmament.

In 1977 the Austrian Pugwash Group published a booklet "Weltprobleme und Wissenschaft" (World Problems and Science), with articles on disarmament, population growth, energy supply, the development of the Third World, as well as a short history of the Pugwash Movement. Most of the 5000 copies printed were distributed free to students in high schools all over Austria. This has been an enormous success; many schools wrote highly complimentary letters and asked for additional copies.

The main international activity was the organization of the 24th Annual Pugwash Conference in Baden in 1974.

Belgium

The Belgian Pugwash Group was officially formed in 1972. All members are

scientists, mainly senior workers in institutes of learning and fundamental research. Most of the members are associated with the Universities in Brussels, Liege and Ghent. Each of these centres organize local informal meetings to which non-members may be invited. Each centre may propose the nomination of new members.

Whenever necessary, but a least once a year, full meetings are held, usually in Brussels, to nominate new members, and discuss questions of general interest.

(b) The Group is not associated with any scientific body and is not supported by any authority.

(c) The activities of the Group include distribution of documents issued by Pugwash, SIPRI and other organizations. Since Belgium is divided into two linguistic communities, every document is issued in both languages. For this reason the central office has two secretaries, one for Flemish and one for French. Documents written in English are not translated.

Among the problems discussed by the Group were: nuclear and other energy sources; nuclear danger and safety; aid to developing countries in the field of scientific research and teaching; the role of the scientists and of Pugwash.

Czechoslovakia

(a) The Czechoslovak Pugwash Committee has 17 members, who are leading scholars of the Czechoslovak Academy of Sciences, the Slovak Academy of Sciences and of universities and colleges. The work is organized by a Secretary.

The Committee meets according to need; its main task is to prepare participation of Czechoslovak scientists in Conferences and other events organized by Pugwash.

(b) The Committee works under the auspices of the Czechoslovak Academy of Sciences, which is the supreme scientific body in Czechoslovakia. The activities of the Committee are financed by the Academy, which is also financing the participation in events organized by Pugwash.

(c) The Pugwash Committee has sent participants to all Conferences organized by the Movement in the past five years and to some Symposia, particularly those relating to chemical warfare.

At meetings of the Committee Czechoslovak participants report on the deliberations and results of individual events. On the basis of these reports the Committee adopts views on the various topics discussed in the Pugwash Movement and draws conclusions about its further activities.

Federal Republic of Germany

(a) In the Federal Republic of Germany Pugwash is represented by the Vereinigung Deutscher Wissenschaftler (Federation of German Scientists). At present VDW has about 300 members. Membership is by invitation only and candidates must be sponsored by at least two members; they must be scientists or scholars of good standing. The VDW is governed by an Executive Board of six members elected by the Assembly of the VDW. There is also an Advisory Council of 10 members which assists the Executive Board. The Assembly meets at least once a year during the Annual Conference of the VDW.

(b) There is no official association with other scientific organizations although many leading figures of the scientific community in the FRG are members of the VDW.

(c) The main activity of the FRG Pugwash Group was the organization of the 27th

Pugwash Conference in Munich, the largest of all Pugwash Conferences held up to now.

The other international activities were: the 27th Symposium on "Problems of Militarily-Oriented Technologies in Developing Countries", held in Feldafing in 1976, and the 8th Workshop on Chemical Warfare, held in Leverkusen in August 1977.

National activities included the Annual Conferences of the VDW, each of which is devoted to a specific subject of immediate political interest. The subjects for the past five years were: 1973, limits to growth; 1974, the influence of science on politics; 1975, technical, economical and political condition of energy supply; 1976, technology in developing countries; 1977, physician, patient, and the pharmaceutical industry.

Finland

(a) The Finnish Pugwash Committee is a joint committee of the Finnish Academy of Science and Letters and the Societas Scientiarum Fennica. It has four members, nominated by the Academies, and a Secretary-General appointed by the Committee.

(b) The Finnish Pugwash Committee receives modest support for its activities from the Ministry of Education.

(c) The Finnish Pugwash Group organized a number of international meetings during the past five years, i.e.

June 1973	Helsinki Arms Control seminar, in Helsinki
Aug-Sept. 1973	23rd Annual Pugwash Conference in Aulanko
April 1974	1st Pugwash CW Workshop, in Helsinki
July 1975	Workshop on Prophylaxis of Organophosphate Poisoning, in Helsinki
May 1977	Symposium on The Arctic Ocean of Northern Europe in International Politics until 2000, in Helsinki (national symposium with invited foreign guests).

In addition, the Group organized national meetings, i.e. in 1975, a seminar on energy, in 1976 a seminar on population, and, in 1977, a meeting on the "Future of Pugwash".

India

(a) The Indian Pugwash Society has at present about 15 scientists on its membership list. They include prominent members from scientific agencies and academic institutes.

The activities of the Society are organized by an Executive Committee which meets several times a year, while the general body meets once a year. However, as a result of close interaction in connection with their official work the members are in touch with each other fairly often.

(c) The major international activity of the Group during the past 5 years was to organize the 25th Pugwash Conference which was held in Madras in January 1976.

In January 1974 the Indian Pugwash Society, in collaboration with the US Pugwash Group, organized in Hyderabad an "Indo/US Vikram Sarabhai Memorial Pugwash Symposium". The meeting made tentative identification of some specific problems in areas of agriculture, energy, environment, and materials, in which joint research work could be undertaken for mutual benefit.

Following the Dar es Salaam Symposium on "The Role of Self-Reliance in Alternative Strategies for Development", which was held in June 1975, the Indian Pugwash Society and the Tanzanian Pugwash Group jointly brought out a Pugwash monograph under the title "Pugwash on Self-Reliance",

eidted by W.K. Chagula, B.T. Feld and A. Parthasarathi, and published in New Delhi.

Israel

(a) The Israel Pugwash Group has eleven members, most of whom work in the natural sciences and mathematics. This membership is considered satisfactory both in number and composition. New members are co-opted by the consensus of existing members.

The Group meets about once a month in order to discuss Pugwash matters, in particular those relating to the Middle East.

(b) The Group has no official affiliation with any organization, but includes senior members of the Institutions of Higher Learning.

The Group has no funds for travel, but the Inter-University Committee (which has government funds) has at times helped out; occasionally the government helps directly. Members of the Group have access to the government, when an exchange of ideas is indicated, but the Group is independent.

(c) The activities during the past five years have been modest and included the following: periodic meetings and discussion of relevant topics, in particular in preparation for Pugwash Symposia and Conferences; meetings with foreign Pugwash members who happen to visit the country; occasional lectures on Pugwash in Institutions of Higher Learning; initiative in preparation of background papers by professional bodies on topics of Pugwash interest.

Italy

(a) The Italian Pugwash Group has no formal structure and its activities are at present co-ordinated by a small core of about four to five people, all physicists, who constitute the Executive Committee of ISODARCO (International School on Disarmament and Research on Conflicts) which has official status and is authorized to handle the necessary financial transactions.

(c) The main activity of the Italian Pugwash Group was to organize the Biennial International School on Disarmament and Research on Conflicts. A detailed report on ISODARCO is given on pp. 80-83.

Switzerland

(a) The Swiss Pugwash Group is at present an informal organization, but it is intended to structure it as an "Association" according to the Civil Code; this will happen as soon as permanent finances can be found.

(b) There is no formal association with other organizations, but there are personal links with academic institutions.

(c) The main activities of the past five years have been:

The First Pugwash Workshop on a "Code of Conduct on Transfer of Technology", held in Geneva in April 1974, and

The 7th Pugwash Workshop on a "Draft Treaty on a World-Wide Nuclear Weapon-Free Zone", held in Geneva in April 1977.

United Kingdom

(a) The membership of the UK Pugwash

Group is about 100. The members of the Group meet once a year. Its activities are organized by an Executive Committee of 10 members, which meets several times per year. The Committee is elected every 3 years by the whole Group.

(b) There is no formal association with other organizations but on a personal basis there are contacts with the Royal Society and Universities. Funds are raised by public appeals. In this respect there is a close association with the "Society for Education in the Application of Science".

(c) The major activity was the organization of the Quinquennial Pugwash Conference which was held in Oxford in 1972.

In 1974 the Group sponsored jointly with the French Pugwash Group, the 20th Pugwash Symposium on An International Institute on World Energy Problems and on The Implications of the World Energy Situation, held in Arc-et-Senans.

In 1976 the Group sponsored one of the Workshops on Chemical Warfare, held in London. This meeting was notable for the participation of several retired military personnel with special expertise.

In August of every year the Group provides a panel of speakers for the International Youth Science Fortnight, discussing in a forum of about 500 young scientists matters of interest to Pugwash.

A major success was the organizing in September 1976 of a one-day Symposium at the Royal Society on the Fast Breeder Reactor in Relation to Energy Policy. This meeting attracted 350 participants, mostly senior scientists. The proceedings were published within two months in a book edited by Professor J. Rotblat, entitled "Nuclear Reactors: To Breed or Not to Breed".

United States of America

(a) Since no formal regulations exist for defining membership, the number of members in the US Pugwash Group is somewhat uncertain, a rough estimate is that the Group consists of about 200 persons.

The US Pugwash Group is governed by a Steering Committee of 10 persons, which meets 2-3 times a year. No formal meetings are held of the full membership; correspondence with members is the only way in which their contributions are received.

(b) The US Pugwash Group is jointly sponsored by the American Academy of Arts and Sciences and the US National Academy of Sciences. The American Academy is substantially more deeply involved and its Executive Officer serves as an ex-officio member of the US Pugwash Steering Committee; his office provides secretarial and administrative assistance for Pugwash activities. The American Academy has been very helpful in securing funds for the US Pugwash Group and the Central Office in London.

(c) Among the international activities was the 26th Pugwash Symposium, which was organized jointly with the Canadian Pugwash Group in May 1976 in Wingspread on "International Arrangements for the Nuclear Fuel Cycle". A volume of the collected papers has been edited by A. Chayes and W. B. Lewis and published by the Ballinger Publishing Company.

During the past four summers the US and Canadian Pugwash Groups met together at Pugwash, Nova Scotia to discuss possible joint efforts and significant topics of international interest. A statement calling for a renewed sense of urgency and concern about arms control problems was issued from the meeting held in 1974.

A joint meeting with the Indian Pugwash Group was held in Delhi in January 1974 (see report from the Indian Pugwash Group).

There were a number of national activities:

A meeting held in November 1972 in Racine on "The Future of the Sea-Based Deterrent" resulted in a monograph with the above title, edited by K. Tsipis, A. H. Cahn and B. T. Feld and published by the MIT Press.

In January 1975 a meeting in Boston on arms control was devoted to an analysis of the Vladivostok Agreements between the USA and USSR on limits of strategic nuclear arms.

Another study on arms control resulted in a publication under the title "Arms, Defence Policy and Arms Control", edited by F. A. Long and G. Rathjens and published in the summer 1975 issue of Daedalus.

The USA Pugwash Group arranged a special programme for presentation at the annual meeting of the National Academy of Sciences in April 1977, on the topic "Arms Control: Issues and Prospects".

Yugoslavia

(a) The Yugoslav Pugwash Conference is constituted on a federal basis and there are Pugwash Groups in each republic. The Federal Group is legally constituted with headquarters in Zagreb.

(c) On the international arena the Yugoslav Pugwash Group organized two Pugwash Symposia: the 16th, on the "Necessity, Opportunities and Obstacles for European Collaboration", held in Dubrovnik in April 1972, and the 22nd on "Science and Ethics" in January 1975 also in Dubrovnik.

According to federal principles other Pugwash activities are carried out by the Pugwash Groups in the republics; a number of lectures were organized with very good response. The Federal Pugwash Group is co-publisher with the Yugoslav Academy of Sciences of a periodical, Encyclopaedia Moderna, which has a circulation of 3000, and is mainly devoted to problems of peace and the influence of science in the contemporary world.

The International School on Disarmament and Research on Conflicts (ISODARCO)

The few physcists who constitute the core of the Italian Pugwash Group have organized, every second summer since 1966, an International School on Disarmament and Research on Conflicts. The idea was patterned on the model of the Summer Schools in Physics, which have now become a permanent feature of scientific life and were already well established, although less common, a decade ago. This model works very well; it has been followed without major changes every second year since 1966.

The School lasts about two weeks, and is held each time in a different location: in 1966 in Frascati near Rome, in 1968 in Pavia near Milan, in 1970 at Castello Duino near Trieste, in 1972 in Padova, in 1974 in Urbino, and in 1976 in Nemi near Rome. (For more details see Chart).

The programme is generally organized around a few major themes. Three or four lectures are held every day, with much time alloted for discussions; round table discussions and workshops on specific topics are also organized. The emphasis is on maximizing interaction between all the participants; this is greatly facilitated by accommodating, to the maximum extent feasible, all participants in the same place,

and by choosing as the venue for the meeting a quiet location, with sufficient touristic interest to attract participants who might otherwise not have wanted to come, yet without too many diversions close at hand (for this reason it has always been considered preferable to avoid large cities).

As the announcement of the School states, "the course is intended for people who either have a professional interest in these problems or who would like to play a more active and technically competent role in this field. It has an interdisciplinary character, and extends its subject matter from the technical and scientific side of the problem to its sociological and political implications." As it happens, the participants range from graduate students to junior (and occasionally senior) diplomats, from military personnel to "peaceniks" of various persuasions, from scientists to journalists. Such variety of background is an asset, making the discussions more lively and the exchanges more fruitful; it constitutes a minor problem for the more technical lectures. (The School has always devoted a fair amount of time to the dissemination of "hard" technical information by expert lecturers). From the beginning the School has prided itself in having a truly international character, with participants and lecturers from the socialist countries, from Western Europe, from America, from the Arab countries, from Israel; for obvious reasons participation from the Far East and the Far South has been minimal, although not altogether lacking.

The proceedings of the first two courses were issued in mimeographed form. The proceedings of the subsequent ones were published as books (and are now used as background material for peace-oriented courses at various Universities): "Disarmament and Arms Control" (C. Schaerf and F. Barnaby, eds.), Gordon and Breach 1972; "The Dynamics of the Arms Race" and "International Terrorism and World Security" (C. Schaerf and D. Carlton, eds.), Croom Helm, London 1975; and "Arms Control and Technological Innovation" (C. Schaerf and D. Carlton, eds.), Croom Helm, London 1977.

The next course will be held in Ariccia near Rome, on August 18-28, 1978. The main themes will be: (1) Energy and its Security Implications: (2) Violence at Sub-State Level; and (3) Current Disarmament Issues. The School will be advertised by a poster, and by an announcement published in some journals. Help in making the School known will be greatly appreciated. For information or suggestions, write to ISODARCO, c/o Istituto di Fisica, Universita di Roma, Piazzale delle Scienze 5, 00185 Roma (Italy).

The School has been supported by contributions from various sources, including municipal and regional administrations, the Italian Ministries of Education and of Foreign Affairs, the Italian National Research Council, UNESCO, the Ford Foundation. It is run on a very tight budget, thanks to the completely voluntary contributions of time and effort put in by its organizers; but the funding, in spite of its small size, is becoming an increasingly difficult problem. Of course, only funds with no strings attached are accepted.

ISODARCO is also running a research activity, on two small grants from the Italian National Research Council: the first on certain aspects of terrorist activity in Italy, the second on the physical security of fissile materials.

In conclusion, it should be emphasized that up to now the ISODARCO experiment has been a very successful one: it has established itself as one of the soundest peace-oriented educational enterprises; it is indeed probably quite unique in its broadness of geopolitical participation and in its standards of scholarship. For the organizers it has been an

inspiring, if occasionally trying, experience; and, most important, it has constituted an enriching and useful experience for all the people who have participated in it, many of whom are playing, and will be playing in the years to come, an important role in influencing, and possibly shaping, the policies of their countries.

C. Schaerf
F. Calogero
A. Pascolini

The International School on Disarmament and Research on Conflicts

Venue, date, no. of non-Italian participants + no. of Italian participants = total no. of participants	Countries represented (in brackets the number participants if more than one)	Lecturers	Main Themes
Frascati June 13-25 1966 26+10=36	Canada, Czechoslovakia(3), Denmark(3), FRG(2), Holland(4), India(2), Italy(10), Poland(2), Sweden, UK, Yugoslavia(3) and USA(4).	G. Arangio-Ruiz, R. Bjornerstedt, W. Epstein, K. Lapter, M. Marcovich, B. V. Röling, T. Stonier, P. Sylos-Labini.	Effects of nuclear weapons; Nuclear Strategy; Technical, political and economic problems of disarmament, of peace-keeping and of peace-making.
Pavia July 15-26 1968 37+11=48	Austria, Belgium(2), Czechoslovakia(3), Denmark, Finland, France, FRG(4), Hungary, Indonesia (2), Iran, Israel(2), Italy(11), Netherlands(3), Romania, UK(4), USA(8), USSR and Yugoslavia.	F. Calogero, V. Emelyanov, W. Epstein, B. T. Feld, J. Moch, M. Mishkat, J. Niezing, M. Kalkstein, M. Pivetti, L. Sohn.	Effects of nuclear weapons; CBW; ABMs; Disarmament and Verification; Peace-keeping; Economy of Disarmament; Gaming and Simulation.
Duino Aug. 17-Sep. 5 1970 46+9=55	Austria(2), Denmark, France, FRG, Holland(2), Iran, Italy(9), Jordan, Kuwait, Malta, Mexico, Mongolia, Poland, Rhodesia, Romania, Sweden(4), UK(5) USA(18), USSR(2) and Yugoslavia.	F. Barnaby, J. Ben-Dak, B. Brunelli, F. Calogero, A. Chammah, V. Emelyanov, W. Epstein, W. Gutteridge, M. Kaldor	Technology of weapons of Mass Destruction; History and Future Prospects of Disarmament; Dynamics of the Arms Race; European Security;

Venue	Countries	Lecturers	Main Themes
Duino (contd.)		K. Lapter, J. Moch, J. Perry-Robinson, A. Rapoport, O. Reutov, R. Richard, N. Sodnom, K. Tsipis.	Gaming and Simulation.
Padova Aug. 21-Sep. 5 1972 50+8=58	Austria, Belgium, Bulgaria, Canada, France, FRG(2), Holland, Iran(2), Iraq, Israel(3) Italy(10), Japan, Jordan(2), Kuwait, Lebanon, Nigeria, Saudi Arabia, Sweden(3), UK(4), USA(17), USSR, Yugoslavia(4)	R. Caracciolo, D. Carlton, F. Cavalletti, A. Dowty, W. Epstein, J. Goldblat, W. Gutteridge, J. Kashi, P. Kodzic, H. Leurdikj, J. Moch, H. Morgenthau, G. Rathjens, O. Reutov, J. Ruina, M. Sahovic, T. Schelling, K. Tsipis, H. York.	The Nuclear Arms Race; CBW; Theory of Conflicts and Related Case Studies.
Urbino August 12-24 1974 51+9=60	Austria(2), Belgium (2), Ethiopia, France (3), FRG, Holland(2), Hong Kong, Iran, Israel, Italy(9), Japan, Nigeria, Norway, Poland, S. Africa, Sweden (2), Switzerland, UK(6) and USA(23).	J. Barton, J. B. Bell, T. Blau, D. Carlton, L. Davis, L. Dumas, B. T. Feld, V. Gilinsky, P. Hassner, D. Heradstveit, B. Jenkins, H. Leurdijk, M. Nicholson, N. Pasti, S. Rosen, G. Silwowski, T. Stonier, H. York, C. Zoppo.	International Terrorism; The Arms Race; Nuclear Proliferation; European and Middle East Security; Peace Teaching and the Study of Conflicts.
Nemi June 22-July 7 1976 59+11=70	Australia, Austria(4), Bangladesh(2), Bulgaria, Canada, Finland(3), FRG, Holland(9), Hungary(2), Iran, Israel, Italy(11), Japan, Mexico, Nigeria, Norway, Senegal, Sweden(2), Chad, UK(6), USA (16), USSR(2) and Yugoslavia.	S. Baker, J. B. Bell, F. Calogero, D. Carlton, L. Dumas, A. Eide, W. Epstein, T. Halsted, E. Jacchia, M. Kaldor, I. Kende, P. King, K. Lapter, H. Levine, J. Miettinen, M. Milstein, M. Mushkat, M. Nacht, J. Perry-Robinson, W. Pfeifenberger, B. Röling, E. Schoettle, H. Scoville, T. Stonier, K. Tsipis, H. York.	New Technologies and their Military Applications; Nuclear Proliferation; SALT; History of Wars; The Economy of Arms Production and Trade.

THE FIFTH PUGWASH CHEMICAL WARFARE WORKSHOP

Cologne/Leverkusen, FRG, 17-19 August 1977

Participants

K. Babievsky (USSR)
Z. Binenfeld (Yugoslavia)
D. Borrmann (FRG)
H. L. Boter (Netherlands)
A. F. Childs (UK)
J. Franek (Czechoslovakia)
E. E. Galal (Egypt)
H. Hoffmann (FRG)
H. Hulpke (FRG)
M. M. Kaplan (Director-General)
Kh. Lohs (GDR)
S. J. Lundin (Sweden)
J. K. Miettinen (Finland)
D. J. Minich (Yugoslavia)
A. J. J. Ooms (Netherlands)
K. H. Risse (FRG)
R. E. Roberts (USA)
J. P. Perry Robinson (UK)
L. Scheichl (FRG)
K. J. Schmidt (FRG)
J. L. Spigarelli (USA)
W. Zeil (FRG)

Agenda

1. Visit to the R&D Laboratory of the Agrochemicals Division of Bayer AG at Wuppertal/Elberfeld.
2. Visit to the Analytical, Pharmacological and Toxicological Laboratories of the Agrochemicals Division of Bayer AG at Wuppertal.
3. Discussion on convertibility of commercial organophosphate insecticide plants to production of CW agents. Visit to the Dormagen insecticide plant of Bayer AG.
4. Presentation of results of analytical intercomparison runs on phosphonates in river water and phosphates in waste water. Discussion of methods of sampling and analysis and interpretation of results.
5. Use of questionnaires for verification of non-production of CW agents.
6. Planning the future activities of the Pugwash CW Study Group.

Report from the Workshop

1. Introduction

The Fifth Workshop of the Pugwash Study Group on Chemical Warfare (CW) was held in Köln/Leverkusen, Federal Republic of Germany, on 17-19 August 1977. Twenty-two participants from 12 countries attended. The agenda, list of participants and abstracts of papers are attached.

The main purpose of the Workshop was to find out whether it is possible to ascertain that nerve gas is not being manufactured in large-scale industrial plants producing organic phosphorus

commodities.

The Agrochemicals Division of Bayer AG kindly acted as hosts to this meeting which was arranged and financed by the FRG Pugwash Group on the recommendation of the Pugwash Council. Bayer AG is a chemical company whose products include large amounts of phosphorus-containing pesticides. Their plants located near Köln, in Elberfeld, Dormagen and Leverkusen, provided an excellent venue for the CW Study Group to explore the problems of verifying non-production of CW agents that would arise should on-site and/or near-site inspection be considered for incorporation into a CW Convention that would ban the development, production and stockpiling of CW agents. The Group acknowledges its warm appreciation to Bayer Agrochemicals Division for the opportunity presented and for the unstinting efforts of the Bayer staff to make the Workshop extremely rewarding.

The facilities and operations of the plants were laid open to the Study Group for inspection, with representatives of the management being on hand to answer questions. Bayer Agrochemicals Division did not consider this activity prejudicial to their commercial secrets.

The Group also used the opportunity of the Workshop for discussing, not only among themselves but also with Bayer experts, the results of an intercomparison study that had been run on the use by different laboratories of techniques of chemical analysis applicable to near-site environmental samples. One set of samples, a waste-water simulant, had earlier been furnished for the study by Bayer Agrochemicals Division.

The Group considers that Pugwash has served a commendable function in organizing and arranging the international collaborative efforts described in this Report, an undertaking for gaining experience and information that could not be contemplated at present at official levels.

In addition to the main purposes of the meeting as stated above, the Group felt that it would be valuable to make a general assessment of its activities over the past several years, in the light of the present state of the CCD negotiations on a CW Convention, and to consider what further action the Group might take during the next year or two.

2. Present Situation

The present situation on CW weapons remains highly disturbing because of the continuing failure, despite many years of negotiations at the CCD level, to arrive at a comprehensive treaty banning the development, production and stockpiling of chemical weapons. Large stocks of highly lethal nerve gases are now emplaced in, for example, Europe, ready for military operational use. Apart from the potential danger of their actual use in warfare, in particular the risk that they may serve as an escalating factor to the use of nuclear weapons, these stocks (already many years old) may develop leaks with the passage of time, exposing civilian populations to environmental contamination. It is urgent, therefore, that steps be taken in the nearest future to remove these stocks and destroy them.

The assessment of the Group, made at an earlier Workshop, is that the advantages of these weapons are highly questionable from a purely military point of view, and that the many disadvantages they possess, including the fostering of continuing mistrust and tension, and the risk of proliferation to other countries and areas of the world, reinforce the justification for their immediate and permanent removal from the already troubled European scene.

The many years of CW-treaty negotiation have witnessed the development of binary

munitions - a new generation of nerve-gas weapons that represent a marked qualitative advance in terms of military logistics. Binary weapons, if introduced into the military arsenals, would greatly increase the difficulties of achieving a worthwhile CW treaty: the Group strongly urges, as it has in the past, that all possible steps be taken to prevent a transition to binary weapons.

The slow pace of progress of official negotiations, thus far, for a comprehensive CW treaty leaves the way open for the emergence of still more dangerous chemical weapons. There are other dangers as well. Thus, chemical manufacturing capacity throughout the world could with, or even in some cases without, plant changes, be used for the production of CW agents, their intermediates, or binary precursors.

We therefore again call upon public opinion in all countries to urge the adoption of a comprehensive, adequately verified CW treaty which would for ever remove this dreadful class of weapons of mass destruction as a menace to mankind.

3. Review of Activities of the Pugwash CW Study Group over the Last Four Years

Since its inception after the Aulanko Conference in 1973, the Pugwash CWSG has held five Workshops and two round-tables. These have brought together experts in the CW field and concerned scientists from, particularly, both East and West, providing a forum in which new ideas about CW disarmament have been generated and information relating to the underlying problems exchanged and discussed in a frank and constructive manner. No other forum has dealt with this problem on a sustained basis. Out of this a number of initiatives in international cooperation have developed, which have provided experience regarding possible CW disarmament regimes. The site-visit to the phosphorus-pesticide production facility, around which the present Workshop was built, is one example.

The agenda of past meetings of the Group have been keyed both to matters that the Group has itself considered particularly important and to inflexions in the negotiations within the CCD. The two main pre-occupations have been with the scope of a CW disarmament convention and with its verification. As to the former, it is now apparent from the course of the CCD discussions that the comprehensive scope which had always been advocated by the Group, particularly as regards incapacitants, is now finding general acceptance among the participating governments. The question of scope is thus no longer a problem. Verification, on the other hand, remains a difficult issue. The Group has been searching continuously for means of reconciling the differences of view that exist on the need for intrusive regimes of observation and information; and there is now a significantly increased international understanding of the main concerns. Especially fruitful here has been the appreciation of the need for confidence-building measures: for it is clear that demands for intrusive means of verification are rooted in feelings of mistrust which, if they could be alleviated, would greatly simplify the verification provisions that are a necessary part of a CW convention. The Group has paid close attention to near-site techniques of verification involving the analysis of samples collected from outside the periphery of chemical facilities; to the declaration and destruction of CW stockpiles; to the possibilities of international cooperation in the treatment of nerve-gas poisoning; to data-reporting and monitoring techniques of non-production verification, particularly phosphorus accountancy; and to technical exchange visits. In some of these areas the Group has been able to advance specific proposals.

Throughout its work the Group has been conscious of the widely differing security implications that CW weapons have for different states, and, for this reason, of the danger of concentrating attention solely on the CW situation pertaining to the superpowers and their allies. The possibility of CW proliferation, for example, is judged to be a particularly serious danger warranting a commensurately high priority in the design of a CW convention and its verification provisions.

4. Results of the Present Workshop

This, the fifth Workshop of the Group, was devoted to verification, the main topics for discussion being, first, the prospects afforded by near-site analytical technique and, second, the technical information visits noted above.

The main overall feature of the Workshop was the opportunity it afforded for exploring the problems that possible verification procedures might present for commercial chemical enterprises. New insight was gained, in particular, into the matter of proprietary interest and its vulnerability to verification procedures. It transpired that, at least as regards some components of Western chemical industry, the concern of plant managements to protect industrial know-how extended less to on-site visits than to the disclosure of production data. Although many such data were routinely reported to governmental authorities, and might thus contribute to national verification schemes, the reporting was done in strict confidence and there would be great reluctance on the part of manufacturers for the data to receive a wider distribution, for example, to an international verification organ. In contrast, there might be considerably less reluctance to accept inspection visits from such an organ, even visits that involved the taking of samples of plant-throughput. Considerations such as this, and the manner in which it might differ as between East and West, would obviously need to be taken closely into account in determining the optimum balance of national and international means in the design of a verification regime. There was a need also to consider whether the national/international balance might not be struck rather differently as regards the verification of non-production, on the one hand, and of stockpile destruction, on the other.

A suggestion was put forward concerning a possible means for reconciling East-West differences over the need for on-site verification activities. If it was assumed that a CW convention would institute a Consultative Committee, the convention might also stipulate a procedure within that Committee for negotiations between directly concerned Parties to arrange mutual on-site observations. The reciprocity in these procedures should facilitate the negotiations involved in the verification process; in certain instances it might be possible that no on-site observations would need to be performed if other information exchanged during the negotiations proved sufficient to allay suspicions. The Consultative Committee as a whole might finally be informed of the outcome of the deliberations; if the results were positive, that information might be sufficient; if negative, the full reasons thereof might be disclosed. This closed procedure might protect vital information about the concerned parties, precluding its unnecessary dissemination, but might nevertheless keep all parties and the Consultative Committee sufficiently informed of the prevailing situation. This might solve the problem of getting a multilateral consultative committee operative.

The Group reiterated the following recommendations for consideration by governments as confidence-building measures prior to the conclusion of a CW convention:

(a) exchanges of invitations to witness CW

destruction/detoxification activities;

(b) mutual technical exchanges.

4.1 The site visit

The Director of the organophosphate insecticide plant (a plant containing several fixed production lines) which was visited, presented to the Study Group a detailed analysis of the problem of conversion of an organophosphate plant designed for the production of specific end-products for production of chemical warfare agents or their precursors. The problem of conversion was discussed in detail after the visit. The following conclusions were drawn:

4.1.1 Production of highly toxic warfare agents

A normal insecticide plant does not have today the safety arrangements that would make possible production of highly toxic CW agents. The absence or presence of such safety precautions could be verified by a trained inspector visiting the factory. However, with the increasing requirements for industrial hygienic standards the difference between plants producing moderately toxic and highly toxic products may decrease in the future.

4.1.2 Production of non-toxic precursors

The pesticide plant visited was designed for optimal production of the desired end-products. It did not, therefore, have the flexibility which could permit rapid conversion back and forth from pesticide to agent production. Time-consuming and expensive production-line alterations would be required. Experts indicated that this situation is characteristic of mass-production pesticide plants throughout the world.

4.1.3 Openness of operations

In technically highly developed societies the general nature of the production of commercial plants is well known to the workers of not only that plant, but even those of other plants of the same company, because a considerable exchange of workers is customary according to the demands of various products. Any unusual change in production, particularly to a highly toxic agent, would soon become common knowledge to the whole community. Many types of controls, carried out by health authorities, workers' unions, various government agencies, etc., exist, and make the operation of the plant in normal conditions highly transparent.

4.2 The problem of binary precursors

The possibility of the production of relatively non-toxic precursors of nerve-gas binary systems greatly complicates the verification of non-production of chemical weapons. Such production might be possible in a modern multipurpose plant. However, the number of phosphonate intermediates usable in binary systems is probably quite limited, and the feasibility of an accountability verification system should be investigated.

4.3 The intercomparison run on organophosphate trace analysis and identification

Analytical methods, suitable for identification of organophosphates in various media, have been discussed at earlier workshops of the Group, notably their potential contribution to near-site verification technique. Such methods have been further studied in several countries. In Spring 1977 the Group organized an attempt at an informal international analytical intercomparison run, including six countries and involving two samples, one simulating typical waste waters from organophosphate plants, the other a river water containing such wastes and also including phosphonates. The preliminary results warranted the

following conclusions:

(a) International intercomparison of methods usable for analysis of chemical warfare agents is possible and feasible.

(b) The analytical results reported were in satisfactory, even excellent, agreement, proving that the methods used were applicable in the participating laboratories for reliable analysis of organophosphates and phosphonates in waste and river waters in mg/l to µg/l concentrations.

(c) The results of the intercomparison study have to be carefully analysed. The analytical results as such, when the method is applied to environmental samples, cannot in themselves provide reliable verification of nerve-gas production or nonproduction. The applicability of such analyses has to be carefully evaluated for complementarity with other verification procedures. The following suggestions were made:

- The laboratories that participated in the intercomparison runs should continue the joint development of new methods for identification of organophosphates, particularly compounds containing a phosphorus-carbon bond, in different media.
- Samples from various water systems: rivers, lakes, estuaries, and different countries and latitudes should be studied.
- Intercomparison runs including such samples and samples of other media (air, soils, sediments, vegetation, carcasses of animals, etc.) should be conducted.
- More countries should join the intercomparison runs.
- The possibility of production of P-C-bonds, particularly Me-P bonds, by natural processes should be investigated.

4.4 Use of questionnaires for verification of non-production of warfare agents by production plants

Use of questionnaires for verification purposes was discussed with representatives of organophosphate industries present in the meeting. The opinion was presented that such questionnaires do not in themselves provide a feasible verification method because industry is not likely to release sensitive production data to any other bodies than their own government. However, use of a questionnaire as an inspector's aid should be further studied.

The experts from industry considered acceptable the release of quantitative production data only to a national authority and proposed an on-site visit as the method for international inspection.

Their experience with on-site inspections relating to

(a) Good Manufacturing Practice (GMP) within the pharmaceutical industry, and

(b) the verification activities of the Arms Control Agency of the Western European Union

has indicated to them that an on-site inspection can be carried out without undue risk to commercial secrets.

5. Future Activities of the Study Group

During the Workshop, several areas were identified in which it was felt that the Group could make useful contributions to progress towards a CW convention, the point being made once again that the activities of the Group themselves constituted a not-insignificant confidence-building measure:

(a) The insights gained during the visits to the chemical facilities in the Cologne area could usefully be extended by means of a visit to a chemical establishment in an eastern European country.

(b) The problems that CW weapons presented to the smaller countries, and to

countries in the Third World, were felt to need more attention, particularly the relationships between a possible proliferation of CW weapons and of other weapons of mass destruction in areas of local conflict. A Workshop might usefully be devoted to this subject.

(c) A continuation of efforts to jointly develop, test and refine analytical techniques applicable to CW verification problems.

(d) Further study of the role of questionnaires in verification measures.

(e) Visits to detoxification and destruction plants; analysis of existing experience and study of new possibilities for destruction.

(f) Further study and evaluation of CW therapeutic/prophylactic techniques. The opportunity presented by the forthcoming International Congress on Occupational Medicine (October 1978), when a large number of specialists in the field would be assembled in Dubrovnik, might be exploited for another round-table on the subject.

(g) Since the forthcoming United Nations General Assembly Special Session on Disarmament (Spring 1978) was potentially an opportunity to familiarize a wider audience with CW problems and to promote CW disarmament endeavour, the Group might create a working party to draft a submission to the Session. In this connection, consideration might be given to the idea of formulating a statement on measures to be taken in this field.

Summaries of papers

Z. Binenfeld (Yugoslavia)

MEASURES NEEDED FOR DESIGNING A DRAFT CONVENTION ON A CW BAN

All the initiatives in CCD regarding chemical disarmament, notwithstanding their positive implications, were blocked because of the mistrust between the USSR and the USA, and all the efforts lost their importance because of the unfulfilled promise of a joint Draft Convention on the ban of lethal CW agents. The principal point to be solved in CCD was the mutual concern of the USSR and the USA about how to prevent one side getting an advantage in the possible use of CW against the other side. The threat of CW to the non-CW states was practically neglected. Such important questions as the differentiation between CW and non-CW states, CW agents based on foreign territories, definition aimed at preventing the creation of new CW agents and weapons, were not adequately treated.

This Workshop should identify those questions that have to be clarified and precisely named in a Draft Treaty. The Pugwash secretariat could convene a Workshop to prepare a Draft Treaty; this should be a Pugwash contribution to the Special Session of the UN General Assembly on Disarmament. The proposed action could perhaps give the necessary impulse which, for either subjective or objective reasons, has so far been lacking in CCD.

D. Borrmann (FRG)

CAN CHEMICAL WEAPONS BE PRODUCED IN PLANTS DESIGNED FOR THE PRODUCTION OF NORMAL INSECTICIDES?

There are two sub-questions: Is such conversion technically feasible? Could it escape public notice? Both can be answered, in the case of large-scale organophosphate (OP) insecticide plant and G-agent nerve-gas production, by detailed consideration of the Bayer plant complex at Dormagen; and what holds for the OP facilities at Dormagen is likely to hold elsewhere also. As to technical feasibility, only tabun could in theory be produced, but even this would necessitate major changes in equipment and procedures. In West Germany any such alterations could not be done without attracting attention. Thus at Dormagen, the changes would soon be known throughout the plant complex, for there is a copious internal information flow due to the centralization of quality control and environmental control, to the meetings of the Workers Council, and to the recurrent shifting of workers from one plant to another within the complex. Then there is an external information flow because government licenses are required if new plant is to be built or an existing one modified: detailed process information must be given to several government agencies for the necessary impact assessments, and the plans must be published to admit any public opposition proceedings. In use, moreover, licensed plant is inspected at irregular intervals by Department of Trade and Industrial Control officials to ensure that only licensed products are being manufactured and that stringent environmental-protection regulations are being observed. Finally, there are the controls exercised by the WEU Armaments Control Agency in connection with the undertaking of the Federal Republic not to produce chemical weapons.

Kh. Lohs (GDR)

THE PROBLEM OF CW VERIFICATION AND FURTHER PUGWASH ACTIVITIES

We are all aware that disarmament verification presents a fundamental political problem. A lack of mutual trust is, however, constantly apparent in calls for verification, and for this reason it is not necessarily a barometer for confidence-building measures but rather serves to confirm an atmosphere of continuing suspicion. Since this is a political reality for the time being, scientists are called upon to solve scientific and technical aspects of verification problems. In doing so they must remain conscious that solutions to technical verification problems do not necessarily lead to a banning of the particular weapon systems in question.

International agreements reached so far on checking nuclear arms development and monitoring disarmament in the field of biological weapons have shown that, wherever political will exists to reach suitable agreements, technical preconditions for supervision can also be created.

Methods of verification can be achieved by many means. For example: inspection visits, studies of scientific and political literature, monitoring of economic data, sampling of collected materials from suspect plants noted as special targets (near-site sampling), health control of workers in critical factories and places, satellite intelligence etc.

There are many more technical and practical details of monitoring methods still to be discussed, for each year brings further scientific knowledge. Such discussions could be held for years and decades to come, and they might foster mutual distrust still further, because new methods of verification might lead a potential enemy to perfect his weapon system in order to circumvent any monitoring.

In the case of the verification problems mentioned here, it is my opinion that Pugwash should not allow itself to be pushed too far into technical discussions on chemical and physico-chemical methods of analysis; international symposia and congresses serve this purpose. This does not mean that we do nothing in this field, but a discussion of the scientific and technical problems of verification in a rarified academical atmosphere may be a bad approach to this essential question.

Pugwash should give greater expression to the political and moral will of those scientists throughout the world who urge effective steps to be taken to ban chemical weapons and call for a wider ban on weapons of mass destruction, both old and new. What we need is a good balance between concrete research work in disarmament and to convince scientific workers of the necessity to stop the arms race and achieve disarmament.

Kh. Lohs (GDR)

SYNTHETIC POISONS AS ENVIRONMENTAL HAZARDS OF GLOBAL CONCERN

Apart from the problems of environmental hazards by radioactive substances, most of the dangers by synthetic poisons are underestimated. Such synthetic poisons are found as wastes as well as by-products in the environment, and also when used in industry and agriculture. In the past, the environmental problems in connection with synthetic poisons were ignored for a long time until they reached the extent of an uncontrolled catastrophe. It is sufficient to refer to the oil disasters of the sea, the ecological damage by herbicide weapons in Vietnam, or the Seveso disaster by TCDD (Dioxin) in 1976. This dioxin is an example of a synthetic poison which can be treated as a potential environmental weapon, but there are many other poisons produced in chemical plants which can affect life and the environment in an irreversible way, and so produce delayed toxic effects.

We have to face the fact that our knowledge is still insufficient concerning the chemical problems of dangerous reactions by synthetic poisons. We need much more basic research in this field. We know today a lot about the synthesis of new chemical products and compounds, but we do not know enough about their detoxification, their metabolism, the long-range extension conditions in the atmosphere in connection with the chemical reaction that takes place between the components (for example amines and NO_x - gases building nitrosamines), or in the soil and in water. We have to learn more about the health risks involved in the deposition of such chemical compounds as well as their metabolic pathways in plants, animals and in the atmosphere. Through better knowledge one can avoid excessive optimism or unjustified pessimism. There is also the danger that a substance known as very

harmful will be replaced by another substance not less dangerous, especially as far as delayed toxic effects are concerned.

As long as our concrete knowledge is not sufficient enough and the scientists don't explain the relations to the public in a proper way, we leave the interpretation to half-informed journalists who sometimes are not able to distinguish between astrology or astronomy concerning the environmental problems.

S.J. Lundin (Sweden)

VERIFICATION OF A BAN ON CHEMICAL WEAPONS - A SUGGESTION FOR MUTUAL ON-SITE OBSERVATIONS

This paper concerns a suggestion on a possible means for reconciling East-West differences over the need for on-site verification activities. Assuming that a CW convention would institute a consultative committee, the convention might also stipulate a procedure within that committee for negotiations between directly concerned parties to arrange mutual on-site observations. The reciprocity in these procedures should facilitate such negotiations. In certain instances it would be possible that no on-site observations might need to be performed if other information exchanged during the negotiations involved in the verification process proved sufficient to allay suspicions. The consultative committee as a whole might finally be informed of the outcome of the deliberations; if the results were positive that information might be sufficient, if negative the full reasons herefore might be disclosed. This closed procedure might protect vital information about the concerned parties to be spread unnecessarily, but might nevertheless keep all parties and the consultative committee sufficiently informed of the current situation. This might solve the problem of getting a multilateral consultative committee operative.

J.K. Miettinen (Finland)

POTENTIALITIES OF EXTRA-MURAL ENVIRONMENTAL ANALYSIS IN VERIFICATION OF CW ACTIVITIES

On-site inspection may be the most intrusive and politically most unacceptable method of verification of compliance of a CW convention. Near-site verification should be politically and from the viewpoint of commercial secrets more easily acceptable.

Near-site sampling of, for instance, river water or air, can be relatively easily carried out even unofficially in peace time, at least anywhere where free movement, e.g. camping, is allowed. Inclusion of provisions of near-site analytical programmes into a CW Convention might also be politically more acceptable than on-site inspection.

The potentialities of near-site sampling and analysis are increasing with increasingly efficient methods of concentrating of environmental media and analysing trace components. Approximate detection limits for 15 instrumental methods are given. In air they lie generally between 10^{-6} and 10^{-12} g/m^3.

For near-site detection of nerve gases an enzymatic technique using detector

paper is also cited. When used in combination with an adsorbent tube by which a 10^5-fold concentration is achieved the sensitivity of the method extends considerably below physiologally active concentrations. Since production plants, research laboratories and stocks of CW agents are never completely sealed, clandestine operations would probably be considered too risky if an adequate extramural verification activity was operating.

J. P. Perry Robinson (UK)

NEAR-SITE VERIFICATION TECHNIQUE: ITS PLACE IN A CONFIDENCE-BUILDING STRATEGY OF VERIFICATION

The basic task of verification is to give parties to a CW convention a degree of assurance of not in the future being menaced by CW weapons that exceeds the degree of confidence imparted by possessing such weapons or by remaining able to acquire them. In theory, then, there is a threshold which objective analysis can translate into the minimum verification provisions that a particular state should be able to accept in a CW convention. But in practice there are subjective fears about embarking upon CW disarmament which must also be allayed. They are a function of the prevailing degree of mutual trust. In evaluating candidate verification techniques, two different criteria therefore need to be applied: capacity for detecting a significant treat violation; and capacity for building confidence among parties that the treaty is probably being observed. The use of complementary techniques each partly satisfying one or other criterion and together satisfying both should provide a synergy that would reduce the intrusiveness of the overall verification scheme. The verificability of a CW convention can be increased by unilateral actions: national data-collection capacity could be expanded, or existing data controls could be relaxed. Herein lies a route to that synergy. Because successive reciprocated relaxations could, below a certain threshold, successively reduce the demands placed on each party's data-collection capacity, a mechanism could be set in motion for counteracting the process whereby mistrust heightens verification requirements. This would not necessarily require that formal verification provisions be written into the CW convention. The provisions might be limited to the institution of a framework within which the mechanism could operate: undertakings, for example, for a continuing exchange of data on phosphorus consumption or on CW protection R & D, or for recurrent technical exchange visits. Near-site verification methods could play a variety of useful secondary roles.

J. Spigarelli (USA)

A DISCUSSION OF THE NEAR-SITE VERIFICATION TECHNIQUE

Previous discussions of the problem of treaty verification have led to the examination of the near-site, or perimeter, verification technique. Strategic factors, e.g. international vs. national verification and identification of sites, are of overriding importance to the actual implementation of any verification system; however, an examination of several operational considerations is useful.

This paper describes steps in the overall perimeter verification methodology.

Thus far, most emphasis has been placed on the detection and quantification step (instrumental analysis). Of equal, or perhaps greater, importance to the interpretation or relevance of the analytical result is the sampling process, i.e. how, what, when and where to sample. The proper selection of sampling media and time is imperative to obtain a "real time" indication of plant activities. The sampling of air and water are the most desirable media; soil and vegetation should also be considered, but kinetic considerations complicate the interpretation of the analytical results for the latter two media.

Instrumental analysis methods, and their sensitivities, which have been applied to the analysis of organophosphorus pesticide plants effluents in the U.S., are described.

A. Verweij, C.E.A.M. Degenhardt & H.L. Boter (Netherlands)

DETERMINATION OF PCH_3-CONTAINING COMPOUNDS IN A RHINE WATER SAMPLE AND IN A WASTE WATER SAMPLE

In order to check the applicability of a procedure to verify the presence of nerve gases, their degradation products or starting materials in the waste water of a production plant, an interlaboratory experiment was carried out.

In short, the procedure consists of hydrolysing the nerve agent or related products into methylphosphonic acid, concentrating this, converting it into the volatile compound dimethyl methylphosphonate by methylation, separating this from related compounds by means of a gas chromatographic column, and detecting it in minute quantities by using a specific detector for phosphorus.

The participants of the intercomparison study were provided with a Rhine river sample as a model for waste water, to which a certain amount (3.1 µg/litre) of dimethyl methylphosphonate was added. They were asked to carry out a duplicate analysis with 0.5 litre of the sample, following the prescribed procedure.

The concentrations calculated as dimethyl methylphosphonate reported by five participants were lying around the theoretical value mentioned above; the ratio of the highest and lowest value was about sixteen.

Using the same verification procedure two of the above-mentioned participants determined concentrations of 4.4 mg/litre and 6.7 mg/litre respectively of one or more PCH_3-containing compounds calculated as dimethyl methylphosphonate in a waste water cocktail which was known to contain polyphosphates, inorganic phosphates, phosphoric acid esters and phosphonic acid esters. The values reported turned out to be close to the theoretical amount (5 mg/litre).

Both investigations seem to indicate that a reliable and sensitive method to trace the possible presence of nerve agents, their degradation products or starting materials in waste water has been developed.

Twenty-Eighth Pugwash Symposium

MILITARISM AND NATIONAL SECURITY

Oslo, Norway, 21-24 November 1977

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O. Wilkes (Norway)
H. Wulf (FRG)

List of papers

U. Albrecht -- Towards a conceptualization of the militarism paradigm.

W. Eckhardt -- The causes and correlates of Western militarism.

A. Eide -- Present international law versus the present world military order.

L. Herrera -- Institutional terrorism, the case of Chile.

M. Huq -- Consequences of U.S. military policy in South Asia.

I. Kende -- The wars of our days - and some reflections on the term "militarism".

A. Kolesnyk -- Aspects of relations between militarism and national security.

M. Leitenberg -- A survey of studies of post W.W.II wars, conflicts and military coups.

P. Lock & H. Wulf -- The dialectics of rearmament and dependence.

M. Lumsden -- Militarism: cultural dimensions of militarization.

D. Senghaas -- Militarism dynamics in contemporary context of periphery capitalism.

M. Thee -- Militarism and militarization in contemporary international relations.

J. Oberg -- Militarism and human security.

Report on the Symposium

Twenty-five researchers, primarily from the social sciences, and coming from 14 countries met for three days to discuss the problems of militarism, militarization and security.

As to militarism and militarization, the broadness of both terms was recognized. Economic, political, social, cultural and psychological dimensions were considered. Militarization may sometimes be a direct consequence of historical circumstances (e.g. a country may be attacked by aggressive forces and has to defend itself; or a colonized country could have been compelled to fight to obtain national independence), and therefore the discussion focused on the role of militarism in the promotion of aggressive, expansionist policies and the maintenance by military force of inequitable social orders. The concept of militarism was examined in depth, partly in terms of the "superstructure" of society or culture (i.e., at the ideological, attitudinal level) and partly in relation to the social order at the "basis" of society (i.e. as a structural, socio-economic phenomenon).

Considerable effort was devoted to the application of the terms to concrete social formations. Militarism and militarization could best be seen as related concepts, interplaying with fundamental features of contemporary societies. Thus, there were contributions which discussed the relationships of militarism to war, to armament dynamics and the global reach of armaments, to the arms trade, to the tools of and trade in repression, to the transfer of technology, to the role of military technology and R&D, and to governmental and institutional terrorism (e.g. the case of Chile). There was also discussion of the relationship between what could be termed "the world military order" and the notion of a New International Order.

It was repeatedly emphasized that militarism was to be seen in the context of fundamental social orders and the penetration of the military into the rest of society; it may be experienced in various configurations in different historical contexts. To apply the concept today requires, on the one hand, more precise definitions and, on the other hand, a theoretical effort to arrive at a reasonably general conceptualization.

This part of the Symposium was more notable for the richness of approaches and the potential for further research in the field than for the degree of conceptual agreement actually reached.

The second basic theme - that of security - was considered at the individual, human need-oriented level, at the national level, and at the global level. The traditional conceptualization was generally challenged. It was put forward that military means of "national security" are often counterproductive. "Security" may be an euphemism for measures of internal repression, and the maintenance of the status quo of privileged elites; it may become a myth which hides an actual increase in human insecurity and structural underdevelopment, and serves to legitimize internal repression and/or external domination.

What criteria should be applied in defining how much "security" is "enough" was not clearly agreed upon, and this is, therefore, a point for further theoretical development and more concrete investigation.

To summarize, it may be concluded that the Symposium generally agreed on the following points:

1. Militarism and militarization are phenomena which, in the last analysis,

are embedded in a variety of ways and degrees, in basic social orders. The social dynamics of militarism require further study at a number of levels.

2. To arrive at a demilitarized and disarmed society - nationally and internationally - requires, in consequence, structural changes in the pattern of international socio-economic relations, as well as internally in many nations, in order to promote peaceful social formations.

3. The term "National Security", as presently used is not synonymous with security in general. Security must be seen at the individual, the national and the global levels. "National Security" as a term may be used to signify truly legitimate defence measures, but has often been used to cover political and military activities directed against the security of individuals, populations or other nations.

4. Militarism is originated primarily by dominant elites, both in the rich, overdeveloped, as well as in an increasing number of Third World countries. It has serious detrimental effects upon true socio-economic development and basic need satisfaction. it furthers structural underdevelopment in the present international economic order and leads to violations of human rights.

5. There is a fundamental need for the further study of the problems of militarism, militarization and security, and the way they affect true development and the transformation of social orders towards more peaceful social formations. There is also a particular need for the research community to bring these problems to the attention of a larger audience through education and consciousness-raising actitivies. This need was exemplified at the Symposium through the information supplied about some activities of the World Council of Churches and the preparations for the UN Special Session on Disarmament in May-June 1978.

Proposals for Further Action

After a broad exchange of views on militarism and international security it was felt that much attention should be given to the further study of the problems and the growing dangers of militarism, especially to the dynamics of armaments and militarism and the linkages between armaments/disarmament and mal-development/development.

The issues of armament and development are closely associated both at the national and international levels. The universal fulfilment of basic human needs can only be achieved with a new economic world order. A drastic reduction of military expenditures is a prerequisite for such development. Within this general framework the participants felt that a number of problems require immediate action to be taken by the appropriate international bodies and backed up by broad political mobilization throughout the world. The following proposals were put forward by various participants, and do not imply endorsement by the Symposium as a whole.

1. Military research and development

Military research and development, in which about half a million scientists and engineers are employed, and for which

approximately 50 billion dollars a year (approximately 15 per cent of world military expenditures) are spent, has become one of the main driving forces behind armaments and world militarization. Pugwash is urged to take up the problems of military research and development as a most pressing issue for study and action so as: (a) to bring military research and development under democratic control; and (b) to bring about the conversion of actual research and development efforts to constructive civilian tasks, especially for the needs of developing countries. As far as control is concerned, a start should be made by the elimination of nuclear weapons tests. A further step is to limit the development of new weapons, followed by the progressive reduction of military research and development capabilities.

The scientific community should be guided by a code of conduct and other measures, including:

(a) an appeal not to work on the extension and innovation of military technology, but to focus instead upon the eradication of the unnecessary and redundant technologies represented by the arms race;

(b) restrictions in the migration of scientific talent to countries where the build-up of new capacities for arms production is initiated, in order to stop the spread of arms production;

(c) the UN should register all scientists, engineers, technicians and military personnel who are serving outside their own country in military R&D, arms production and the installation of military infrastructures; all UN members countries should be obliged to inform the UN accordingly.

2. Reduction of military expenditures

Never in history has the world and the individual human being been so insecure and endangered with so much of armaments and world-wide military presence. Security must be based on the satisfaction of basic human needs and a much lower level of armaments. Therefore, the following proposals are made:

(a) A call for a 25 per cent reduction in the military expenditures of the USA and the USSR in 1980 and for other nations to follow if the two powers keep this level.

(b) That 10 per cent of NATO and WTO military expenditures should be made available to the Secretary-General of the United Nations for an international disaster relief force. This force should act upon the call of nations hit by disaster and operate under the exclusive command of the Secretary-General and his staff.
The adoption of such a measure should under no circumstances lead to increases of military expenditures in NATO and WTO countries.
Such a measure might have an educational effect and will help to link the issues of disarmament and development.

(c) UNCTAD should include in its proceedings the arms trade issue, which is hitherto not linked to trade development efforts, in order to arrive at a comprehensive understanding of world transfer structures and problems.

(d) An international fund for demilitarization and conversion of industries should be established under the auspices of UNCTAD. WTO and NATO countries should contribute 1 per cent or more of their military budgets to this fund. The fund should reward any country for the reduction of force levels and conversion of military industries. The poorer WTO and NATO countries should also be eligible at a later stage. The decision-making procedures must be based upon the principle of unanimity.

3. Regulation of the arms trade

The United Nations should embark upon the regular publication of detailed arms export registers by exporting countries, including weapons, ancilliary equipment and technology.

4. Militarism and human rights

In many cases militarism and war have been associated with gross violations of human rights. Therefore, the following proposals were made:

(a) An embargo on arms transfers and the delivery of repression technology and methodology (i.e. equipment, computers, surveillance devices, riot-control equipment, training, technical assistance) to the police, security forces or paramilitary forces of nations which have been cited for "consistent patterns of gross violations of internationally-recognized human rights".

(b) Creation of a special UN Agency to support the efficiency of international sanctions and other pressure mechanisms applied to countries that "grossly violate internationally-recognized human rights".

5. Human rights in armed conflicts

The scientific community is urged to support the ongoing efforts at the UN and elsewhere to improve respect for human rights in armed conflicts, in particular by prohibiting or restricting the use of inhumane and indiscriminate weapons, namely:

(a) nuclear, chemical and other weapons of mass destruction, including enhanced radiation weapons ("neutron bombs");

(b) napalm and other incendiary weapons, including white phosphorus;

(c) small arms projectiles which deform, break up or tumble in the body, including their police use;

(d) wide area and delayed-action anti-personnel weapons;

(e) depleted uranium projectiles;

(f) fuel-air explosives;

(g) laser weapons;

(h) electrical, electromagnetic and acoustic devices, including their police use.

6. Promoting strategies for change

Militarism may be regarded as "the use of armed force for exploitative, repressive and generally unjust purposes". Militarism is therefore a function of the existence of dominant elites in an inequitable, imperialist world structure .The implication of these postulates is that militarism cannot be eradicated without changing world social structures from inequitable and hierarchical, to equitable and democratic ones. The radical change of existing social structures (which some might label 'socialist revolution') requires changing international and social institutions so that rights and responsibilities, power and freedom, and the resources required to serve basic needs are equitably distributed.

Changing social institutions, in turn, requires political mobilization based on increased political awareness, and popular participation. In this educational and consciousness-raising task, scientists and cultural workers have a particular role to play, for example by:

(a) promoting the value of equality rather than the myth of superiority;

(b) describing the effects of 'structural violence' and its dependence upon social structures maintained by direct violence;

(c) supporting environmental theories of

social development rather than heredity theories which tend to promote the status quo of authoritarian societies;

(d) promoting humanistic rather than authoritarian means of socialization in the home, school and family in order to direct personal and social development towards equality;

(e) integrating research, education and action, in order to avoid conquest by division, as well as to develop a holistic approach.

STATEMENT BY THE DUTCH PUGWASH GROUP ON THE DEVELOPMENT OF THE NEUTRON BOMB

Since its beginning more than 20 years ago, the Pugwash Movement has always devoted itself to urging scientists not to apply their knowledge and intelligence to the development of new weapons, but, on the contrary, to contribute to an effective process of disarmament, détente and positive cooperation between nations.

In harmony with this goal the Dutch Pugwash Group urges the Dutch people and their government to do everything possible to prevent the deployment of the neutron bomb by NATO forces. We do not want to suggest that Pugwash considers the fission or hydrogen bombs which have been deployed up to the present as humane weapons, but we feel that there are several reasons for labelling the inclusion of the neutron bomb in the NATO-arsenal as reprehensible. These reasons can be placed in four categories.

1. The effect on the population resulting from the use of radiation as a weapon. There will inevitably be many more civilian victims than enemy troops if the neutron bomb is used in a densely populated area.

2. The predictable effect on the (nuclear) arms race caused by the introduction of this weapon into the NATO-arsenal.

3. Lowering of the threshold for the use of nuclear weapons, since the neutron bomb would become part of the NATO-strategy of flexible response. (This applies to any introduction of small nuclear weapons).

4. Further undermining of the Non-Proliferation Treaty (NPT) by developing a new generation of nuclear weapons, in spite of the obligation embedded in the Treaty to stop the nuclear arms race and to strive for complete disarmament.

1. Radiation (in this case, fast neutrons) damages living organisms in such a way that by using a weapon like the neutron bomb there probably will be, apart from the soldiers who are killed, a great number of civilians who are condemned to terrible suffering, long-lasting in many cases, which ends with certain death. Outside the radius of a deadly dose, there is a still larger area where later occurring disorders (for instance cancer) and genetic damage will shed a shadow of fear and misery on future generations. These consequences, not mentioned by the supporters of the introduction of the neutron bomb into the NATO-arsenal, are inevitable because radiation is often in fact a slow killer. If the neutron bomb or any radiation weapon is to kill enemy troops fast enough to obtain a decisive tactical advantage in a modern war, the soldiers who are the direct target will have to receive 10 to 20 times the deadly dose. (These figures are taken from the new criteria of the American army for the use of radiation on the battlefield. See A. S. Warshafsky,

Military Review 56:5 (1976) 3.)

For this reason there is no possibility of preventing the above-mentioned slow death of a large number of civilians in the surroundings, especially when a densely populated area like Central Europe is concerned.

2. During the past 30 years every introduction of a new weapon has led to an increase in the arms race, thereby in the end decreasing the security of every nation, including the nation that introduced the new weapon. Apparently, those favouring the introduction of the neutron bomb assume that this weapon will not be developed in other countries if it is included in the NATO-arsenal. But just as in the past, the assumption that other nations will not be able to develop a new weapon, whatever it is, will turn out to be wrong. If this weapon can be used in a war by both sides, it will not increase anybody's security; on the contrary, insecurity will be increased.

3. Still more serious is that the neutron bomb, although it has led to much comment and discussion, is only a small part of the modernization of the tactical nuclear forces and the doctrine governing the use of such weapons. The neutron bomb is one of the small nuclear weapons that can be used easier against non-nuclear nations and on the battlefield, than the old, heavier tactical and strategic bombs. Besides, small nuclear weapons are quite comparable in destructive power to heavy conventional explosives. From this point of view, producing the neutron bomb means a step further on the road to actual use of nuclear weapons on the battlefield, and thus a lowering of the nuclear threshold.

The use of neutron bombs and other small nuclear bombs on the battlefield is part of the strategy of flexible response. In our opinion this strategy should be seriously reconsidered in order to decrease as much as possible the risk of an unwanted escalation.

4. It is not difficult to imagine the consequences of the introduction of this weapon on further proliferation of nuclear weapons. In our opinion such a step would constitute a violation of the Non-Proliferation Treaty. This treaty obligates the nuclear nations "... to pursue negotiations in good faith on effective measures relating to cessation of the arms race at an early date and to nuclear disarmament...." The introduction by one side of a new generation of nuclear weapons can under no circumstances be seen as respecting this obligation. The non-nuclear nations may feel themselves directly threatened, and consequently take their own measures. As mentioned above the neutron bomb, being a rather small weapon, is more suitable for use against non-nuclear nations than in a war against a nuclear nation. This threat (real or imagined) could induce some highly industrialized countries that would be able without much difficulty to construct nuclear weapons, to withdraw their official membership to, or unofficial cooperation with, the NPT.

Conclusions

It is reasonable to demand that the Netherlands do not collaborate in a NATO-policy of including the neutron bomb in its arsenal. We should protest against the deployment of this weapon in NATO-territories, and stimulate the conclusion of an international treaty prohibiting the manufacture and/or possession of neutron bombs. Any use of radiation as a weapon must be placed, in our opinion, in the same category as the use of chemical and biological weapons, which are considered to be inhumane throughout the world. This makes it even more imperative for the Netherlands to follow the dictates of conscience.

Calendar of Forthcoming International Pugwash Meetings

(please note revised dates)

Spring 1978 (tentative)	6th Workshop on Chemical Warfare: Technology of Destruction of Nerve Gas Stockpiles.	Salt Lake City/ Kansas City, U.S.A.
10-11 April 1978	Meeting of Executive Committee	Warsaw, Poland
12-15 April 1978	29th Symposium: European Cooperation and Security	Zakopane, Poland
20-22 April 1978	Workshop on 1979 UN Conference on Science and Technology for Development	Morocco
4-7 May 1978	30th Symposium: Dangers of a Nuclear War by the Year 2000.	Toronto, Canada
28 May - 3 June 1978	31st Symposium: Pan-African Symposium on Feeding Africa.	Cape Coast, Ghana
8-10 June 1978	32nd Symposium: Social Values and Technological Choice in an International Context	Racine, Wisconsin, U.S.A.
30-31 August 1978	Meeting of Council	Varna, Bulgaria
1-5 September 1978	28th Conference	Varna , Bulgaria
December 1978 (tentative)	Workshop on Political and Psychological Aspects of Crisis Management	Switzerland
December 1978	Meeting of Executive Committee	Switzerland
February 1979 (tentative)	Symposium on Implementation of Recommendations of UN Special Session (1979) on Disarmament	Canada
Spring 1979 (tentative)	7th Workshop on Chemical Warfare: Verification of Non-Production of Nerve Gases	G.D.R.
July 1979	Symposium on the Nuclear Situation in the South Pacific	New Zealand
August 1979	29th Conference	Mexico City, Mexico
August 1980	30th Conference	Netherlands

29th Pugwash Symposium

"Security and Cooperation in Europe: Problems and Prospects after Belgrade"

Zakopane, Poland, 12-15 April 1978

Agenda

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

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

Pugwash Workshop on 1979 UN Conference on Science and Technology for Development

Morocco, 20-22 April 1978

Agenda

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

30th Symposium, Toronto: For main headings of agenda see Newsletter Jan. 1977, p. 79.
31st Symposium, Ghana : For agenda see Newsletter July/October 1976, p. 44.
32nd Symposium, Racine : For agenda see Newsletter July/October 1976, p. 43.

DEATHS

We regret to announce the death of the following Pugwashites: Professor F. Csaki, Professor B. P. Gregory, Academician R. V. Khokhlov and Dr. C. D. Leake. Obituaries will be published in the next issue of the Newsletter.

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