

CALIFORNIA INSTITUTE OF TECHNOLOGY

PASADENA, CALIFORNIA 91109

DIVISION OF THE HUMANITIES
AND SOCIAL SCIENCES

Dr. Noel Vietmeyer
Department of Chemistry
Stanford University
Stanford, California 94305

September 2, 1970

Dear Dr. Vietmeyer:

Though invited to attend the Stanford "Pugwash Symposium" by Dr. Rabinowitch, I sent my regrets because I had a prior commitment to go to the Ivory Coast in early September. Though this African trip was recently postponed until October, I was hesitant about seeking another invitation to Stanford at the last moment.

While the topic of the conference is still fresh, however, I would like to voice a few ideas, or rather concerns. First, a few words about the background from which these arise. All of my work in the underdeveloped countries has been in Africa; primarily in Zambia, Egypt, and East Africa, with shorter trips in West Africa. My knowledge is contemporary, since I have travelled to Africa at least once a year for the past nine years (my last visit, for ten weeks last spring, was to Zambia). Throughout this time period I have been primarily concerned with rural development -- especially agricultural and river basin development. My research has dealt entirely with how rural populations maintain and change their behavior and attitudes, and with the impact of technology on their life styles. Since 1956, I have been involved, with Professor Elizabeth Colson of Berkeley, in an intensive, long-term study of a single population -- the Gwembe Tonga of Zambia's Middle Zambezi Valley. We picked these people because 55,000 of them were about to be relocated in connection with the Kariba dam project, and we wished to see what impact this major engineering event would have upon them. To date, we have spent approximately 5 man-years studying continuity and change among the Tonga, with research and visits in 1956-57, 1960, 1962-63, 1965, 1967, 1968 and 1970. We hope to continue this study indefinitely.

I have supplemented this detailed research with more extensive work as a consultant for various agencies concerned with development in Africa --

especially the World Bank, FAO and the United Nations Development Programme. Here my role has been primarily concerned with three areas:

- (a) attempting to assess the sociological implications of various rural development strategies for the local populations concerned.
- (b) recommending research to provide whatever information is needed to facilitate (a).
- (c) evaluating the achievements of development projects at various stages in their history.

Against this background, my concerns as a social anthropologist and cultural ecologist are as follows:

- (1) Usually it is not enough just to develop centers of excellence and research stations in Africa and probably elsewhere. A technological answer to a problem is worth very little unless this answer is understood by the people it is supposed to benefit, and is implemented by them with the desired results. All too often research work is never implemented simply because rural populations do not adopt the innovations involved. The best way to overcome this problem, I believe, is to tie research work more closely to the relevant local people and to the relevant government extension and development services. This isn't easy, as it requires researchers to come to terms with a world that is far more confusing than their laboratories. But this is the world of development, and if we want to get better returns for our efforts (and the returns to date are pretty poor), we have to come to terms with it. This means enlarging the spectrum from which research personnel are recruited to include micro-economists, agricultural economists, cultural ecologists, sociologists, anthropologists, and extension and management specialists.

At the beginning of this section I noted that it usually is not enough to just develop centers of excellence etc. The major exception is where the center's goal is to deal primarily with the development of "single trait" innovations. Here I would include the development of new varieties of major food and export crops like rice, wheat, maize and cotton. Or of techniques for insect control which do not involve primary dependence on insecticides, or of new machinery. It may well be that centers manned mainly by expatriate scientists will wish to

concentrate on these more manageable problems. While this is a valid alternative, for much work is needed here, who then is going to come to grips with the more complex problems of development? Furthermore, many "single trait" innovations turn out to be more complex once they are implemented, requiring, for example, application of water, fertilizers, insecticides, etc., as in the case of certain hybrid cereals. This brings up my second concern.

(2) More research effort should be applied, perhaps through centers of excellence, to the implications now and in the future of various technological innovations. Let me give some examples.

(a) What are the implications of the green revolution for the distribution, size and stratification of the labor force in various countries? We hear arguments and counter-arguments as to whether or not the labor force will be significantly reduced in, say India; as to whether or not the green revolution will set off a major movement of people to the cities, which may or may not worsen current urban problems; as to whether or not it will increase the polarization between rich and poor, since mainly the rich will have the resources to benefit from the new cereals. These are critically important questions which must be systematically studied by scientists. Who is going to do the work?

(b) What are the ecological dangers of relying on the intensive monocropping of relatively delicate hybrid crops (the green revolution) for those countries involved? We have the problem in a number of Latin American countries and elsewhere, of cotton yields falling off drastically over a short number of years because of the appearance of insecticide resistance. What would be the implications, in India for example, ten years hence, of grain yields falling off 40% over a several year period? Since such a danger exists, we should start now considering ways to reduce it, and to minimize its consequences should it arise.

(3) This point follows from (2). We need to pay more attention to the ecological and cultural context of technological innovation in the underdeveloped world. This context will of course vary between regions, countries, and within specific countries. We should know now that usually one can't just transfer a technology intact from one area to another. Rather, it has to be adapted to local circumstances. And where that technology is tailor-made for a country, it will often

have far-reaching implications for the context within which it is introduced. In the research planning stages future implications should be considered, for once a particular research strategy is selected, this automatically focuses attention on one alternative approach. We need to think more about the selection of alternatives. One way to do this is to think more about implications. For example, will a given technological innovation increase or decrease employment opportunities? If it decreases them, is that desirable for the countries involved? As a general statement, I believe that in introducing new technology in industry, agriculture and fisheries, too much emphasis is placed on increasing productivity alone, rather than on increasing productivity and the number of jobs. Because of population dynamics, especially population increase, a specific technology which increases productivity but decreases the number of jobs available may, in the long run, prove more of a problem than a blessing. So we need to widen our perspective here and select the proper mix for a given country or region. Furthermore, we need to consider the type of jobs involved against the expectations and current occupations of the local populations.

(4) We need to pay more attention to improving governmental extension and development services. While Pugwash may feel that surely this one lies outside its jurisdiction, in my experience often the weakest link between a government's development goals and its local population is the extension service. Obviously research resulting in excellent technologies for development is of little use if the government can't "package and deliver" these in such a way as to get them adopted. This area of extension really needs attention. And the same goes for the training of local government personnel responsible for planning and implementing development policy.

(5) In the area of intermediate technology, a center of excellence dealing with the development of agricultural implements for the small- to medium-sized family farm warrants serious consideration. J. C. de Wilde of the World Bank has thought considerably about this one, but I do not believe such a center is in fact being planned.

(6) On a broader level, a center concerned with monitoring the ecological implications of international development deserves serious consideration. The implications, for example, of the increasing use of insecticides, fertilizers, etc. in agricultural development; or of the damming of tropical rivers which is proceeding at an ever-increasing rate; or of the problems associated with irrigation in arid lands.

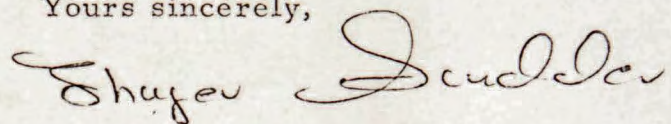
(7) Development of a better computerized documentation center on existing experiences with development. I believe that Harrison Brown has thought considerably about this one. I'm appalled in my own work how frequently good research on an area about to be developed is ignored because present planners are unaware of its existence. We also need early warning manuals (such as FAO's on man-made lakes) written by scientists which can familiarize governments and international development agencies with problems before they start a project.

Well, I've gone far enough; in fact probably too far.

You will be interested to know that while in Zambia I came across the materials on the Hiller process that you sent to Fosbrooke there. This material was considered by the planning group concerned with the development of the Kafue River, but since they weren't faced with an aquatic weed problem then, the material was filed. And there I found it last May.

With best wishes,

Yours sincerely,

A handwritten signature in cursive script that reads "Thayer Scudder". The signature is written in dark ink and is positioned to the right of the typed name.

Thayer Scudder
Professor of Anthropology

jp

cc: Harrison Brown
John C. de Wilde

PUGWASH CONFERENCE

(8/31 - 9/8/70)

Stern Hall - Twain East
Twain North

- Adams, Mrs. Ruth	Twain North 219	1739	
Aubrac, R	Twain North 123	1704	
- Bacigalupo, Antonia - <i>Peru</i>	Twain North 222	1736	
- Barzelatto, Jose - <i>OAS, Wash DC</i>	Twain North 230	1746	
- Buzzati-Traverso, Mr. - <i>Pavia</i>	Twain East 211	1633	
- Coleman, Dr. James - <i>Africa</i>	Twain North 223	1735	
Copeland, Mr. Wesley	Twain North 225	1733	
- deWilde, Prof. J - <i>Holland</i>	Twain North 231	1745	
- Diczfalusy, Prof Egon - <i>Sweden</i>	Twain East 105	1605	
Engel, Mr. Julien	Twain East 206	1638	
Frank, Mr. Charles	Twain North 221	1737	
- Glubrecht, Prof. Dr. H - <i>Denmark</i>	Twain East 108	1602	
Heaphey, Dr. James	Twain North 120	1707	
Hirschman, Prof. Albert	Twain East 205	1639	
Hopper, Dr. W. David	Twain North 127	1714	
Islam, Dr. Nurul	Twain North 126	1715	
Kaplan, Dr. Martin	Twain East 106	1604	
Katili, Dr. John	Twain North 118	1709	
Kleinjans, Dr	Twain East 209	1635	
Kretzmann, Dr. Edwin	Twain East 109	1601	
- Leon, Mr. Alberto	Twain East 210	1634	
- Marcovich, Dr. H	Twain East 102	1611	
- Meguid, Mr. A.R. Abdel	Twain North 121	1706	
- Nash, Prof. Manning	Twain North 119	1708	
- Odhiambo, Prof. Thomas	Twain North 122	1705	
Okita, Mr. Saburo	Twain North 125	1716	
- Oldham, Dr. C.H.G.	Twain North 224	1734	
- Pal, Prof. Yash	Twain East 207	1637	
- Parthasarathi, Mr. A	Twain East 104	1606	
- Rabinowitch, Dr. Eugene	Twain North 115	1712	
- Rabinowitch, Dr. Victor	Twain East 201	1640	
Revelle, Dr. Roger	Twain East ^{North} 212 123	1632 1713	
- Rotblat, Prof. J	Twain North 228	1748	
Salam, Prof. Abdus	Twain East 107	1603	
Schultz, Prof. Theodore	Twain East 208	1636	
- Sohns, Dr. E.R.	Twain North 226	1731	
- Szilard, Dr	Twain North 218	1740	
- Torto, Prof. F.G.	Twain North 124	1705	
- Varsavsky, Prof. C.M.	Twain East 203	1642	
Voss, Mr. John	Twain East 101	1610	
- Weiss, Dr. C	Twain North 227	1731	
Hall, Warren	Twain North 123	1704	
Nagchaudhuri, D	Twain North 116	1711	
Rachwarton, Mr. Rio	Twain East 212	1632	

JANE HOWARD . . .

a charming, blue-eyed, clean-cut, all-American girl reporter from the middle west shed her inhibitions (and once or twice her clothes) to bring back alive the first, complete eyewitness account of the human potential movement.



PLEASE TOUCH

Jane Howard was sent by LIFE to witness the Esalen phenomenon. She ended up covering (and uncovering) a wide sampling of Encounter Groups. Some of what she discovered was bizarre. Some pretentious. But in most of the groups she was moved and impressed, as people cried, laughed, yelled, hugged and dared in new ways to trust and touch each other.

McGraw Hill \$6.95

Special 24-Hour Order Phone HO. 9-8198

Pickwick Bookshops

HO. 9-8191 • CR. 5-8191



- HOLLYWOOD—6743 Hollywood Blvd. 883-8191
- CANOGA PARK—Topanga Plaza (714) 540-2191
- COSTA MESA—S. Coast Plaza (805) 832-2815
- BAKERSFIELD—Valley Plaza 541-2416
- PALOS VERDES—Peninsula Center (714) 889-8335
- SAN BERNARDINO—Inland Center (714) 291-1315
- SAN DIEGO—Mission Valley Center (714) 624-9672
- MONTCLAIR—Montclair Plaza (714) 729-5988
- CARLSBAD—Plaza Camino Real (805) 485-2188
- OXNARD—The Esplanade

Open Sundays 12 to 5 (Except Hollywood, Palos Verdes)

Pickwick Bookshops, 6743 Hollywood Blvd., Hollywood, Calif. 90028
Please send me _____ copies of PLEASE TOUCH at \$6.95 each.
Please add 5 1/2% Sales Tax plus 35c per order for mailing.

Name _____
Address _____
City _____ State _____ Zip _____
 Remittance enclosed Charge my Pickwick Account
 Charge my BankAmericard Master Charge # _____

RICHARD JESSUP'S

stormy action novel of youth/age confrontation is "an exciting, swift, and hard-hitting parable of what may happen—and perhaps is already happening."—Playboy

A Quiet Voyage Home

By the author of The Cincinnati Kid. \$5.95. Little, Brown

Folly of Nuclear Arms Escalation

BY IRVING S. BENGELSDORF

Race to Oblivion by Herbert York (Simon & Schuster: \$6.95)

• In mid-September 1939, Herbert F. York, now professor of physics and acting chancellor at UC San Diego, was almost 18 years old, studying physics at the University of Rochester.

Two weeks earlier, Germany had invaded Poland to start World War II. And a month before that, the late Leo Szilard, Hungarian-born physicist and refugee from Germany, had persuaded Albert Einstein to write a letter to President Franklin D. Roosevelt.

That letter resulted in the Manhattan Project, the massive U.S. research effort to produce nuclear weapons.

As the title of his first-written book indicates, Dr. York feels that the nuclear arms race is an absurdity—a race to oblivion. The book is must reading for every citizen who wants to be informed these days about the real stories behind ABM, MIRV, cost-overruns, etc. Dr. York knows first-hand of what he writes.

He has worked at Oak Ridge, Tenn., to develop uranium bombs, served as the first director of the Lawrence Radiation Laboratory at Livermore to develop thermonuclear fusion weapons (H-bombs), was a member of the first President's Science Advisory Committee (PSAC) established after the Soviet Union launched Sputnik on Oct. 4, 1957, was the first chief scientist of the Defense Department's Advanced Research Projects Agency (ARPA), and was appointed by President Eisenhower to be the first Director of Defense Research and Engineering (DDRE).

Dr. York writes that as early as 1961 he stated, "Ever since shortly after World War II, the military power of the United States has been steadily increasing; over the same period the national security of the United States has been rapidly and inexorably diminishing . . .

"It is my view that the problem posed to both sides by this dilemma of steadily increasing military power and steadily decreasing national security has no technical solution. If we continue to look for solutions in the area of military science and technology only, the result will be a steady and inexorable worsening of this situation.

"I am optimistic that there is a solution to this dilemma; I am pessimistic only insofar as I believe there is absolutely no solution to be found within the areas of science and technology." Dr. York adds, "There is no possibility of stopping the arms race except by political action OUTSIDE the two defense establishments."

Dr. York concludes, "If we are to avoid oblivion, if we are to reject the ultimate absurdity, then all of us, not just the current 'in' group of experts and technicians, must involve ourselves in creating the policies and making the decisions necessary to do so."

"Probably the best portrait we shall ever get of Hitler...can stand comparison with Satan, the real hero of Paradise Lost."

—JAMES P. O'DONNELL, The New York Times Magazine

"Speer leads us right through the looking glass, into the malice-in-wonderland of the Third Reich—the daily conniving, double-crossing, knife-in-the-back death-manship which typified intramural relationships in the Nazi hierarchy. Above all, he makes his Fuehrer believable."

—WILLIAM MANCHESTER

"... a frightening timeliness for all men of good will who have been led into the corridors of power."

—JOHN TOLAND in a front-page review in The New York Times Book Review

"There are no better close-up portraits of Hitler, Goering, Goebbels and the lesser members of the Nazi Pantheon... It is more than ever a comfort in the trying present to recall that they failed to win the war."

—HOWARD K. SMITH

"A monumental contribution to history."

—S.L.A. MARSHALL

"Magnificent... No one can afford to be without this book who wishes to understand the central problems of the 20th Century."

—C. NORTHCOTE PARKINSON

Nationwide Bestseller

INSIDE THE THIRD REICH

Memoirs by Albert Speer

48 pages of photographs
632 pages \$12.50

The Macmillan Company
866 Third Avenue,
New York, N.Y. 10022



A great new bestseller

Elizabeth Goudge

The Child From the Sea

from the bestselling author of Green Dolphin Street, The White Witch, The Dean's Watch, The Scent of Water...



50,000 copies in print. \$8.95. COWARD-McCANN



sybil leek's ASTROLOGICAL GUIDE to successful everyday living

\$7.95 At your bookseller or by mail. Prentice-Hall Englewood Cliffs, N.J. 07632

The Compleat Book Store

OF COLLEGE BOOK COMPANY

Is Pleased To Announce That MRS. YETIVE MOSS

Is Now The Buyer For Our General Book Department Which Has Been Greatly Expanded

1002 WESTWOOD BLVD., WESTWOOD VILLAGE PHONE 477-8051

WE WILL BE PLEASED TO OPEN YOUR ACCOUNT

A Chef's In the House. See HOME

Profile of a Military Aristocrat

BY STANTON A. COBLENTZ

The Years of MacArthur, Volume 1, 1880-1941, by D. Clayton James (Houghton Mifflin: \$12.50)

• Will Douglas MacArthur be ranked by coming generations as one of the great American generals, or will his fame be permanently overclouded by the unhappy culmination of his career? And when the mists of controversy have all blown away, will he be most esteemed as a soldier or in his nonmilitary capacities?

These questions are suggested by D. Clayton James in the first volume of what promises to be a monumental two-volume biography. In the present offering, which ends at the crucial moment of Pearl Harbor, the author builds upon a great amount of painstaking research to give us a detailed and impartial picture of one of the most controversial figures of recent times.

What emerges is a many-sided and often bewildering character who, in the biographer's view, will be most appreciated in the future as an administrator. While he "was dedicated, mind, heart, and soul, to his duty as a soldier," his philosophy was "surprisingly simplistic," and he made no major contribution to military thought.

But as an individual he was imposing; there was something in his very presence that drew people to him, and

in his subordinates he inspired loyal and devoted service. It is noteworthy that his severest critics were persons who knew him little or not at all.

The roles that he played, even before the shattering events of World War II, were many and varied—rescuer of entombed miners, unwilling judge at the court-martial of Brig. Gen. William Mitchell, president of the American Olympic Committee, commander in World War I and in the Philippines, and Chief of Staff of the Army.

But perhaps the pre-Pearl Harbor activity for which he is best remembered is that which occurred in 1932 in his dispersal of the bonus marchers—peniless veterans of World War I, who had convened in Washington to demand immediate payment of adjusted service benefits. For his moves against these unarmed demonstrators, MacArthur has been severely criticized; James, however, stresses the general's sincere although mistaken belief that the Bonus March was a "a Red conspiracy," and that MacArthur acted as a "military aristocrat" in what he took to be his country's best interests, and not as a would-be dictator.

While the implications of all this for our own day are not emphasized by the biographer, it is not difficult for the reader to glance between the lines and trace the relationship.

Rise and Fall of a Board Chairman

BY WILLIAM FADIMAN

The Rise and Fall of Jake Sullivan by Hunter Davies (Little, Brown: \$6.95)

• Precariously riding the swell still left by "What Makes Sammy Run" and others of its ilk, this English version of a young man on the make and his ultimate and predictable downfall has its moments of crude power and flashy vitality. Its Teddy Boy hero, Jake Sullivan, begins his meteoric career in Cumberland as a school drop-out and petty thief, proceeds from there to a series of briefly held jobs

By a series of triumphant get-rich-quick schemes over a three-year period he succeeds in becoming board chairman of a gigantic corporation on Piccadilly complete with all the appurtenances of conspicuous consumption including private airplanes, Rolls-Royces and a bevy of willing females. En route in his dizzying rise he earns the hatred of his mother, assists in the destruction of most of his friends, and slips in and out of two loveless marriages before he re-

ceives his comeuppance via a prison sentence for bribery and corruption.

Davies knows the posh world of the parvenu in London and has ably captured its glittering vulgarity and intensity. But his swaggering, conscienceless, profane hero remains a fictional stereotype. Nor does the author's profligate delight in our new freedom of language invest the book with any new values or insights. Excessive use of four-letter words can become a bore—also a four-letter word. In addition, the author's painstaking descriptions of the intricacies of real estate transactions become somewhat tedious to the non-specialized reader.

On the credit side, Davies' racy dialog and rapid-fire pacing keep the story in continual movement. Individual scenes portraying the hero's tyrannical treatment of his business underlings have a sharp, effective theatricality. It is unfortunate that Jake Sullivan remains a two-dimensional character.

PLAY IT AS IT LAYS



A novel by
JOAN DIDION

"There is a pregnant pain in the book and something savagely personal, like the expression of a runner when he breaks the wire . . . A truly female book full of desperation and valiance."

New York Magazine

Farrar, Straus & Giroux

\$5.95

Special 24-Hour Order Phone HO. 9-8198

Pickwick Bookshops

HO. 9-8191 • CR. 5-8191



HOLLYWOOD—6743 Hollywood Blvd.	863-8191
CANOGA PARK—Topanga Plaza	(714) 540-2191
COSTA MESA—S. Coast Plaza	(805) 832-2815
BAKERSFIELD—Valley Plaza	541-2416
PALOS VERDES—Peninsula Center	(714) 889-8335
SAN BERNARDINO—Inland Center	(714) 291-1315
SAN DIEGO—Mission Valley Center	(714) 624-9672
MONTCLAIR—Montclair Plaza	(714) 729-5988
CARLSBAD—Plaza Camino Real	(805) 485-2188
OXNARD—The Esplanade	

Open Sundays 12 to 5
(Except Hollywood, Palos Verdes)

Pickwick Bookshops, 6743 Hollywood Blvd., Hollywood, Calif. 90028

Please send me _____ copies of PLAY IT AS IT LAYS at \$5.95 each.
Please add 5½% Sales Tax plus 35¢ per order for mailing.

Name _____

Address _____

City _____

State _____

Zip _____

Remittance enclosed

Charge my Pickwick Account

Charge my BankAmericard Master Charge # _____

**Pickwick Bookshop
Hollywood Store Only**

RED TAG SALE

ALL BOOKS ON THE MEZZANINE!

Over 500 Titles from our BARGAIN BOOK FAIR DEPT.

NOW MARKED DOWN AGAIN TO A FRACTION OF ORIGINAL PUBLISHED PRICES!

FINAL WEEK!

Pickwick Bookshops

6743 Hollywood Blvd. — Hollywood

REDUCED
REGULAR PRICE \$10.00
SALE PRICE **5.95**
NOW \$2.95

All Sales Final!



DR. DAVID REUBEN —
the new apostle of sanity in sex

Everything you
always wanted to
know about sex*

Explained by
David Reuben, M.D.

*BUT WERE AFRAID TO ASK

McKAY

\$6.95

23rd Pugwash Conference on Science and World Affairs
Aulanko, 30th August - 4th September 1973

PROGRAMME OF CONFERENCE

Thursday, 30th August 1973

09.30 - 13.00

First Plenary Session

Chairman: Prof. J. K. Miettinen

Opening address by the Chairman

Address by the Prime Minister of Finland,
Mr Kalevi Sorsa

Messages of greetings

Address by the President, Prof. H. Alfvén

Tributes to the memories of:
Lev Artsimovich, Eugene Rabinowitch,
Mikhail Millionshchikov

Report on Pugwash activities in the last year
by the Secretary-General, Prof. J. Rotblat

Discussion of the report

14.30 - ^{18.00}19.30

Meetings of Working Groups

20.30 - 22.00

Second Plenary Session

Chairman: Prof. R. R. Neild

- 1) Report on SIPRI work by Mr T. Nemeč
- 2) Report on the Tällberg Symposium on Nuclear Proliferation Problems, by Prof. F. Calogero
- 3) Report on the Helsinki Symposium on Arms Control Measures in Europe, by Prof. J. K. Miettinen

Friday, 31st August 1973

09.30 - 13.00

Meetings of Working Groups

14.30 - 18.00

Meetings of Working Groups

Saturday, 1st September 1973

09.30 - 13.00

Meetings of Working Groups

14.30 - 18.00

Third Plenary Session

Chairman: Prof. C. Djerassi

Panel discussion on Population Problems,
introduced by Mrs Helvi Sippila. Other speakers
include: J. Barzelatto, T. Odhiambo,
E. R. Diczfalusy, C. Djerassi, B. Linnér

Sunday, 2nd September 1973

09.30 - 13.00

Meetings of Working Groups

Afternoon free (excursion)

Monday, 3rd September 1973

09.30 - 13.00

Meetings of Working Groups

14.30 - 18.00

Fourth Plenary Session

Chairman: Academician M. A. Markov

Reports from Working Groups

Tuesday, 4th September 1973

09.30 - 10.30

Meetings of Working Groups

10.30 - 12.00

Fifth Plenary Session

Chairman: Prof. H. Alfvén

Discussion of programme for Baden Conference

Close of Conference

STATEMENT FROM THE CONTINUING COMMITTEE
ON THE 23rd PUGWASH CONFERENCE,
HELD IN AULANKO, FINLAND,
30 AUGUST - 4 SEPTEMBER 1973

The Twenty-third Pugwash Conference on Science and World Affairs, organized by the Finnish Pugwash Group, was held in Aulanko, Finland from the 30th August to the 4th September 1973. It was attended by 108 participants from 29 countries and 6 international organizations. Our hosts provided us with a most congenial and efficiently operating atmosphere for our work.

Pugwash is an international Movement of Scientists that has met regularly since 1957 in Annual Conferences, topical Symposia, regional meetings and other appropriate forums, to discuss the traditional problems relating to Disarmament and Arms Control; Peace Keeping and Security; as well as Environment and Resources; Population; Development; Scientific Collaboration and Education; the Social Responsibility of Scientists. Coming together as individuals, these gatherings, which include many of the world's most distinguished scientists, endeavour to apply their collective technical competence and experience to the solution of many of the world's most pressing problems. Although entirely unofficial in character, the results and conclusions of these Conferences are widely disseminated among appropriate governmental and international bodies and throughout the scientific community.

We met this year in an atmosphere of more relaxed international tensions deriving from a number of significant events that have taken place since our last Conference: The Brezhnev-Nixon Accords that have followed so rapidly on the heels of the Strategic Arms Limitation (SALT) Agreements of 1972, with their promise to seek further and rapid progress in controlling the nuclear arms race; the growing détente between the states of Central Europe and the initiation of negotiations on European Security and Mutual Arms Reductions; the continued improvement of US-Chinese relations; the withdrawal of US Forces from Indo-China and the consequent "winding-down" of the Vietnam war; and the beginnings of normalization of relations between India, Pakistan and Bangladesh. On the other hand, we cannot refrain from noting the continuing dangers to world peace arising from the failure to bring about a complete end to the hostilities in Indo-China, to the continuing absence of peace in the Middle East, and to the ever-widening economic disparity between the developing and the developed nations. Moreover, we deplore the continuing failure to achieve any progress in nuclear disarmament, the continued growth of nuclear weapons stockpiles and the failure of progress in the Conference of the Committee on Disarmament (CCD) in Geneva. Nor can we be complacent in the face of the increasing burdens on the world's resources and on our biosphere that are resulting from the rapid and largely uncontrolled technological growth in the highly industrialized parts of the world.

The general theme of this year's Conference was "European Security, Disarmament and Other Problems". Under this heading, the Conference divided into five Working Groups on: Disarmament and Strategic Arms Limitations; Disarmament in Europe; European Security and Co-operation; Social, Economic and Political Barriers to the Application of Science and Technology to Development; and Radioactive Pollution of the Environment in the Context of the Energy Problem.

In addition, we met in two plenary symposia. At one, reports were given on the recent work and current programme of the Stockholm International Peace Research Institute (SIPRI); on a special Symposium on the Non-Proliferation of Nuclear Weapons, organized by SIPRI and held in Tällberg, Sweden in June 1973, and on the Helsinki Arms Control Seminar, convened by the Finnish Pugwash Group in June 1973. The second Plenary Symposium, on Population Problems, organized by the Swedish Pugwash Group, presented a number of reports on current work and progress on population planning taking place in a variety of countries and scientific institutions.

The following was prepared by the Continuing Committee on the basis of the main conclusions and recommendations from the Conference's Working Groups.

1. Disarmament and Strategic Arms Limitations

The current year has seen the achievement of important new accords between the United States and the Soviet Union on "The Basic Principles of Negotiations on the Further Limitation of Strategic Offensive Arms". Among other things, these accords include a pledge to make a serious effort to convert the present interim agreement on the limitations of offensive weapons to a permanent and more complete agreement in 1974.

The hope was expressed that the parties will interpret the new accords in the spirit that they are a pledge not only between the parties themselves, but before all mankind, to make major progress in reducing weapon levels.

While welcoming this new step, it was again recalled that the parties to these new accords, and the governments of many other nations as well, have on several solemn occasions stated that their ultimate goal is General and Complete Disarmament. So far, progress has been restricted to achieving arms limitations only, and no reductions in nuclear arms whatsoever have yet been accomplished. The view was therefore asserted that these new accords and the general progress towards political détente can and must be followed promptly by some real and substantial reductions in nuclear weapons. At the same time, negotiations to limit arms should be initiated among other states in relation to other geographical regions.

Nuclear Disarmament and Strategic Arms Limitations

In connection with nuclear disarmament and strategic arms limitations, we wish at this time to emphasize the following points:

1) It is dangerous to lose any more time. Further delays will provide new opportunities for the development of still more dangerous and menacing weapons. Further delays also increase the chances of further proliferation of nuclear weapons.

2) It is most important that some real and substantial arms cuts be made. The tremendous size of the current deployments make such reductions urgent, and the recent progress towards political détente makes them possible. Having in mind the promise to include arms reductions as well as arms limitations in the forthcoming negotiations, it was felt that particular attention should be paid to the following possibilities:

(a) Eliminate those delivery systems which carry the largest payload (e.g. heavy bombers, large missiles). Such a reduction would make the biggest contribution towards reducing the potential death and destruction contained in the current stockpiles.

(b) Eliminate without replacement the most obsolete of the currently deployed systems (e.g. the Titan missiles, those Polaris submarines which are not scheduled for conversion to Poseidons, the older Soviet missiles). Such a reduction may be the most readily acceptable from a political point of view.

(c) Large reductions in total numbers, either with the proportions of types of weapons kept constant, or left to the discretion of each nation. Such reductions have the advantage of avoiding arguments involving comparisons of weapons details, and for that reason may be the most easily accepted. They could also preserve the present "mix" of forces and whatever additional stability may accrue from it.

3) Despite evidence of some progress, the matter of unauthorized or accidental use of nuclear weapons remains a very serious problem deserving further attention.

4) International negotiations constitute the best way to achieve lasting arms reductions and, ultimately, general and complete disarmament. However, unilateral cuts can be important too. When, as now, negotiations are under way, substantial unilateral cuts may serve to accelerate progress and to break the bottlenecks that often develop in negotiations out of arguments over details. Unilateral actions by one party should, of course, be designed with an eye to stimulating similar though not necessarily identical responses by other parties by force of mutual example. The reductions in tensions and suspicions resulting both

from current progress towards political détente and also from previous arms limitations agreements ought to make such actions more acceptable to all governments.

5) In the past, fundamental asymmetries in the geopolitical, economic, and technological situations in the various nuclear weapons states contributed importantly to making progress in arms control and disarmament very difficult and painfully slow. The current situation, characterized by political détente on the one hand and huge numbers of nuclear weapons on the other, makes it both urgent and possible to reduce the extreme attention to precise numerical balances among all varieties of weapons and at all stages of disarmament.

6) Further qualitative developments can make the situation more dangerous than it already is. Fortunately, the governments are also expressing some concern in this area, and we urge that they give further serious consideration to such measures as a comprehensive nuclear test ban, a limitation in the rate of missile test launches which could serve as a prelude to a more comprehensive ban, and overall reductions in research and development on weapons through control of budgets or control of the total manpower engaged in such work.

7) It is noted that, in order to achieve our ultimate goal of General and Complete Disarmament, the concept of deterrence will eventually have to be abandoned. In the meantime, whatever case there may be for reliance on deterrence will weaken as the process of détente advances. Moreover, even within the framework of deterrence, there is a basis for very substantial reductions, since the assured retaliatory capabilities of the United States and the Soviet Union are grossly in excess of what that doctrine requires.

The Comprehensive Test Ban, and the Peaceful Uses of Nuclear Explosives

As before, we believe that the conversion of the Limited Nuclear Test Ban now observed by most nations into a Comprehensive Nuclear Test Ban observed by all nations is a matter of utmost importance and urgency. In this connection, we again wish to express our view that any plans or programmes for the so-called peaceful uses of nuclear explosives greatly complicate attempts to achieve a universal and comprehensive test ban and to prevent proliferation, and we therefore reaffirm our previous opposition to such plans and programmes.

Miniature Nuclear Weapons

It was noted that there are renewed efforts towards making nuclear war more acceptable. The current means for doing so is through the development of the technology for producing so-called

"mini-nukes" (i.e. very low yield nuclear weapons) and the development of tactical concepts for their use in battle. We believe that their introduction would seriously blur the gap between conventional and nuclear war and thus make nuclear war more likely. We further believe such a war, once begun with the so-called mini-weapons, would very probably escalate into a war with full sized nuclear weapons. For this reason, we believe the potential dangers inherent in the concept of mini-nuclear weapons demands that their development be stopped immediately.

Non-Use of Nuclear Weapons

The importance was noted of the Accord on Avoiding Atomic War signed in June 1973 by the United States and the Soviet Union, and their pledge to pursue policies designed "to remove the danger of nuclear war and of the use of nuclear weapons". At the same time, the participants expressed their belief that further steps are desirable in the direction of prohibiting the threat and the use of force and the permanent prohibition of nuclear weapons. Some participants expressed the view that among the practical steps in this direction, there could be an agreement about no-first-use of nuclear weapons, and no-use against non-nuclear countries.

Chemical Disarmament

We note with regret that the United States and 41 other member states of the UN have not yet ratified the 1925 Geneva Protocol. We urge that its ratification be accomplished without delay, without restrictions, or preferably with an interpretation that the Protocol covers the tear gases and herbicides. The continuing lack of agreement on chemical warfare (CW) poses great dangers. There are large stocks of CW agents in existence. The development of new weapons continues and includes, in particular, the development of binary weapons which seem bound to make the negotiation and enforcement of CW disarmament more difficult. Some participants felt that the main risk of use of chemical weapons probably lies in continents other than Europe, where advanced countries may be tempted to use them, or develop them for possible use against poor, defenceless countries with whom they are in conflict.

Others felt that in some circumstances the main risk of use of CW would be between the advanced countries. Indeed, such a risk did exist during World War II.

All deplore the continued failure of the Conference of the Committee on Disarmament (CCD) during the past year to make progress in the negotiation of chemical disarmament as provided in the 1972 Biological Warfare (BW) Accord.

World Disarmament Conference

The UN General Assembly voted to hold such a conference without specifying the time span and place. We wish it the greatest success and also offer our assistance. We urge all the governments involved and the Secretary-General of the UN, in the preparations for the Conference, to make maximum use of public bodies, experts, institutes and others dedicated to arms control and disarmament.

World Congress of Peace Forces

We express our sympathy with the aims of the World Congress of Peace Forces, to be held in Moscow in October 1973, and hope it will make a considerable contribution to world peace and disarmament.

2. Disarmament in Europe

The present military and political condition of Europe was examined. Although varied conceptions of the situation were advanced, there was a good deal of common ground among the participants. There was, for example, a general belief that the improved situation, both globally and in Europe, had made the chances of war in Europe much more remote than a few years ago, and has created a new international political climate, more favourable for arms control and disarmament.

On the other hand, the imbalance between the political détente and the situation in the military sphere was noted. The arms race in Europe continues and, moreover, there have been dangerous increases in numbers and efficiency in certain categories of forces and weapons on European soil. There was a difference of opinion on whether a possibly sizeable disengagement of US forces from Western Europe would have a de-stabilizing effect. Different views were also expressed on the possible effects of foreign troops, in any part of Europe and elsewhere, in inhibiting the free exercise of national sovereignty.

Considering the talks on mutual force reductions (MFR) due to be held shortly in Vienna, the hope was expressed that the talks would achieve and give real impetus to reductions in armaments, forces and military expenditure to parallel the reductions in political tensions, but the difficulties involved in obtaining, in the first place, any very large percentage reductions were noted.

Considerable attention was given to the present character and future prospects of the British and French independent nuclear forces. Some participants thought that the early possibility of Anglo-French co-operation was unlikely and they gave even less credence to the idea of a collective European nuclear force. Others regarded such co-operation as running counter to hopes for a developing East-West détente, particularly if it resulted in the involvement of the Federal German Republic. However, it was agreed that British and French participation in strategic arms limitation negotiations would be desirable.

Careful consideration was given to the important problem of tactical nuclear warheads and the delivery vehicles in Europe. Various proposals were advanced for the reduction of nuclear

weaponry and the creation of nuclear-free zones of varying width. Some suggestions that were advanced included the total withdrawal of foreign nuclear weaponry to their homelands; the idea of a large nuclear-free zone, e.g. from the Rhine to the Vistula; and of a narrower zone in the centre of Europe. But unanimity on any of these suggestions was not forthcoming.

In the context of the discussion of European Security, some participants wished to see states sign an agreement involving no-first-use of nuclear weapons. But others expressed doubts about the utility of such a declaration, whether it should be limited to Europe, and whether a no-early-first-use agreement might be preferable. It was also suggested that improved methods might be found for preventing an immediate, or an unauthorized, or an accidental use of nuclear weapons.

There was also a proposal by some participants that the military organizations of the Atlantic Alliance and the Warsaw Pact should be disbanded, and that all foreign troops be withdrawn to their homelands.

In addition, it was suggested:

1) MFR should aim in its first stage at an initial reduction of foreign troops stationed in Europe and at establishing ceilings which would freeze or reduce the levels of other forces and weapons in Europe in accordance with the principle of equal security for all;

2) France and Great Britain should at some point be included in the negotiations of strategic force ceilings and reductions. This might best be done in the context of a conference of either four or five nuclear powers rather than by expanding the bilateral SALT forum.

3) There should be exchange of information between all nations concerning the composition of their military forces which have a bearing on the European situation.

4) There should be notification of major military manoeuvres (it was felt by some that this should apply at least in Central Europe as a first step), and the exchange of observers at such manoeuvres may be desirable.

3. European Security and Co-operation

We concentrated mainly on the non-military aspects of European security. The progressive development of mutual trust and confidence depends upon, amongst other things, the maximum freedom in the exchange of information. There were some doubts about a totally free system, in view of the possibility of dangerous social consequences, but there was no doubt that every

possible step should be taken to use the mass media to promote international understanding.

The education of new generations was thought to be as important as the influencing of adults. Particular importance was attached to the development of schemes of comparative studies in, e.g. law, sociology, political science and history, and to postgraduate courses enabling relatively mature students to work in another country and gain, along with specialist expertise, a real knowledge of its socio-political philosophy and attitudes. Pugwash scientists in particular should make full use of their influence to encourage the ready availability of staff to take part in international exchange schemes in order to make these projects effective. At the school level attention needs to be paid to the content and bias of teaching in such fields as history and geography. Some progress has been made, mainly in bilateral commissions towards eliminating international misconceptions, but regular meetings of historians for this purpose and to enhance the emphasis on the international character of the history of science and technology are necessary. In this connection, the importance of establishing a European Association of Historians was re-emphasized, one of whose functions would be to discuss varying chauvinist or ideological interpretations of trends and events which may lead to hostile feelings between nations and to falsification of historical facts.

In the fields of economic, scientific and technical co-operation, it was noted that some progress has been made towards an international treaty to deal with the pollution of the Baltic Sea. The problem of the ecological degradation of the Mediterranean is now urgent and a project to devise legal measures to cope with major abuses in the area would provide significant scope for collaboration between the developed and less developed countries concerned.

Standing study groups or seminars in different countries would be a useful way of providing a continuous flow of information about obstacles to economic and other co-operation.

In particular, endorsement was given to those principles enunciated at the recent Helsinki Conference which related to basic individual rights of people to free movement and political rights. The view was expressed in favour of the establishment of a permanent European Council or Commission, to review and take initiatives in all these fields, as had been suggested at Helsinki.

On the military aspects of European security, a gradual movement towards the long-term goals of de-militarization and disarmament was envisaged. The essential pre-requisite to substantial progress is a real confidence that the principle of non-intervention by one state in the affairs of another would be respected. In the meantime, on a sub-regional basis, it might, for example, be possible to work - as suggested in Pugwash on

earlier occasions - for a nuclear free zone in the Balkans and some steps to reduce the naval presence in the Mediterranean of non-Mediterranean powers. The importance of the resolution of the Middle East problem for the security of Europe was stressed.

The view was expressed that the expansion of the trade in arms, in Europe and originating in Europe, ought to be more widely publicized and debated in all the countries concerned. Transfers of sophisticated weapons were often made without the opportunity for the decisions of the governments concerned to be challenged and openly justified. The free availability in a popular form of the kind of information compiled by the Stockholm International Peace Research Institute (SIPRI) would greatly help.

In general, the need was emphasized to avoid complacency and to take steps to consolidate in detail the promising results of the Conference for Security and Co-operation in Europe which began in Helsinki in June 1973.

4. Development

The discussions on development concentrated on barriers to the application of science and technology to development. Whilst recognizing the need for an increased flow of external aid for development, we concentrated our discussions on the role in development of the concept of self-reliance, fundamental to which is the indigenous capacity of the less developed countries (LDC's) for autonomous decision-making, free from foreign influence or undue dependence on foreign aid. Such an approach is essential if the independence of the LDC's is to have real meaning and not be confined to the formal symbols of political sovereignty. In many LDC's self-reliance can be substantially increased through broad co-operation with other LDC countries.

Transfer of technology

Consideration of the barriers to technology primarily related to technology owned by its producers in the developed countries (DC's). The forms in which such technology is introduced into LDC's tends to support primarily the interests of capital and technology suppliers. Its impact upon building up the development potential of the LDC's, particularly in regard to the application of science and technology to development, is often undermined by factors such as the choice of inappropriate technologies, recommendation of capital intensive technologies in countries with unemployment problems, and the tendency of foreign investors and technology suppliers to concentrate all their research and development in their home countries. The financial terms and restrictive clauses imposed by DC sellers on the LDC's in technology purchase contracts impose a heavy financial burden upon the LDC's. The scientific and technological

community in the DC's should insist that, at least, the norms applied in the technology trade between DC's should be enforced in technology trade transactions between the DC's and the LDC's. There is an urgent need for a Code of Conduct to govern international technology transactions. Such a Code would take into account the legitimate rights of the proprietary technology owners and the needs of LDC technology buyers and would be enforced by all governments. Its elaboration, at international level within the UN family, hitherto opposed by certain key technology-producing countries, cannot succeed unless it receives the support of the international scientific and technological community.

Foreign assistance

It was noted that for different reasons, many DC's and the LDC's have become increasingly disenchanted with the results of foreign assistance. As a result, relative to the GNP of the DC's, financial and other assistance have dropped to levels grossly insufficient to make any appreciable impact on the standard of living in the LDC's. The view was expressed that there is little hope of progress for many LDC's, whose development plans have been predicated on aid from DC's, unless greatly increased assistance is provided under conditions that are free of present deficiencies and undesirable implications. Setting up of an international fund, hopefully consisting of at least 1% of the gross national product of the DC's, while representing a fraction of their expenditure on their armaments, may be one way in which such assistance could be provided.

However, it was generally felt that it was more realistic for many LDC's to plan their development on the basis of self-reliance, i.e. with minimum reference to and dependence on assistance from DC's. It was felt that a study of this theme should be carried out, involving leading economists and natural scientists from East, West, North and South, to analyse the situation on the premise that little or no assistance will be forthcoming from the rich countries, and that the future salvation of LDC's, therefore, lie in planning together on the basis of maximum co-operation in the use of their own resources and through joint undertakings in all fields.

Resources for development

It was felt that there are no absolute shortages of human, physical and financial resources for applying science and technology to development. There is rather a need of social organization to promote the efficient utilization of existing resources.

A strong case can be made for a study in the near future to identify, and suggest measures that would remove constraints on the development and utilization of human resources.

Mechanisms of co-operation between developing countries

It was noted that there are imperative needs for LDC's to enter into forms of co-operation with other developing countries to further economic development, and particularly the application of science and technology towards that end. Such co-operation, however, is sometimes difficult to achieve, the preponderant links still being between DC's and LDC's. One of the major reasons for this is the comparative lack of financial resources to support co-operation between LDC's. Scientists are urged to contribute ideas to bodies such as the United Nations Development Programme (UNDP) which are prepared to devote financial resources to study such co-operation between the LDC's.

Professional norms of scientific and technical communities

Educational and research establishments in LDC's have been modelled upon those in the metropolitan countries. The new needs of development are recognized, but established traditions and attachment to DC institutions, tending to encourage pure rather than applied science, make changes difficult. The incentive and reward systems, now geared towards excellence in basic research in sciences rather than to the development and application of technology to fields of importance for development, need to be changed. Both basic and applied research have to be relevant to national requirements as identified jointly by scientists, planners and the users of research.

The prime responsibility to effect the required change remains with the scientific leadership in the LDC's. But the international scientific community should lend support to actions in LDC's aimed at bringing such changes about, and help to educate and influence their colleagues in both LDC's and DC's in this regard.

Role of scientists in promoting the self-reliant development of LDC's

Parallel to the influence which the scientific community has exercised on disarmament questions, scientists need to exert pressure, particularly on governments, by means of person to person contacts, through scientific societies; the Press and Parliaments, in both the DC's and the LDC's, for the development of the welfare and self-reliance of the latter countries.

5. Radioactive Pollution of the Environment in the Context of the Energy Problem

Need for fission

The future needs for fission power depend on the growth of energy consumption worldwide, the distribution of that growth between rich and poor countries, the size of electricity's role in the total energy budget, and the magnitude and time scale for development of alternative energy sources. Growth of energy use is most badly

needed in the poor countries, where nuclear power is at a disadvantage because of the small scale and dispersed character of present needs. Fusion, solar energy and geothermal are major sources potentially achievable and able to reduce reliance on fission on a time scale of 20 to 50 years, while cleaner technologies for burning fossil fuels have some promise for the interim.

Energy potential of fission and need for breeder reactors

Continued reliance on non-breeder fission reactors for the next 30 to 50 years would require the use of expensive low-grade uranium ores¹ if fission grows as its promoters have projected. However, the cost of nuclear-generated electricity is so insensitive to the price of uranium, even in non-breeder reactors, that no drastic increase in electricity cost would result from the use of the expensive and abundant ores² in light water reactors or gas cooled reactors. Available data indicate that it is not necessary, on grounds of worldwide uranium shortage, to deploy breeder reactors in the next 30 to 50 years. (It must be noted that this conclusion was not unanimous.)

Routine emissions

It is technically possible and desirable to reduce routine emissions of radioactivity from nuclear reactors and fuel re-processing plants to levels such that the radiation exposure to members of the public from all such sources is less than one per cent of the average "natural background". The greatest technical and regulatory vigilance will be required to assure that the technical potential for such low emissions is achieved in practice, everywhere in the world. Establishment of a worldwide network of radioactivity monitoring stations is recommended.

Radioactive wastes

No general solution for the isolation of long-lived radioactive wastes from the biosphere, for the necessary many thousands of years, is yet in hand; that is, despite a wide variety of proposals, "experts" still disagree on whether any of them will suffice. Disposal in deep salt beds is perhaps the most thoroughly investigated possibility, but the viability of this approach depends on the geological details of the particular salt deposit. New and larger research programmes should be initiated in search of a solution. It is impossible to be complacent about expansion in the use of nuclear power without having a solution in hand.

1 \$35/kg U_3O_8 in 2000 and perhaps \$100/kg in 2020 versus \$15/kg in 1973.

2 About 0.5 mills/kwhe increase in 2000 and 1.5 to 3 mills/kwhe in 2020. These cost increases compare to an average delivered cost of electricity of 20 mills/kwhe in the USA in 1970.

Major releases

Catastrophic releases of radioactivity from nuclear reactors and fuel re-processing plants (and to a lesser degree waste shipments) are possible in principle, as a result of accident, natural disaster, sabotage, or act of war. This requires that reactors and re-processing plants should not be sited in earthquake or tsunami zones. Estimates of reactor accident probabilities ranging from 10^{-4} to 10^{-12} per reactor-year have been published by competent authorities; in the absence of proof or agreement, prudence requires operating on the assumption that the higher (less safe) figure is possible. For this reason, siting reactors near population centres is to be avoided. The potential of siting reactors 100 metres or more underground should be investigated. The effects of sabotage and acts of war are outside the normal probability calculations and justify grave concern. Nuclear facilities should be more closely guarded and perhaps clustered to facilitate this and to minimize shipments, but it is difficult to believe that such measures can be 100 per cent effective.

Diversion of fissionable materials

All fission reactor types involve the use of fissionable materials in forms usable for the manufacture of fission weapons, without further isotopic separation. The high Pu-240 contamination in plutonium from light water reactors would perhaps prevent an unsophisticated group from producing a weapon with this material, but could not stop a more sophisticated effort. The two principal threats are: (1) proliferation of weapons by means of material diverted from a country's non-nuclear fuel cycle or from that of another country; (2) theft of material by subnational groups bent on manufacturing a weapon for terrorism or blackmail. The existing safeguards against proliferation, enforced by the IAEA under the Non-Proliferation Treaty, are extensive and conscientiously enforced. There is some disagreement as to whether these safeguards were completely sufficient or capable of improvement. A major improvement in the present safeguards situation, which is urgently advocated, would be that all countries sign and ratify the Non-Proliferation Treaty. The possibility of strengthening the safeguards and the IAEA's implementation capability, within the framework of the NPT, should be thoroughly examined. The question of uniform standards for control of fissionable material in the reactor programmes of weapons states needs special attention. Technical means for deterring subnational groups from diversion and weapons manufacture should be thoroughly researched; although no method yet proposed could stop all such attempts, it is certainly worth trying to alter the probabilities so as to diminish the risk of diversion.

Implications of problems related to fission

The as yet unsolved problem of waste management and the possibly unsolvable (in an absolute sense) problems of catastrophic

releases of radioactivity and diversion of bomb grade material combine to create grave and justified misgivings about the vast increase in the use of nuclear power that has been widely predicted. The wisdom of such an increase must at the present time be seriously questioned. It is evidently impossible to abandon fission altogether in the near future, but every effort should be made to develop alternatives by greatly accelerating research on potentially cleaner energy sources, and by re-examining the relation between genuine, sustainable needs for energy, on the one hand, and projected demands on the other. In the meantime, every effort should be made to minimize by technical and regulatory means the hazards of fission, as described above. Since none of the problems described here are significantly diminished by breeder reactors, and problems of safety and plutonium diversion are significantly aggravated, and since available data indicate (in the view of the majority of the Working Group) that breeder reactors are not needed in the next 30 to 50 years on grounds of worldwide uranium availability, their large-scale deployment should be dependent on a thorough re-examination of the questions of safety and diversion.

International Energy Institute

A Pugwash Symposium to review the efforts of major existing institutions in the energy field has been announced for 1974. Ultimately, on the basis of the Symposium results and further discussions at the 1974 Baden meeting, Pugwash may wish to recommend (and contribute to) the strengthening and expansion of an existing institution already dealing with international energy problems, or the broadening of some other international group (such as SIPRI) to include such problems; or the formation of an entirely new International Energy Institute (perhaps along the lines of CERN). Alternatively, it may become apparent that existing activities and institutions concerned with international energy problems are adequate as they are.

PUGWASH CONFERENCES ON SCIENCE AND WORLD AFFAIRS

Secretary-General: Professor J. ROTBLAT

Telegraphic Address: Pugwash, London

Telephones: 01-405 6661

01-253 9875

01-435 1471

9 GREAT RUSSELL MANSIONS,
60 GREAT RUSSELL STREET,
LONDON, W.C.1.B. 3BE

21st August 1973

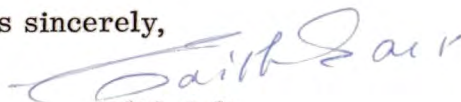
Mrs. Trude Szilard,
Hotel Alphorn,
BE 3780 Gstaad,
Switzerland.

Dear Mrs. Szilard,

We have now heard from Mr. Kuhlberg that there will be accommodation for you in Aulanko. Would you please let him know when you are arriving. His address is Mr. S. Kuhlberg, The Finnish Pugwash Committee, Unionkatu 35, 00170 Helsinki 17, Finland. The hotel is Hotel Aulanko, Hämeenlinna (Telephone 917- 21 271).

If you arrive in Helsinki on August 29th you would probably be able to take advantage of a journey to Aulanko on one of the special buses for participants. Otherwise it would mean a train journey from Helsinki to Hämeenlinna (about 100 km). There are frequent trains and the railway station is in the centre of Helsinki, not far from the air terminal.

Yours sincerely,



Edith Salt

Secretary

as from: Hotel Alphorn
Gstaad, Switzerland

Mr. S. Kuhlberg
The Finnish Pugwash Committee
University of Helsinki
Unioninkatu 35
00170 Helsinki 17, Finland

August 24, 1973

Dear Mr. Kuhlberg :

I appreciate it very much that you have been able to find accomodation for me in Aulanko.

I plan to arrive on Tuesday, August 28, from Copenhagen by Finnair (AY 814) at 17:55, and plan to stay in Helsinki overnight, then take one of your buses to Aulanko on the 29th. Would you please be good enough to leave a message for me at the airport, which Hotel at Helsinki I should go to that evening ?

Many thanks for your assistance, and looking forward to meeting you.

Sincerely,

TWENTY-THIRD PUGWASH CONFERENCE
ON SCIENCE AND WORLD AFFAIRS
AULANKO, 30 AUGUST - 4 SEPTEMBER 1973

Please return this completed form as soon as possible to Mr. S. Kuhlberg. The Finnish Pugwash Committee, University of Helsinki, Unioninkatu 35, 00170 Helsinki 17.

Name

Address

.....

.....

.....

Accompanied by

Date and time of arrival

.....

Method of travel (air, rail, sea, road)

If known, please give details of flight number and airline, etc.

.....

Date and time of departure from Aulanko

.....

Special requests (e.g. vegetarian food)

.....

23rd Conference
Information for Participants

The Conference will begin at 9.30 a. m. on Thursday, 30th August and will finish at about noon on Tuesday, 4th September.

Accommodation. All participants will be accommodated in the Aulanko Hotel, where all meals will also be served.

Arrival. Please fill in, on the enclosed questionnaire, the time of your arrival, and Flight No. if you are going by air to Helsinki.

Participants who arrive at Helsinki airport on August 29th will be taken by special bus directly from the airport to Aulanko.

Participants who arrive on other dates will have to take care of their own transportation. By road, Aulanko lies about 100 km. from Helsinki. There are frequent trains and buses from Helsinki to Hämeenlinna, which is the station for Aulanko. If, therefore, you arrive on a day other than the 29th August please take the airport bus to the air terminal and from there a taxi to the Central Bus Station or the Railway Station, both of which are in the centre of Helsinki, not far from each other and from the air terminal. Anyhow, arriving participants are advised to contact the Information Desk at the airport, where further advice will be given.

Weather. The weather is usually very pleasant at the beginning of September. It seldom rains, there is mostly sunshine, and it is mostly warm. However, just in case, bring with you a sweater or a light raincoat.

Telephones and Telegraphic Addresses.

Hotel Aulanko,
Hämeenlinna.

Telephone : 917- 21 271
Telex : 2320

The Finnish Pugwash Committee
Unioninkatu 35
00170 Helsinki 17

Telephone: 65 07 23

Mail. Mail for participants should be addressed:

4/0 Pugwash Conference,
Hotel Aulanko,
Hämeenlinna,
Finland.

Rooms. Rooms in the hotel will be available from Wednesday, 29th August until Wednesday morning, 5th September.

23rd Pugwash Conference, Aulanko, Finland
30th August - 4th September 1973

EUROPEAN SECURITY, DISARMAMENT AND OTHER PROBLEMS

TOPICS FOR WORKING GROUPS

1. Problems of Disarmament

- a) Current status and prospect of SALT.
- b) Limitations of military research and development (including comprehensive test ban; restrictions on missile tests, etc.).
- c) Collateral measures (limitations on budgets, chemical warfare ban).
- d) Progress toward GCD through steps not involving technological limitations (no first use agreement, secure ocean areas for missile submarines, etc.).

2. Disarmament in Europe

- a) Mutual balanced force reductions (MBFR).
- b) Problems of the European nuclear deterrent forces.
- c) Other arms control measures affecting Europe.

3. European Security

- a) Current status of the European Security Conference (ESC).
- b) Relationships between ESC and MBFR.
- c) Role of Pugwash in furthering economic, scientific, technical and cultural co-operation in Europe.

4. Development

- a) Social, economic and political barriers to the application of science and technology in development.

5. Radioactive Pollution of the Environment

- a) Assessment of current regulations and practices on release of radioactive materials into the biosphere.
- b) Dangers arising from power economy based on plutonium breeding (health hazards and possibility of clandestine diversion).

STATEMENT FROM THE CONTINUING COMMITTEE
ON THE 23rd PUGWASH CONFERENCE,
HELD IN AULANKO, FINLAND,
30 AUGUST - 4 SEPTEMBER 1973

The Twenty-third Pugwash Conference on Science and World Affairs, organized by the Finnish Pugwash Group, was held in Aulanko, Finland from the 30th August to the 4th September 1973. It was attended by 108 participants from 29 countries and 6 international organizations. Our hosts provided us with a most congenial and efficiently operating atmosphere for our work.

Pugwash is an international Movement of Scientists that has met regularly since 1957 in Annual Conferences, topical Symposia, regional meetings and other appropriate forums, to discuss the traditional problems relating to Disarmament and Arms Control; Peace Keeping and Security; as well as Environment and Resources; Population; Development; Scientific Collaboration and Education; the Social Responsibility of Scientists. Coming together as individuals, these gatherings, which include many of the world's most distinguished scientists, endeavour to apply their collective technical competence and experience to the solution of many of the world's most pressing problems. Although entirely unofficial in character, the results and conclusions of these Conferences are widely disseminated among appropriate governmental and international bodies and throughout the scientific community.

We met this year in an atmosphere of more relaxed international tensions deriving from a number of significant events that have taken place since our last Conference: The Brezhnev-Nixon Accords that have followed so rapidly on the heels of the Strategic Arms Limitation (SALT) Agreements of 1972, with their promise to seek further and rapid progress in controlling the nuclear arms race; the growing détente between the states of Central Europe and the initiation of negotiations on European Security and Mutual Arms Reductions; the continued improvement of US-Chinese relations; the withdrawal of US Forces from Indo-China and the consequent "winding-down" of the Vietnam war; and the beginnings of normalization of relations between India, Pakistan and Bangladesh. On the other hand, we cannot refrain from noting the continuing dangers to world peace arising from the failure to bring about a complete end to the hostilities in Indo-China, to the continuing absence of peace in the Middle East, and to the ever-widening economic disparity between the developing and the developed nations. Moreover, we deplore the continuing failure to achieve any progress in nuclear disarmament, the continued growth of nuclear weapons stockpiles and the failure of progress in the Conference of the Committee on Disarmament (CCD) in Geneva. Nor can we be complacent in the face of the increasing burdens on the world's resources and on our biosphere that are resulting from the rapid and largely uncontrolled technological growth in the highly industrialized parts of the world.

The general theme of this year's Conference was "European Security, Disarmament and Other Problems". Under this heading, the Conference divided into five Working Groups on: Disarmament and Strategic Arms Limitations; Disarmament in Europe; European Security and Co-operation; Social, Economic and Political Barriers to the Application of Science and Technology to Development; and Radioactive Pollution of the Environment in the Context of the Energy Problem.

In addition, we met in two plenary symposia. At one, reports were given on the recent work and current programme of the Stockholm International Peace Research Institute (SIPRI); on a special Symposium on the Non-Proliferation of Nuclear Weapons, organized by SIPRI and held in Tällberg, Sweden in June 1973, and on the Helsinki Arms Control Seminar, convened by the Finnish Pugwash Group in June 1973. The second Plenary Symposium, on Population Problems, organized by the Swedish Pugwash Group, presented a number of reports on current work and progress on population planning taking place in a variety of countries and scientific institutions.

The following was prepared by the Continuing Committee on the basis of the main conclusions and recommendations from the Conference's Working Groups.

1. Disarmament and Strategic Arms Limitations

The current year has seen the achievement of important new accords between the United States and the Soviet Union on "The Basic Principles of Negotiations on the Further Limitation of Strategic Offensive Arms". Among other things, these accords include a pledge to make a serious effort to convert the present interim agreement on the limitations of offensive weapons to a permanent and more complete agreement in 1974.

The hope was expressed that the parties will interpret the new accords in the spirit that they are a pledge not only between the parties themselves, but before all mankind, to make major progress in reducing weapon levels.

While welcoming this new step, it was again recalled that the parties to these new accords, and the governments of many other nations as well, have on several solemn occasions stated that their ultimate goal is General and Complete Disarmament. So far, progress has been restricted to achieving arms limitations only, and no reductions in nuclear arms whatsoever have yet been accomplished. The view was therefore asserted that these new accords and the general progress towards political détente can and must be followed promptly by some real and substantial reductions in nuclear weapons. At the same time, negotiations to limit arms should be initiated among other states in relation to other geographical regions.

I. Nuclear Disarmament and Strategic Arms Limitations

In connection with nuclear disarmament and strategic arms limitations, we wish at this time to emphasize the following points:

1) It is dangerous to lose any more time. Further delays will provide new opportunities for the development of still more dangerous and menacing weapons. Further delays also increase the chances of further proliferation of nuclear weapons.

2) It is most important that some real and substantial arms cuts be made. The tremendous size of the current deployments make such reductions urgent, and the recent progress towards political détente makes them possible. Having in mind the promise to include arms reductions as well as arms limitations in the forthcoming negotiations, it was felt that particular attention should be paid to the following possibilities:

(a) Eliminate those delivery systems which carry the largest payload (e.g. heavy bombers, large missiles). Such a reduction would make the biggest contribution towards reducing the potential death and destruction contained in the current stockpiles.

(b) Eliminate without replacement the most obsolete of the currently deployed systems (e.g. the Titan missiles, those Polaris submarines which are not scheduled for conversion to Poseidons, the older Soviet missiles). Such a reduction may be the most readily acceptable from a political point of view.

(c) Large reductions in total numbers, either with the proportions of types of weapons kept constant, or left to the discretion of each nation. Such reductions have the advantage of avoiding arguments involving comparisons of weapons details, and for that reason may be the most easily accepted. They could also preserve the present "mix" of forces and whatever additional stability may accrue from it.

3) Despite evidence of some progress, the matter of unauthorized or accidental use of nuclear weapons remains a very serious problem deserving further attention.

4) International negotiations constitute the best way to achieve lasting arms reductions and, ultimately, general and complete disarmament. However, unilateral cuts can be important too. When, as now, negotiations are under way, substantial unilateral cuts may serve to accelerate progress and to break the bottlenecks that often develop in negotiations out of arguments over details. Unilateral actions by one party should, of course, be designed with an eye to stimulating similar though not necessarily identical responses by other parties by force of mutual example. The reductions in tensions and suspicions resulting both

from current progress towards political détente and also from previous arms limitations agreements ought to make such actions more acceptable to all governments.

5) In the past, fundamental asymmetries in the geopolitical, economic, and technological situations in the various nuclear weapons states contributed importantly to making progress in arms control and disarmament very difficult and painfully slow. The current situation, characterized by political détente on the one hand and huge numbers of nuclear weapons on the other, makes it both urgent and possible to reduce the extreme attention to precise numerical balances among all varieties of weapons and at all stages of disarmament.

6) Further qualitative developments can make the situation more dangerous than it already is. Fortunately, the governments are also expressing some concern in this area, and we urge that they give further serious consideration to such measures as a comprehensive nuclear test ban, a limitation in the rate of missile test launches which could serve as a prelude to a more comprehensive ban, and overall reductions in research and development on weapons through control of budgets or control of the total manpower engaged in such work.

7) It is noted that, in order to achieve our ultimate goal of General and Complete Disarmament, the concept of deterrence will eventually have to be abandoned. In the meantime, whatever case there may be for reliance on deterrence will weaken as the process of détente advances. Moreover, even within the framework of deterrence, there is a basis for very substantial reductions, since the assured retaliatory capabilities of the United States and the Soviet Union are grossly in excess of what that doctrine requires.

II. The Comprehensive Test Ban, and the Peaceful Uses of Nuclear Explosives

As before, we believe that the conversion of the Limited Nuclear Test Ban now observed by most nations into a Comprehensive Nuclear Test Ban observed by all nations is a matter of utmost importance and urgency. In this connection, we again wish to express our view that any plans or programmes for the so-called peaceful uses of nuclear explosives greatly complicate attempts to achieve a universal and comprehensive test ban and to prevent proliferation, and we therefore reaffirm our previous opposition to such plans and programmes.

III. Miniature Nuclear Weapons

It was noted that there are renewed efforts towards making nuclear war more acceptable. The current means for doing so is through the development of the technology for producing so-called

"mini-nukes" (i.e. very low yield nuclear weapons) and the development of tactical concepts for their use in battle. We believe that their introduction would seriously blur the gap between conventional and nuclear war and thus make nuclear war more likely. We further believe such a war, once begun with the so-called mini-weapons, would very probably escalate into a war with full sized nuclear weapons. For this reason, we believe the potential dangers inherent in the concept of mini-nuclear weapons demands that their development be stopped immediately.

IV. Non-Use of Nuclear Weapons

The importance was noted of the Accord on Avoiding Atomic War signed in June 1973 by the United States and the Soviet Union, and their pledge to pursue policies designed "to remove the danger of nuclear war and of the use of nuclear weapons". At the same time, the participants expressed their belief that further steps are desirable in the direction of prohibiting the threat and the use of force and the permanent prohibition of nuclear weapons. Some participants expressed the view that among the practical steps in this direction, there could be an agreement about no-first-use of nuclear weapons, and no-use against non-nuclear countries.

V. Chemical Disarmament

We note with regret that the United States and 41 other member states of the UN have not yet ratified the 1925 Geneva Protocol. We urge that its ratification be accomplished without delay, without restrictions, or preferably with an interpretation that the Protocol covers the tear gases and herbicides. The continuing lack of agreement on chemical warfare (CW) poses great dangers. There are large stocks of CW agents in existence. The development of new weapons continues and includes, in particular, the development of binary weapons which seem bound to make the negotiation and enforcement of CW disarmament more difficult. Some participants felt that the main risk of use of chemical weapons probably lies in continents other than Europe, where advanced countries may be tempted to use them, or develop them for possible use against poor, defenceless countries with whom they are in conflict.

Others felt that in some circumstances the main risk of use of CW would be between the advanced countries. Indeed, such a risk did exist during World War II.

All deplore the continued failure of the Conference of the Committee on Disarmament (CCD) during the past year to make progress in the negotiation of chemical disarmament as provided in the 1972 Biological Warfare (BW) Accord.

VI. World Disarmament Conference

The UN General Assembly voted to hold such a conference without specifying the time span and place. We wish it the greatest success and also offer our assistance. We urge all the governments involved and the Secretary-General of the UN, in the preparations for the Conference, to make maximum use of public bodies, experts, institutes and others dedicated to arms control and disarmament.

VII. World Congress of Peace Forces

We express our sympathy with the aims of the World Congress of Peace Forces, to be held in Moscow in October 1973, and hope it will make a considerable contribution to world peace and disarmament.

2. Disarmament in Europe

The present military and political condition of Europe was examined. Although varied conceptions of the situation were advanced, there was a good deal of common ground among the participants. There was, for example, a general belief that the improved situation, both globally and in Europe, had made the chances of war in Europe much more remote than a few years ago, and has created a new international political climate, more favourable for arms control and disarmament.

On the other hand, the imbalance between the political détente and the situation in the military sphere was noted. The arms race in Europe continues and, moreover, there have been dangerous increases in numbers and efficiency in certain categories of forces and weapons on European soil. There was a difference of opinion on whether a possibly sizeable disengagement of US forces from Western Europe would have a de-stabilizing effect. Different views were also expressed on the possible effects of foreign troops, in any part of Europe and elsewhere, in inhibiting the free exercise of national sovereignty.

Considering the talks on mutual force reductions (MFR) due to be held shortly in Vienna, the hope was expressed that the talks would achieve and give real impetus to reductions in armaments, forces and military expenditure to parallel the reductions in political tensions, but the difficulties involved in obtaining, in the first place, any very large percentage reductions were noted.

Considerable attention was given to the present character and future prospects of the British and French independent nuclear forces. Some participants thought that the early possibility of Anglo-French co-operation was unlikely and they gave even less credence to the idea of a collective European nuclear force. Others regarded such co-operation as running counter to hopes for a developing East-West détente, particularly if it resulted in the involvement of the Federal German Republic. However, it was agreed that British and French participation in strategic arms limitation negotiations would be desirable.

Careful consideration was given to the important problem of tactical nuclear warheads and the delivery vehicles in Europe. Various proposals were advanced for the reduction of nuclear

weaponry and the creation of nuclear-free zones of varying width. Some suggestions that were advanced included the total withdrawal of foreign nuclear weaponry to their homelands; the idea of a large nuclear-free zone, e.g. from the Rhine to the Vistula; and of a narrower zone in the centre of Europe. But unanimity on any of these suggestions was not forthcoming.

In the context of the discussion of European Security, some participants wished to see states sign an agreement involving no-first-use of nuclear weapons. But others expressed doubts about the utility of such a declaration, whether it should be limited to Europe, and whether a no-early-first-use agreement might be preferable. It was also suggested that improved methods might be found for preventing an immediate, or an unauthorized, or an accidental use of nuclear weapons.

There was also a proposal by some participants that the military organizations of the Atlantic Alliance and the Warsaw Pact should be disbanded, and that all foreign troops be withdrawn to their homelands.

In addition, it was suggested:

1) MFR should aim in its first stage at an initial reduction of foreign troops stationed in Europe and at establishing ceilings which would freeze or reduce the levels of other forces and weapons in Europe in accordance with the principle of equal security for all;

2) France and Great Britain should at some point be included in the negotiations of strategic force ceilings and reductions. This might best be done in the context of a conference of either four or five nuclear powers rather than by expanding the bilateral SALT forum.

3) There should be exchange of information between all nations concerning the composition of their military forces which have a bearing on the European situation.

4) There should be notification of major military manoeuvres (it was felt by some that this should apply at least in Central Europe as a first step), and the exchange of observers at such manoeuvres may be desirable.

3. European Security and Co-operation

We concentrated mainly on the non-military aspects of European security. The progressive development of mutual trust and confidence depends upon, amongst other things, the maximum freedom in the exchange of information. There were some doubts about a totally free system, in view of the possibility of dangerous social consequences, but there was no doubt that every

possible step should be taken to use the mass media to promote international understanding.

The education of new generations was thought to be as important as the influencing of adults. Particular importance was attached to the development of schemes of comparative studies in, e.g. law, sociology, political science and history, and to postgraduate courses enabling relatively mature students to work in another country and gain, along with specialist expertise, a real knowledge of its socio-political philosophy and attitudes. Pugwash scientists in particular should make full use of their influence to encourage the ready availability of staff to take part in international exchange schemes in order to make these projects effective. At the school level attention needs to be paid to the content and bias of teaching in such fields as history and geography. Some progress has been made, mainly in bilateral commissions towards eliminating international misconceptions, but regular meetings of historians for this purpose and to enhance the emphasis on the international character of the history of science and technology are necessary. In this connection, the importance of establishing a European Association of Historians was re-emphasized, one of whose functions would be to discuss varying chauvinist or ideological interpretations of trends and events which may lead to hostile feelings between nations and to falsification of historical facts.

In the fields of economic, scientific and technical co-operation, it was noted that some progress has been made towards an international treaty to deal with the pollution of the Baltic Sea. The problem of the ecological degradation of the Mediterranean is now urgent and a project to devise legal measures to cope with major abuses in the area would provide significant scope for collaboration between the developed and less developed countries concerned.

Standing study groups or seminars in different countries would be a useful way of providing a continuous flow of information about obstacles to economic and other co-operation.

In particular, endorsement was given to those principles enunciated at the recent Helsinki Conference which related to basic individual rights of people to free movement and political rights. The view was expressed in favour of the establishment of a permanent European Council or Commission, to review and take initiatives in all these fields, as had been suggested at Helsinki.

On the military aspects of European security, a gradual movement towards the long-term goals of de-militarization and disarmament was envisaged. The essential pre-requisite to substantial progress is a real confidence that the principle of non-intervention by one state in the affairs of another would be respected. In the meantime, on a sub-regional basis, it might, for example, be possible to work - as suggested in Pugwash on

earlier occasions - for a nuclear free zone in the Balkans and some steps to reduce the naval presence in the Mediterranean and non-Mediterranean powers. The importance of the resolution of the Middle East problem for the security of Europe was stressed.

The view was expressed that the expansion of the trade in arms, in Europe and originating in Europe, ought to be more widely publicized and debated in all the countries concerned. Transfers of sophisticated weapons were often made without the opportunity for the decisions of the governments concerned to be challenged and openly justified. The free availability in a popular form of the kind of information compiled by the Stockholm International Peace Research Institute (SIPRI) would greatly help.

In general, the need was emphasized to avoid complacency and to take steps to consolidate in detail the promising results of the Conference for Security and Co-operation in Europe which began in Helsinki in June 1973.

Transfer of technology

Consideration of the transfer of technology... related to technology owned by its producers in the developed countries (OECD). The forms in which such technology is transferred to the LDC's tends to depend primarily on the interests of the technology suppliers. The impact upon economic growth and development potential of the LDC's, particularly in regard to the application of science and technology to development, is determined by factors such as the nature of the technology transferred, the recommendation of central, international organizations in countries with development problems, and the availability of foreign investors and technology suppliers to commercialize their research and development in their home countries. Financial terms and restrictive clauses imposed by the LDC's on the LDC's in technology transfer contracts impact a heavy financial burden upon the LDC's. The LDC's and technological community in the DC's should insist that the LDC's be entered into in the technology trade between the LDC's and the DC's. In technology trade transactions between the LDC's and the DC's there is an urgent need for a Code of Conduct to govern national technology transactions. Such a Code would take into account the legitimate rights of the technology suppliers, owners and the needs of the LDC technology owners and would be enforced by all governments. The allocation of technology level within the UN family, which is opposed by certain technology-producing countries, cannot succeed unless it receives the support of the international scientific and technological community.

Foreign assistance

It was noted that for different reasons, many LDC's and the LDC's have become increasingly disenchanted with the results of foreign assistance. As a result, relative to the LDC's, the LDC's financial and other assistance have dropped to levels which are insufficient to make any appreciable impact on the standard of

4. Development

The discussions on development concentrated on barriers to the application of science and technology to development. Whilst recognizing the need for an increased flow of external aid for development, we concentrated our discussions on the role in development of the concept of self-reliance, fundamental to which is the indigenous capacity of the less developed countries (LDC's) for autonomous decision-making, free from foreign influence or undue dependence on foreign aid. Such an approach is essential if the independence of the LDC's is to have real meaning and not be confined to the formal symbols of political sovereignty. In many LDC's self-reliance can be substantially increased through broad co-operation with other LDC countries.

Transfer of technology

Consideration of the barriers to technology primarily related to technology owned by its producers in the developed countries (DC's). The forms in which such technology is introduced into LDC's tends to support primarily the interests of capital and technology suppliers. Its impact upon building up the development potential of the LDC's, particularly in regard to the application of science and technology to development, is often undermined by factors such as the choice of inappropriate technologies, recommendation of capital intensive technologies in countries with unemployment problems, and the tendency of foreign investors and technology suppliers to concentrate all their research and development in their home countries. The financial terms and restrictive clauses imposed by DC sellers on the LDC's in technology purchase contracts impose a heavy financial burden upon the LDC's. The scientific and technological community in the DC's should insist that, at least, the norms applied in the technology trade between DC's should be enforced in technology trade transactions between the DC's and the LDC's. There is an urgent need for a Code of Conduct to govern international technology transactions. Such a Code would take into account the legitimate rights of the proprietary technology owners and the needs of LDC technology buyers and would be enforced by all governments. Its elaboration, at international level within the UN family, hitherto opposed by certain key technology-producing countries, cannot succeed unless it receives the support of the international scientific and technological community.

Foreign assistance

It was noted that for different reasons, many DC's and the LDC's have become increasingly disenchanted with the results of foreign assistance. As a result, relative to the GNP of the DC's, financial and other assistance have dropped to levels grossly insufficient to make any appreciable impact on the standard of

living in the LDC's. The view was expressed that there is little hope of progress for many LDC's, whose development plans have been predicated on aid from DC's, unless greatly increased assistance is provided under conditions that are free of present deficiencies and undesirable implications. Setting up of an international fund, hopefully consisting of at least 1% of the gross national product of the DC's, while representing a fraction of their expenditure on their armaments, may be one way in which such assistance could be provided. one

However, it was generally felt that it was more realistic for many LDC's to plan their development on the basis of self-reliance, i.e. with minimum reference to and dependence on assistance from DC's. It was felt that a study of this theme should be carried out, involving leading economists and natural scientists from East, West, North and South, to analyse the situation on the premise that little or no assistance will be forthcoming from the rich countries, and that the future salvation of LDC's, therefore, lie in planning together on the basis of maximum co-operation in the use of their own resources and through joint undertakings in all fields.

Resources for development

It was felt that there are no absolute shortages of human, physical and financial resources for applying science and technology to development. There is rather a need of social organization to promote the efficient utilization of existing resources.

A strong case can be made for a study in the near future to identify, and suggest measures that would remove constraints on the development and utilization of human resources.

Mechanisms of co-operation between developing countries

It was noted that there are imperative needs for LDC's to enter into forms of co-operation with other developing countries to further economic development, and particularly the application of science and technology towards that end. Such co-operation, however, is sometimes difficult to achieve, the preponderant links still being between DC's and LDC's. One of the major reasons for this is the comparative lack of financial resources to support co-operation between LDC's. Scientists are urged to contribute ideas to bodies such as the United Nations Development Programme (UNDP) which are prepared to devote financial resources to study such co-operation between the LDC's.

Professional norms of scientific and technical communities

Educational and research establishments in LDC's have been modelled upon those in the metropolitan countries. The new needs of development are recognized, but established traditions and attachment to DC institutions, tending to encourage pure rather than applied science, make changes difficult. The incentive

and reward systems, now geared towards excellence in basic research in sciences rather than to the development and application of technology to fields of importance for development, need to be changed. Both basic and applied research have to be relevant to national requirements as identified jointly by scientists, planners and the users of research.

The prime responsibility to effect the required change remains with the scientific leadership in the LDC's. But the international scientific community should lend support to actions in LDC's aimed at bringing such changes about, and help to educate and influence their colleagues in both LDC's and DC's in this regard.

Role of scientists in promoting the self-reliant development of LDC's

Parallel to the influence which the scientific community has exercised on disarmament questions, scientists need to exert pressure, particularly on governments, by means of person to person contacts, through scientific societies, the Press and Parliaments, in both the DC's and the LDC's, for the development of the welfare and self-reliance of the latter countries.

5. Radioactive Pollution of the Environment in the Context of the Energy Problem

Need for fission

The future needs for fission power depend on the growth of energy consumption worldwide, the distribution of that growth between rich and poor countries, the size of electricity's role in the total energy budget, and the magnitude and time scale for development of alternative energy sources. Growth of energy use is most badly needed in the poor countries, where nuclear power is at a disadvantage because of the small scale and dispersed character of present needs. Fusion, solar energy and geothermal are major sources potentially achievable and able to reduce reliance on fission on a time scale of 20 to 50 years, while cleaner technologies for burning fossil fuels have some promise for the interim.

Energy potential of fission and need for breeder reactors

Continued reliance on non-breeder fission reactors for the next 30 to 50 years would require the use of expensive low-grade uranium ores¹ if fission grows as its promoters have projected. However, the cost of nuclear-generated electricity is so insensitive to the price of uranium, even in non-breeder reactors, that no drastic increase in electricity cost would result from the use of the expensive and abundant ores² in light water reactors or gas cooled

1 $\$35/\text{kg } \text{U}_3\text{O}_8$ in 2000 and perhaps $\$100/\text{kg}$ in 2020 versus $\$15/\text{kg}$ in 1973.

2 About 0.5 mills/kwhe increase in 2000 and 1.5 to 3 mills/kwhe in 2020. These cost increases compare to an average delivered cost of electricity of 20 mills/kwhe in the USA in 1970.

reactors. Available data indicate that it is not necessary, on grounds of worldwide uranium shortage, to deploy breeder reactors in the next 30 to 50 years. (It must be noted that this conclusion was not unanimous.)

Routine emissions

It is technically possible and desirable to reduce routine emissions of radioactivity from nuclear reactors and fuel re-processing plants to levels such that the radiation exposure to members of the public from all such sources is less than one per cent of the average "natural background". The greatest technical and regulatory vigilance will be required to assure that the technical potential for such low emissions is achieved in practice, everywhere in the world. Establishment of a worldwide network of radioactivity monitoring stations is recommended.

Radioactive wastes

No general solution for the isolation of long-lived radioactive wastes from the biosphere, for the necessary many thousands of years, is yet in hand; that is, despite a wide variety of proposals, "experts" still disagree on whether any of them will suffice. Disposal in deep salt beds is perhaps the most thoroughly investigated possibility, but the viability of this approach depends on the geological details of the particular salt deposit. New and larger research programmes should be initiated in search of a solution. It is impossible to be complacent about expansion in the use of nuclear power without having a solution in hand.

Major releases

Catastrophic releases of radioactivity from nuclear reactors and fuel re-processing plants (and to a lesser degree waste shipments) are possible in principle, as a result of accident, natural disaster, sabotage, or act of war. This requires that reactors and re-processing plants should not be sited in earthquake or tsunami zones. Estimates of reactor accident probabilities ranging from 10^{-4} to 10^{-12} per reactor-year have been published by competent authorities; in the absence of proof or agreement, prudence requires operating on the assumption that the higher (less safe) figure is possible. For this reason, siting reactors near population centres is to be avoided. The potential of siting reactors 100 metres or more underground should be investigated. The effects of sabotage and acts of war are outside the normal probability calculations and justify grave concern. Nuclear facilities should be more closely guarded and perhaps clustered to facilitate this and to minimize shipments, but it is difficult to believe that such measures can be 100 per cent effective.

Diversion of fissionable materials

All fission reactor types involve the use of fissionable materials in forms usable for the manufacture of fission weapons, without further isotopic separation. The high Pu-240 contamination in plutonium from light water reactors would perhaps prevent an unsophisticated group from producing a weapon with this material, but could not stop a more sophisticated effort. The two principal threats are: (1) proliferation of weapons by means of material diverted from a country's non-nuclear fuel cycle or from that of another country; (2) theft of material by subnational groups bent on manufacturing a weapon for terrorism or blackmail. The existing safeguards against proliferation, enforced by the IAEA under the Non-Proliferation Treaty, are extensive and conscientiously enforced. There is some disagreement as to whether these safeguards were completely sufficient or capable of improvement. A major improvement in the present safeguards situation, which is urgently advocated, would be that all countries sign and ratify the Non-Proliferation Treaty. The possibility of strengthening the safeguards and the IAEA's implementation capability, within the framework of the NPT, should be thoroughly examined. The question of uniform standards for control of fissionable material in the reactor programmes of weapons states needs special attention. Technical means for deterring subnational groups from diversion and weapons manufacture should be thoroughly researched; although no method yet proposed could stop all such attempts, it is certainly worth trying to alter the probabilities so as to diminish the risk of diversion.

Implications of problems related to fission

The as yet unsolved problem of waste management and the possibly unsolvable (in an absolute sense) problems of catastrophic releases of radioactivity and diversion of bomb grade material combine to create grave and justified misgivings about the vast increase in the use of nuclear power that has been widely predicted. The wisdom of such an increase must at the present time be seriously questioned. It is evidently impossible to abandon fission altogether in the near future, but every effort should be made to develop alternatives by greatly accelerating research on potentially cleaner energy sources, and by re-examining the relation between genuine, sustainable needs for energy, on the one hand, and projected demands on the other. In the meantime, every effort should be made to minimize by technical and regulatory means the hazards of fission, as described above. Since none of the problems described here are significantly diminished by breeder reactors, and problems of safety and plutonium diversion are significantly aggravated, and since available data indicate (in the view of the majority of the Working Group) that breeder reactors are not needed in the next 30 to 50 years on grounds of worldwide uranium availability, their large-scale deployment should be dependent on a thorough re-examination of the questions of safety and diversion.

International Energy Institute

A Pugwash Symposium to review the efforts of major existing institutions in the energy field has been announced for 1974. Ultimately, on the basis of the Symposium results and further discussions at the 1974 Baden meeting, Pugwash may wish to recommend (and contribute to) the strengthening and expansion of an existing institution already dealing with international energy problems, or the broadening of some other international group (such as SIPRI) to include such problems, or the formation of an entirely new International Energy Institute (perhaps along the lines of CERN). Alternatively, it may become apparent that existing activities and institutions concerned with international energy problems are adequate as they are.

- Ms. Ruth Adams
5201 Kimbark, Chicago, Ill. 60615, U.S.A.
- Dr. H. Afheldt
Max Planck Institut für Lebensbedingungen, 813 Starnberg, Riemerschmidstrase 7, F.G.R.
- Prof. H. Alfven
University of California, San Diego, La Jolla, California 92037, U.S.A.
- Prof. G.T. Allison
Harvard University, Littaver 104, Cambridge, Mass. 02138, U.S.A.
- Prof. G.A. Arbatov
Academy of Sciences, Khlebny per. 2/3, Moscow G-69, U.S.S.R.
- Mr. R. Aubrac (FAO Observer)
160 via Alessandira, Rome, Italy.
- Acad. A.T. Balevski
Bulgarian Academy of Sciences, 7, Narodno Sobranie Sq., Sofia, Bulgaria.
- Dr. J. Barzelatto
1735 Eye St., N.W. (Room 1122), Washington, D.C. 20006, U.S.A.
- Prof. P. Baudoux
86 Avenue Armand Huysmans, B1050 Brussels, Belgium
- Mr. E. Bauer
61 rue de Varenne, Paris³ 75005, France.
- Prof. S. Bhagavantam
Indian Institute of Science, Bangalore-560012, India.
- Dr. S. Bjornholm
Niels Bohr Institute, Blegdamsvej 15-17, 2200 Copenhagen N, Denmark.
- Prof. G.E. von Bonsdorff
Helsinki University Institute of Political Science, Hallitusbatu 11-13, Helsinki, Finland.
- Dr. A. Bindary
1081 Cornish El Nil, Garden City, Cairo, Egypt
- Dr. W.F. von Bredow
Savignystr. 17, 355 Marburg/Lahn, F.G.R.
- Prof. E. Broda
Institut für Physikalische Chemie, Währingerstrasse 42, A-1090 Wien, Austria.
- Prof. B. Broms
University of Helsinki, Hallitutkatu 15, V floor, Helsinki, Finland.
- Dr. A. Burzynski
Institute of Legal Sciences of the Polish Academy of Sciences, Nowy Swiat 72, Poland.
- Prof. F. Calogero
v. S. Alberto Magno 1, 00153 Roma, Italy.
- Dr. D. Carlton
28 Westminster Mansions, Great Peter Street, London S.W.1.
- Prof. H.S. Crowe
Atkinson College, York University, 4700 Keele St., Toronto ONT., Canada.

- Prof. F. Csaki
XI. Goldman Gy. Ter 3, 1111 Budapest, Hungary.
- Dr. R. C. Desai (UN Observer)
Room 3146, United Nations, New York, NY 10017, U.S.A.
- Prof. E. R. Diczfalusy
Rönningevägen 21, Rönninge, Sweden.
- Prof. C. Djerassi
Dept. of Chemistry, Stanford University, Stanford, California 94305, U.S.A.
- Prof. C. Dominice
8, chemin des Limites, CH-1293 Bellevue, Geneve, Switzerland.
- Prof. V. S. Emelyanov
Ul. Vorovskogo 29/31, app. 21, Moscow G-69, U.S.S.R.
- Acad. V. A. Engelhardt
Institute of Molecular Biology, Vavilov str. 32, Moscow 117312, U.S.S.R.
- Prof. B. T. Feld
c/o Pugwash Conferences, 9 Gt Russell Mansions, 60 Gt. Russell St., London WC1B 3BE. UK.
- Prof. E. E. Galal
P.O.B. 29, Cairo, Egypt.
- Mr. S. Galal
Alahram Newspaper, Cairo, Egypt.
- Prof. O. Gherman
Calea Uniru 135, Craiova, Romania.
- Prof. G. Giacometti
Institute of Physical Chemistry, Via Loredan 2, Padova, Italy.
- Mr. H. V. Gottlieb
Christiansborg, 1218 (Statsministeriet), Copenhagen K, Denmark.
- Mr. W. F. Gutteridge
Director of Complementary Studies, University of Aston, Gosta Green, Birmingham B4 7ET, UK.
- Dr. M. Halperin
Brookings Institution, 1775 Mass. Avenue, Washington DC 20036, U.S.A.
- Ms. Kerstin Hanzon
IVA, Box 5073, S-10242 Stockholm 5, Sweden.
- Dr. J. M. Harrison (UNESCO Observer)
UNESCO, Place Fontenoy, 75700 Paris, France.
- Prof. S. Hoffmann
5 Bryant Street, West European Studies, Cambridge, Mass. 02138, U.S.A.
- Prof. O. Hoffmann-Ostenhof
Leopold-Steiner-Gasse 26, A-1190, Wien, Austria.
- Prof. J. Holdren
Energy and Resources Committee, Cory Hall, University of California, Berkeley, Calif.
U.S.A.
- Prof. S. T. Jaatinen
Dept. of Geography, University of Helsinki, Hallituskatu 11-13, Helsinki 10, Finland.

- Prof. P. A. Jauho
Lönnrotinkatu 37, Helsinki, Finland.
- Acad. P. L. Kapitza
Vorobievskoe Shosse 2, Moscow B-334, U. S. S. R.
- Dr. M. M. Kaplan
23 Chemin de Marly, Collonge-Bellerive, Geneva 1245, Switzerland.
- Prof. G. B. Kistiakowsky
12 Oxford St., Cambridge, Mass. 02138, U. S. A.
- Dr. C. Kiuranov
Institute for Sociology, Bulgarian Academy of Sciences, 39, Vitosha Blvd., Sofia,
Bulgaria.
- Mr. J. G. Klenberg
Martintie 33, 02270 Suomenoja 2, Finland.
- Prof. H. Kröger
Parkallee 38, 1533 Stahnsdorf, G. D. R.
- Dr. V. Kuleshov
Academy of Sciences, Leninski prospekt 14, Moscow V-71, U. S. S. R.
- Prof. V. M. Kulish
JMEMO Academy of Sciences, 13 Jaroslavskay Street, Moscow, U. S. S. R.
- Dr. Elizaveta Lebedkina
Lenin prospect 17, Moscow, U. S. S. R.
- Prof. E. Leibnitz
Academy of Science of GDR, Rudower Chaussee 5, Berlin-Adlershof, G. D. R.
- Prof. S. Lifson
Weizmann Institute of Science, Rehovot, Israel.
- Mrs. Birgitta Linner
Glimmervägen 4A, S-75241 Uppsala, Sweden.
- Dr. S. J. Lundin
Roslagsg. 17^{iv}, 113 55 Stockholm, Sweden.
- Mr. A. D. McKnight
Civil Service College, 11 Belgrave Road, London WC1V 1RB, UK.
- Dr. F. Madl,
University of Budapest, Budapest V., Egyetem Ter. 1-3, Hungary.
- Acad. I. Malecki
IPPT PAN, Swietokrzyska 21, Warszawa, Poland.
- Dr. H. Marcovich
24 Av. Foch, St. Cloud 92, France.
- Acad. M. A. Markov
Academy of Sciences, Leninsky Prospekt 14, Moscow, U. S. S. R.
- Prof. J. K. Miettinen
Cygnaeuksenkatu 8A6, SF-00100 Helsinki-10, Finland.

- Dr. W. Multan
Polish Institute of Foreign Affairs, Warecka 1A, Warsaw, Poland.
- Acad. G. Nadjakov
T. Strashimirov str. 1, Sofia 4, Bulgaria.
- Mr. S. Nakicenovic (IAEA Observer)
Konrad Duden Gasse 64, 1130 Wien, Austria.
- Prof. M. Nalecz
Palac Kultury i Nauki p. 2318, Warszawa, Poland.
- Prof. R. R. Neild
Faculty of Economics, Sidgwick Avenue, Cambridge, UK.
- Mr. T. Nemeč (SIPRI Observer)
SIPRI, 166, Sveavagen, Stockholm Va, Sweden.
- Prof. T. R. Odhiambo
ICIPE, P. O. Box 30772, Nairobi, Kenya.
- Mr. A. Parthasarathi
31, Rabindra Nagar, New Delhi, India.
- Mr. I. Pastinen (UN Observer)
Bureau 186, Palais des Nations, Geneve, Switzerland.
- Prof. C. Penescu
Romanian Pugwash National Committee, Bul. Daçia 33, P. O. Box 90, Bucharest 2,
Romania.
- Prof. F. Perrin
4 rue Froidevaux, 75014 Paris, France.
- Prof. N. W. Pirie
Rothamsted Experimental Station, Harpenden, Herts.
- Dr. I. G. Pochitalin
Academy of Sciences, Block 5, Leninsky prospekt 14, Moscow V-71, U.S.S.R.
- Dr. A-J. Polliart (IAEA Observer)
Division of Nuclear Power and Reactors, c/o IAEA, P. O. Box 645, A 1011 Wien,
Austria.
- Mr. J. Prawitz
Ministry of Defence, S-103 20 Stockholm 16, Sweden.
- Dr. V. Rabinowitch
Office of Foreign Secretary, National Academy of Sciences, 2101 Constitution Ave.,
Washington, D. C., U.S.A.
- Prof. G. Rathjens
9-435 M. I. T., Cambridge, Mass. 02139, U.S.A.
- Mr. R. Reford
c/o Canadian Institute of International Affairs, 31 Wellesley St. East, Toronto,
Ontario, Canada.
- Acad. O. Reutov
Department of Chemistry, University of Moscow, Moscow B-234, U.S.S.R.

- Dr. G. Ripka
103 rue du Point du Jour, 92 Boulogne sur Seine, France.
- Prof. J. Rotblat
Department of Physics, St. Bartholomew's Hospital Medical College, Charterhouse
Square, London E.C.1.
- Dr. Elfriede Scheer
Niederschönhausen Str. 200, Nr. 5, 111 Berlin, G.D.R.
- Prof. L. Scheinman
Centre for International Studies, Cornell University, Ithaca, New York 14850, U.S.A.
- Dr. J. Sedlak
UMV, Nerude Street 3, Prague 1, Czechoslovakia.
- Dr. V. A. Shustov
Ministry for Foreign Affairs, Dept. of International Organizations, Smolenskaya-
Lennaya pl. 32/34, Moscow, U.S.S.R.
- Acad. K. Siska
80100 Bratislava 1, Czechoslovakia.
- Prof. P.B. Smith
Westersingel 34, Groningen, Holland.
- Dr. I.A. Sokolov
Institute of World Economy and Foreign Affairs, 13 Jaroslav Street, Moscow, USSR.
- Prof. V.G. Solodovnikov
Starokonushinny Street 16, Moscow, U.S.S.R.
- Dr. J.J. Stone
Federation of American Scientists, 203 "C" St. N.E., Washington, D.C. 20002, USA.
- Acad. I. Supek
Institute for Philosophy, Marulicev Trg 19, 41000 Zagreb, Yugoslavia.
- Mr. W. Swartz
1436 Wrightwood, Chicago 60614, Ill., U.S.A.
- Prof. F.G. Torto
Dept. of Chemistry, University of Ghana, P.O. Box 56, Legon, Ghana.
- Prof. V.G. Trukhanovsky
K-6, Medvedeva Street, 12/6, flat 31, Moscow, U.S.S.R.
- Dr. A. Van der Woude
de Savornin Lohmanlaan 1, Groningen, Netherlands.
- Dr. R. Vayrynen
Tampere Peace Research Institute, Tammelan puistokatn 58B, 33100 Tampere 10,
Finland.
- Acad. A.P. Vinogradov
Maxim Gorky Embankment, House 4/22, Block "B" App. 10, Moscow 127, USSR.
- Dr. A.P. Vuorinen
Institute of Radiation Physics, P.O. Box 268, 00101 Helsinki 10, Finland.
- Prof. H. Wergeland
Seminar of Theoretical Physics, 7034 N.T.H., Trondheim, Norway.

Dr. M.S. Wionczek

Paseo del Pedregal 995, Mexico 20, D.F., Mexico.

Prof. H. York

Physics Dept., UCSD, La Jolla, CA. 92037, U.S.A.

Prof. S.H. Zaheer

Regional Research Laboratory, Hyderabad 500009, India.

Acad. V. Zoubek

Geological Institute of CSAV, Suchdol 2, 16500 Praha 6, Czechoslovakia.

Mr. S. Kuhlberg (Conference Administrator)

Pormestarinrinne 4.F.41, Helsinki 16, Finland.

Dr. T. Dixon Long (Press Officer)

Office of Foreign Secretary, NAS-NRC, 2101 Constitution Ave. N.W., Washington,
D.C. 20016, U.S.A.

Dr. W.R. Copeland (Asst. Press Officer)

Nyyrikinpolku 2 C 26, Kerava, Finland.

23rd Pugwash Conference on Science and World Affairs
Aulanko, 30th August - 4th September 1973

MEMBERS OF THE CONFERENCE

XXIII-Adm.-4

- W-ADAMS, RUTH (USA)
-AFHELDT, DR. H. (FGR)
W-ALFVEN, PROF. H. (PRESIDENT)
W-ALLISON, DR. G. (USA)
ARBATOV, PROF. G.A. (USSR)
W-AUBRAC, MR. R. (FAO OBSERVER) 6
- BACON, JEAN (STAFF)
W-BALEVSKI, ACAD. A.T. (BULGARIA)
W-BAZELATTO, DR. J. (CHILE) *but Washington, D.C.*
BAUDOUX, PROF. P. (BELGIUM)
-BAUER, MR. E. (FRANCE)
W-BHAGAVANTAM, PROF. S. (INDIA)
BJORNHOLM, DR. S. (DENMARK)
BONSDORFF, PROF. G.V. (FINLAND)
BOSERUP, MR. A. (DENMARK)
BREDOW, PROF. W.F. (FGR)
-BRODA, PROF. E. (AUSTRIA)
BROMS, PROF. B. (FINLAND)
-BRUCK, MR. M. (INTERPRETER) *USSR*
BURZYNSKI, DR. A. (POLAND) 140 (20)
- CALOGERO, PROF. F. (ITALY)
CARLTON, DR. D. (UK)
COPELAND, DR. W. (ASST. PRESS OFFICER)
CROWE, DR. H.S. (CANADA)
-CSAKI, PROF. F. (HUNGARY) *knows English*
DESAI, MR. R.C. (UN OBSERVER)
DEVOTO, MR. G. (ITALY)
-DICZFALUSY, PROF. E.R. (SWEDEN)
W-DJERASSI, PROF. C. (USA) 10 (30)
DOMINICE, PROF. C. (SWITZERLAND)
- EGERTON, JEAN (STAFF)
W-EL-BEDEWI, PROF. F. (EGYPT)
W-EL-BINDARY, DR. A. (EGYPT)
W-EL-DINE GALAL, DR. E. (EGYPT)
-EMELYANOV, PROF. V.S. (USSR) 6 (36)
-ENGELHARDT, ACAD. V.A. (USSR)
- FREYMOND, PROF. J. (SWITZERLAND) 2 (38)
-FELD, PROF. B.T. (USA)
- W-GALAL, MR. S. (EGYPT)
GHERMAN, PROF. O. (ROMANIA)
-GIACOMETTI, PROF. G. (ITALY) *Wildera Paelma*
GOTTLIEB, MR. H. (DENMARK)
GUTTERIDGE, Mr. W.F. (UK)
GYLLENBERG, PROF. H. (FINLAND) 6 (44)
- HALPERIN, DR. M. (USA)
HANSON, KIRSTIN (SWEDEN)
-HARRISON, DR. J.M. (UNESCO. OBSERVER) 3 (47)

HOFFMANN, PROF. S. (USA)
 -HOFFMANN-OSTENHOF, PROF. O. (AUSTRIA) 3 (50)
 -HOLDREN, DR. J. (USA) *Paul Holdren -> Berkeley*

JAAKKOLA, DR. T. (AIDE)
 JAATINEN, PROF. S. (FINLAND) 4 (54)
 JANSSON, PROF. J.M. (FINLAND)
 JAUHO, PROF. P. (FINLAND)

KALELA, MR. J. (AIDE)
 -KAPITZA, ACAD. P.L. (USSR)
 -KAPLAN, DR. M.M. (WHO OBSERVER)
 -KISTIAKOWSKY, PROF. G.D. (USA)
 KIURANOV, DR. C. (BULGARIA)
 KLENBERG, COMM. J. (FINLAND)
 KORHONEN, DR. K. (FINLAND)
 KROGER, PROF. H. (GDR)
 KROKFORS, MR. C. (AIDE)
 -KUHMBERG, MR. S. (CONFERENCE ADMINISTRATOR)
 KULESHOV, DR. V.F. (USSR) 12 (66)
 KULISH, PROF. V.M. (USSR)

LANDHEER, PROF. B. (NETHERLANDS)
 -LEBEDKINA, ELIZABETH (INTERPRETER)
 LEIBNITZ, PROF. E. (GDR)
 -LIFSON, PROF. S. (ISRAEL)
 LINNEN, BIRGITTA (SWEDEN)
 LODGAARD, MR. S. (NORWAY)
 -LONG, DIXON (PRESS OFFICER) -> *NASA = Vienna, -> 8 (74)*
 LUNDIN, DR. J. (SWEDEN) *to UN-52*

McKNIGHT, Mr. A.D. (UK)
 MADL, DR. F. (HUNGARY)
 MALECKI, PROF. I. (POLAND)
 -MARCOVICH, DR. H. (FRANCE) -MD
 -MARKOV, ACAD. M.A. (USSR)
 -MIETTINEN, PROF. J.K. (FINLAND)
 MULTAN, DR. W. (POLAND)
 NADJAKOV, ACAD. G. (BULGARIA)
 NAKICENOVIC, MR. S. (IAEA OBSERVER)
 NALECZ, PROF. M. (POLAND)
 NEGUCIOIU, PROF. A. (ROMANIA)
 NEILD, PROF. R.R. (UK) 13 (87)
 NEMEC, MR. T. (SIPRI OBSERVER)

-ODHIAMBO, PROF. T.R. (KENYA) 2 (89)
 ONITIRI, DR. H.M.A. (NIGERIA)

PASTINEN, MR. I. (UN OBSERVER)
 W - PARTHASARATHI, MR. A. (INDIA)
 PENESCU, PROF. C. (ROMANIA)
 -PERRIN, PROF. F. (FRANCE)
 -PIRIE, MR. N.W. (UK)
 POCHITALIN, DR. I.G. (USSR)
 -POLLIART, MR. A-J. (IAEA OBSERVER) (French)
 PRAWITZ, MR. J. (SWEDEN)

W - RABINOWITCH, DR. V. (USA)

- RAHOLA, TUA (AIDE)
RATHJENS, PROF. G. (USA)
REFORD, MR. R. (CANADA)
REUTOV, ACAD. O. (USSR)
RIPKA, DR. G. (FRANCE)
— ROTBLAT, PROF. J. (SECRETARY-GENERAL)
RUHALA, MR. K. (AIDE)
- SALT, EDITH (STAFF)
SCHEER, DR. E. (GDR)
SCHEINMAN, DR. L. (USA)
W — SEDLAK, DR. J. (CZECHOSLOVAKIA) → *Report: Disarmament + Development*
SHUSTOV, DR. V.A. (USSR)
SIPPILA, HELVI (UN)
SISKA, ACAD. K. (CZECHOSLOVAKIA)
SMITH, PROF. P.B. (NETHERLANDS)
W — SOKOLOV, DR. I.A. (USSR)
— SOLODOVNIKOV, PROF. V.G. (USSR)
STONE, DR. J.J. (USA)
— SUPEK, ACAD. I. (YUGOSLAVIA)
SUSILUOTO, MR. I. (ASSISTANT ADMINISTRATOR)
— SWARTZ, MR. W. (USA)
- W — TORTO, PROF. F.G. (GHANA)
TRUKHANOVSKY, PROF. V.G. (USSR)
- VAN DER WOUDE, DR. A. (NETHERLANDS) *M.D.*
VAYRYNEN, DR. R. (FINLAND)
— VINOGRADOV, ACAD. A.P. (USSR)
VIRTAMO, MR. J. (AIDE)
VUORINEN, DR. A. (FINLAND)
- WERGELAND, PROF. H. (NORWAY)
W — WIONCZEK, DR. M. (MEXICO)
- YORK, PROF. H. (USA)
- W — ZAHEER, PROF. S.H. (INDIA)
ZUBEK, ACAD. V. (CZECHOSLOVAKIA)

FINNISH STAFF

AARNIO, INKERI
ELOMAA, ANJA
HAMALAINEN, MIRJA
MIETTINEN, IRJA (LADIES PROGRAMME)
NIEMI, RITVA



A
U
L
A
N
K
O

HÄMEENLINNA
Suomi — Finland

Aulanko's development into a modern tourist centre began in 1926, when the Borough of Hämeenlinna bought the Karlberg estate with all its lands. Since 1935 the Vanajavesi shore areas have been owned by the Finnish Tourist Association. The Aulanko National Park became the property of the State, administered by the Forestry Research Institute, in 1963.

The Aulanko Hotel was completed in 1938. Aulanko Hotel expanded again in summer 1970 when the new hotel wing of main building was ready. At the same connection the hotel got swimmingpool, three new saunas, condition training room, massage room, hairdressing saloon and barber shop. Today the accommodation of the hotel is 149 rooms (about 252 beds). The restaurant will seat over 700. As well as the main building, the hotel has various annexes with accommodation. There are two tennis courts, a 9-hole golf course, riding stables, boats and saunas for guests' use, and in winter a slalom slope with ski-lift and marked ski trails in the National Park. In autumn 1967 the Aulanko Hotel came under Matkaravinto Oy. The Aulanko camping site on the shore of Vanajavesi, near Katajisto, is one of the most pleasant and best equipped in the country, with sauna, boats and water-skiing.

Aulanko also lies beside the lake route that is known as the Finnish Silver Line. The beautiful voyage to the industrial city of Tampere takes about 6 hours.

DAS TOURISTENZENTRUM AULANKO

Aulanko ist als Mittelpunkt des Reiseverkehrs in Finnland ebenso wie weit jenseits der Grenzen bekannt. Jahr für Jahr nimmt es Tausende in- und ausländischer Besucher auf.



Die weiten Parkanlagen von Aulanko sind ein deutlich sichtbares Denkmal der Lebensarbeit von Oberst Hugo Standertskjöld. Dieser grosse Naturfreund und Schönheitsanbeter steckte mit dem Park den Rahmen für das heutige Touristenzentrum ab.

Der damalige Hauptmann Hugo Standertskjöld (* 1844 und † 1931) kaufte 1883 das Gut Karlberg dicht bei Hämeenlinna am Ufer des Vanajavesi. Es umfasste ausser der jetzigen Parkanlagen grosse Äcker und Weiden. Die imponierenden Bauarbeiten begannen sofort, nachdem Standertskjöld das Gut Karlberg übernommen hatte, und dauerten bis weit in unser Jahrhundert hinein. Die Umwandlung der ausgedehnten Uferbezirke rund um den Hof herum in Parks und Ziergärten forderte sehr viel Arbeit und sehr viel Geld; um ein Vielfaches höher aber stiegen die Kosten, als der früher so karge und steinige Berg Aulanko sein heutiges Aussehen erhielt. Der Nationalpark am Berge hat eine reiche Vegetation mit einer Vielzahl von Arten, die jeden Naturfreund interessiert.

Ausser einheimischen Pflanzen wachsen im Nationalpark viele für Finnland ungewöhnliche Arten aus anderen Ländern. Die Vogelwelt ist durch die Bewohner des Schwanenteichs am auffälligsten vertreten, jedoch auch sonst ist der Park von vielen gefiederten Arten bewohnt.

Die Entwicklung von Aulanko zum heutigen Touristenzentrum begann 1926, als die Stadt Hämeenlinna das Gut Karlberg mit seinem gesamten Landbesitz kaufte. Seit 1935 gehören die Strand- und Uferstücke am Vanajavesi dem Finnischen Fremdenverkehrsverband. Der Nationalpark ging 1963 in den Besitz des Staates und in die Verwaltung des Forstlichen Forschungsinstituts über.

Das Hotel Aulanko wurde 1938 fertig. Aulanko Hotel hat sich wieder erweitert im Sommer 1970. Das Hotel bekam dann auch Hallenbad, 3 neue Saunas, ein Saal für Konditionstraining, Massageraum und Damen — und Herrenfriseur. Die Zahl der Zimmer hat auch vermehrt. Heute das Hotel hat 149 Zimmer (etwa 252 Betten). Im Restaurant haben mehr als 700 Personen Platz. Auch einige Nebengebäude bieten Unterkunftsmöglichkeiten. Das Hotel hat ein eigenes Orchester. Den Gästen stehen ausserdem zur Verfügung: zwei Tennisplätze, ein Golfplatz mit neun Löchern, ein Reitstall, Boote, Saunas sowie im Winter ein Slalomberg mit Skilift und markierte Skisfrecken im Nationalpark. Das Hotel Aulanko wechselte Herbst 1967 in die Verwaltung der Hotel- und Restaurantkette Matkaravinto Oy über.

Der Campingplatz Aulanko am Ufer des Vanajavesi gehört zu den schönsten und am vollständigsten ausgerüsteten Finnlands. Sauna, Boote, Wasserski.

Aulanko liegt auch an der Seenroute »Finnische Silberlinie«. Die herrliche Fahrt zur grünen Industriestadt Tampere dauert etwa 6 Stunden.

Hämeenlinnan kaupungin matkailulautakunta

AULANGON MATKAILUKESKUS

Aulanko on laajalti maamme rajojen ulkopuolellakin tunnettu matkailukeskus, joka vuosittain ottaa vastaan tuhansia koti- ja ulkomaisia vieraita.

Aulangon laajat puistoalueet, jotka aikoinaan loivat puitteet matkailukeskuksen syntymiselle, ovat yhden miehen, suuren luonnonystäväen ja kauneuden palvojan, eversti Hugo Standertskjöldin elämäntyön näkyvä muistomerkki.

Vuonna 1883 osti silloinen kapteeni Hugo Standertskjöld (s. 22. 9. 1844, k. 9. 5. 1931) Hämeenlinnan liepeillä Vanajaveden rannalla sijainneen Karlbergin kartanon, jonka omistukseen nykyisten puistoalueiden lisäksi kuuluivat laajat alueet kartanon ympäristössä. Suurisuuntaisiin rakennustöihin ryhdyttiin heti kun Standertskjöld oli saanut Karlbergin haltuunsa, ja puistojen rakentaminen jatkui pitkälle tämän vuosisadan puolelle. Laajojen kartanoa ympäröivien ranta-alueiden raivaaminen puistoiksi ja koristepuutarhoiksi vaati paljon työtä ja varoja, mutta monin verroin suuremmiksi kohosivat kustannukset, kun kartanon äärellä kohoavaa Aulangonvuorta, joka luonnontilassa oli karu ja kivikkoinen, ryhdyttiin rakentamaan nykyiseen asuunsa. Vuorella sijaitsevan kansallispuiston rehevä ja runsaslajinen kasvillisuus kiinnostaa jokaista luonnonystäväää. Paitsi kotimaista kasvistoa tapaamme kansallispuistossa runsaasti meille outoja, muualta tuotuja lajeja. Joutsenlammen hoidettujen lintujen lisäksi on puistossa runsas luonnonvarainen linnusto.

Aulangon kehitys nykyaikaiseksi matkailukeskukseksi alkoi vuonna 1926, jolloin Hämeenlinnan kaupunki osti Karlbergin kartanon kaikkine maa-alueineen. Vuodesta 1935 lähtien Suomen Matkailuliitto on omistanut Vanajaveden rajoittuvat ranta-alueet. Aulangon kansallispuisto siirtyi valtion omistukseen ja Metsäntutkimuslaitoksen hallintaan v. 1963.



Aulangon hotellirakennus valmistui v. 1938. Kesällä 1970 Aulanko laajeni jälleen kerran, kun uusi siipi saatiin valmiiksi päärakennuksen yhteyteen. Samalla hotelli sai uima-altaan, 3 uutta saunaa, kuntosalin, hieromahuoneen, kampaamon ja parturin. Myöskin huonemäärä lisääntyi ja hotellissa onkin nyt 149 huonetta (n. 252 vuodesijaa). Ravintolaan mahtuu yli 700 henkilöä. Päärakennuksen lisäksi on matkailukeskuksessa useita majoitukseen käytettäviä sivurakennuksia. Hotellilla on oma orkesteri. Vieraitten käytettävissä on kaksi tenniskenttää, 9-reikäinen golfrata, ratsutalli, veneitä ja saunoja, talvisin pujottelumäki hiihtohisseineen sekä kansallispuiston merkityt hiihtoladut. Lastenkaitaja ulkoiluttaa kesäisin lapsia leikkikentällä. Syksyllä 1967 Aulanko siirtyi Matkaravinto OY:n hallintaan.

Aulangon leirintäalue Vanajaveden rannalla Katajiston läheisyydessä on maamme viihtyisimpiä ja täydellisimpiä saunoineen, veneineen ja vesihiihtomahdollisuuksineen.

Aulangonjärven ulkoilumaja sijaitsee luonnonkauniissa ympäristössä kansallispuiston äärellä.

Aulanko on kuuluisan sisävesireitin, Suomen Hopealinjan tukikohta. Nykyaikaiset moottorilaivat kuljettavat matkailijoita Hämeenlinnan ja Tampereen välillä.

AULANKO TURISTCENTRUM

Tusentals inhemska och utländska turister strömmar varje år till Aulanko, turistcentrummet som inte bara är känt inom Finland utan också ytterom landets gränser. De vidsträckta parkerna i Aulanko, vilka på sin tid utgjorde en av grundförutsättningarna för att ett turistcentrum överhuvudtaget skulle komma till, är den stora naturvännen och skönhetsdyrkaren överste Hugo Standertskjöld's synliga minnesmonument.

Dåvarande kapten Hugo Standertskjöld (f. 22. 9. 1844 d. 9. 5. 1931) köpte Karlbergs herrgård vid stranden av Vanajavesi i närheten av Tavastehus år 1883. I köpet ingick förutom de nuvarande parkområdena vidsträckta områden runt herrgården. Genast då Standertskjöld hade fått herrgården i sin ägo inledde man storartade byggnadsarbeten och parkarbetena fortsatte ännu långt in på detta århundrade. Det krävdes enormt mycket arbete och kapital för att göra om de vidsträckta strandremorna kring herrgården till parker och dekorationsträdgårdar. Emellertid blev kostnaderna mångdubbelt högre då man började röja upp Aulankoberget, som i sitt naturliga tillstånd var ytterst kargt och stenigt. Besökare med blick för naturen intresserar sig för den frodiga, sortimentrika grönskan i nationalparken på berget. Förutom hela den inhemska floran möter oss här otaliga främmande växter som hämtats från andra länder. Förutom svandammens fåglar vimlar det av flera olika slags fåglar i parken.

Selityksiä:

- Hotelli Aulanko
- Kavaljeeri
- Katajisto
- Kuusisto
- Pikku-Aulanko
- Koivisto
- Aulangonjärven retkeilymaja
- Leirintäalue
- Tornikahvila
- Rantasaunoja
- Suomen Hopealinja
- Golfkenttä
- Ratsutalli ja ratsastusrata
- Tenniskentät
- Pallokentät
- Pujottelumäki
- Hugo Standertskjöldin muistokivi
- Rauniolinna (Satuteatteri)
- Onnentempeli
- Joutsenlampi
- Metsälampi
- Ruusulaakson paviļjoni
- Näkötorni
- Karhuluola ja Karhuperheveistos (Rob. Stigell)
- Ancylusjärven rantaviiva
- Yoldianmeren rantaviiva
- Uimaranta
- Kioski
- Veneitä

Legend:

- Aulanko Hotel
- Youth Hostel Kavaljeeri
- Annex Katajisto
- Annex Kuusisto
- Annex Pikku-Aulanko
- Annex Koivisto
- Aulangonjärvi Youth Hostel
- Camping site
- Café
- Shoreside saunas
- Pier (Finnish Silver Line)
- Golf course
- Riding stables and track
- Tennis courts
- Ballgrounds
- Slalom slope
- Hugo Standertskjöld memorial
- Artificial castle ruins (Fairytale Theatre)
- Temple of Happiness
- Swan Lake
- Forest Lake
- Rose Valley Pavilion
- Panorama Tower
- Sculpture — Bear Family (Robert Stigell)
- The strip of the shore of Lake Ancylus
- The strip of the shore, dating back to Yoldia-Sea
- Bathing beaches
- Soft drinks kiosks
- Boats

Förklaringar:

- 1. Hotelli Aulanko
- 2. Annex Kavaljeeri
- 3. Annex Katajisto
- 4. Annex Kuusisto
- 5. Pikku-Aulanko
- 6. Annex Koivisto
- 7. Aulangonjärvi vandrarmen
- 8. Campingområde
- 9. Torncafe
- 10. Strandbastur
- 11. Finska Silverlinjen Sbatbrygga
- 12. Golfbana
- 13. Ridstall och ridbana
- 14. Tennisplaner
- 15. Bollplaner
- 16. Slalombacke
- 17. Hugo Standertskjöldin minnsten
- 18. Ruinborg (Sagoteater)
- 19. Lyckotempel
- 20. Svandamm
- 21. Skogsdamm
- 22. Rosendahlsens paviljong
- 23. Utsiktstorn
- 24. Staty av en björnfamilj
- 25. Ancylussjöns strandkontur
- 26. Yoldiahavets strandkontur
- S Simmstränder
- K Läskdryckskiosker
- B Båtar

Zeichenerklärung:

- 1. Hotel Aulanko
- 2. Jugendhotel
- 3. Nebengebäude Katajisto
- 4. Nebengebäude Kuusisto
- 5. Nebengebäude Pikku-Aulanko
- 6. Nebengebäude Koivisto
- 7. JH Aulangonjärvi
- 8. Campingplatz
- 9. Turmcafe
- 10. Strandsaunas
- 11. Bootanlegeplatz (Finnische Silberlinie)
- 12. Golfplatz
- 13. Reitbahn und Stall
- 14. Tennisplätze
- 15. Ballplätze
- 16. Slalomhang
- 17. Gedenkstein für Hugo Standertskjöld
- 18. Burgruine (Märchentheater)
- 19. Glückstempel
- 20. Schwanensee
- 21. Waldsee
- 22. Pavillon im Rosental
- 23. Aussichtsturm
- 24. Skulptur Bärenfamilie (Rob. Stigell)
- 25. Die Uferlinie des Ancylus See
- 26. Die Uferlinie vom Yoldia Meer
- S Badstrand
- K Getränkekieoske
- B Boote



Aulankos utveckling till ett modernt turistcentrum börjar år 1926, då staden Tavastehus köpte den Karlbergska herrgården med tillhörande jordområden. Från och med 1935 äger Finlands Turistförbund strandområdena vid Vanajavesi. Sedan 1963 är Aulanko nationalpark i statens ägo och underlyder administrativt Skogsforskningsinstitutet.

Hotellbyggnaden i Aulanko blev färdig år 1938. På sommaren 1970 blev Aulanko åter utvidgad, när den nya sidobyggnaden blev färdig i anslutning till huvudbyggnaden. Samtidigt fick hotellet simbassäng, 3 nya bastur, konditionalsal, massagerum och frisersalong för damer och herrar. Också rumantalet ökades och hotellet har nu 149 rum (ca. 252 bäddar). Restaurangen rymmer över 700 personer. Förutom huvudbyggnaden finns flera flygelbyggnader med inkvarteringmöjligheter. Hotellet har en egen orkester. Två tennisplaner, en golfbana med nio hål, ett ridstall, båtar, bastur, en slalombacke med skidlift, märktä skidspår i parken, — allt detta står till gästernas förfogande. Sedan hösten 1967 sköter Matkaravinto Oy Aulankos administration. Aulanko campingområde vid stranden av Vanajavesi nära Katajisto är ett av landets mest trivsamma och mest fullkomliga.

Aulanko har även en stor betydelse som knutpunkt för den livligt trafikerade sjörutten, Finska Silverlinjen. Moderna sjöbussar transporterar sina passagerare till Tammerfors.

AULANKO TOURIST CENTRE

Aulanko is well known in Finland and abroad as a tourist centre: every year it has thousands of visitors, Finnish and foreign.

The extensive Aulanko parklands, the foundation of the whole tourist centre, are a living memorial to the life-work of one man, a great lover of nature and servant of beauty, Colonel Hugo Standertskjöld.

In 1883 the then Captain Standertskjöld (b. 22. 9. 1844, d. 9. 5. 1931) bought Karlberg estate, on the shores of lake Vanajavesi on the outskirts of Hämeenlinna. The estate extended over large areas around the manor as well as the present parklands. When Standertskjöld became master of Karlberg he began large-scale building, and the landscaping went on well into the present century. Much work and great resources were needed for the transformation of the shores around the manor into parks and ornamental gardens, but all previous expenditure paled beside the task of taming Aulanko hill, rising near the estate, which in its natural state was barren and stony. Every observant visitor is fascinated by the luxuriance and variety of the vegetation in the National Park on the hill.

The National Park has not only indigenous plants but many varieties unfamiliar in Finland, brought from abroad. As well as the birds of the swan lake, there are many wild birds, of numerous species, in the park.

T
S I P R I

International Institute

For Peace And

Conflict Research

Mail address: Sveavägen 166, Stockholm Va, Sweden.

Cable address: Peaceresearch, Stockholm.

Telephone: 34 96 00, Stockholm.

Postal Account: 40 38 82, Stockholm.

PURPOSE

The Institute was established on 1 July 1966 to undertake research into problems of international conflict and cooperation. The decision of the Swedish Parliament to establish the Institute was prompted by a proposal launched by the Prime Minister in August 1964 that this would be a suitable way to celebrate Sweden's 150 years of unbroken peace.

The mandate of the Institute, endorsed by the Swedish Parliament, is to undertake research into specific problems that are of relevance to current or future international relations. The research should be primarily directed to the problems of disarmament and arms regulation, but should also extend to other problems, such as the influence of the mass media on public attitudes to conflicts, the risk of new conflicts arising as a result of technological progress or the study of the causes of conflicts in particular areas of the world.

The governing bodies and research staff of the Institute, as well as its studies, are international. The statutes are designed to ensure that the Institute is independent in the conduct of its studies and the publication of its results. In recruiting staff, foremost attention is given to scientific ability and research performance in the selected areas of research. The Institute aims to establish a multinational centre of scholars with experience of different social and economic systems. It will endeavour to make it possible for peace and conflict research problems and disarmament questions to be studied under genuinely international auspices.

The Institute seeks active cooperation with research institutions in other countries and with international organizations.

FINANCE

The Swedish Government and Parliament acting as sponsors to the Institute have allocated about 2,5 million Swedish Crowns (500.000 US \$) for its two first years of activity, 1966—68. It is foreseen that this contribution will gradually increase as the research activities are expanded. The allocation is intended to secure the Institute's "decisive financing". Costs of field studies may have to be financed on an adhoc basis from other sources.

ORGANS OF THE INSTITUTE

The Governing Board, of 8 members appointed for 5 years, has the overall responsibility for major decisions concerning the work programme of the Institute and its management.

The Director has executive functions. His tasks comprise the organization and the setting up of the Institute and the guidance of its activities. He has the main responsibility for the work programme of the Institute.

The Scientific Council, of 24 members selected among highly qualified scholars, statesmen and international civil servants, has consultative functions in the planning of the research programmes and in their evaluation.

The members of the Governing Board and, initially, two thirds of the members of the Scientific Council as well as the

Director, are appointed by the Swedish Government. The Council itself is initially responsible for the co-option of the last third of its membership. Subsequently, the Council is to be responsible for appointment of persons to replace outgoing members.

The following members have so far been appointed to serve on the Board, in addition to the director, who is a member *ex officio*:

Professor *Gunnar Myrdal*, Stockholm, Sweden, Chairman

Professor *Hilding Eek*, Stockholm, Sweden, professor of international law

Academician *Ivan Málek*, Prague, Czechoslovakia, professor of microbiology

Professor *Joseph Rotblat*, London, United Kingdom, professor of physics, Secretary General, Pugwash Conferences on Science and World Affairs

Professor *B. V. A. Röling*, Groningen, Holland, professor of international law, Secretary General, International Peace Research Association

Professor *John Sanness*, Oslo, Norway, Director of Institute of International Relations, Oslo.

The following members have so far accepted to serve in the Scientific Council:

The Hon. Alastair Buchan,
United Kingdom

Professor Johan Galtung,
Norway

Dr. Robert Gardiner,
Ethiopia

Director Nicolaj N. Inozemtsev,
USSR

Professor Carl Kaysen,
USA

Professor Henry A. Kissinger,
USA

Dr. Bruno Kreisky,
Austria

Professor Manfred Lachs,
Poland

Mr. Leo Mates,
Yugoslavia

M. Pierre Mendès France,
France

Professor Bror Rexed,
Sweden

Dr. Vikram Sarabhai,
India

Professor Torgny Segerstedt,
Sweden

Professor Grigorij I. Tunkin,
USSR

Sir Solly Zuckerman,
United Kingdom

Mr. Robert Neild, United Kingdom, has been appointed Director.

WORK PLANS

The aim is to build up the work and staff of the Institute progressively over a period of several years. It is envisaged that, at the end of the first five years, some 15—25 persons will be employed on the research staff. Recruitment is under way.

The following are some of the projects that are being launched or explored:

- (1) The possibility of banning the use and development of biological means of warfare. Work on the military and the political aspects would be combined with work on the technical problems of control and verification.
- (2) The arms trade, its economic and political aspects, and its impact on conflicts in different regions.
- (3) The role of mass media in conflicts. How are local conflicts e.g. in Cyprus, Kashmir or Vietnam, reported, what selection process takes place and what factors contribute to distortion on the one hand and objectivity on the other? What are the effects of mass media on conflicts either through their direct influence on the decision makers or through the impact on public opinion?
- (4) The political problems likely to result from the international transmission of information and propaganda through telecommunication satellites. How far is international regulation needed and, if so, "who shall send what to whom?"

August 1967.

17th Pugwash Conference on Science and World Affairs
Ronneby, Sweden, 3-8 September 1967

ALLOCATION TO WORKING GROUPS

WORKING GROUP 1

"Arms Control"

Conveners:

Emelyanov
Rathjens

Members:

Afheldt
Amaldi
Barnaby
Calogero
Cockroft
Delbrück
Desai
Fehrm
Feld
Garwin
Kalkstein
Kashkai
Katz
Kepes
Kliefoth
Knapp
Kolesnyk
Lider
Liska
Meyer
Millionshchikov
Myrdal
Nadjakov
Perrin
Prawitz
Rabi
Rathgeber
Scoville
Skolnikoff
Toyoda

WORKING GROUP 2

"Peacekeeping and Security"

Conveners:

Snejdarek
Sohn

Members:

Aboltin
Adamczewski
Adler
Birnbaum
Dobrosielski
Eek
Elim
Forlati
Frank
Ghazanfar
Hajdu
Hodgkin
Jones
Kröger
Landheer
Menzel
Moch
Muller
Munger
Parsons
Pochitalin
Raiser
Raven
Sparring
Vavpetic
Voslensky
Wünsche
Yamada

WORKING GROUP 3

"New Approaches in Disarmament"

Conveners: Kargin

Members: Artsimovitch
Björnerstedt
Boserup
Cyvin
Evang
Herriott
Imshenetsky
Inglis
Jungk
Kapitza
Kaplan
Kende
Kos
Leake
Long
Lösche
Meyrowitz
Miyaki
Neild
Nesterenko
Ogawa
Rosebury
Roth
Ruina
Seligman
Tammelin

WORKING GROUP 4

"International Programmes in Science"

Conveners:

Maalöe - Copenhagen - Norw. Biol.
Torto

Members:

Aklilu Lemma
Bassir
✓ Bergmann (U.S.A., Mrs. Xajczyk-Salaga)
✓ Bognar
✓ Bratanov - Biol.
Brown
Catala de Alemany
Chagula - Pol.
Chain
Chiowanich
Engström Norw.
Engelgardt - USSR - Norw. Biol.!
Garcia - Pol.
Goldschmidt-Clermont (Switz.)
Hill
Lattes
Leite Lopes - Brazil
Malek - CSR - Pol.
Marshak
Naggar
O'Ceallaigh - Ireland
Palevsky
Platanov USSR
Powell
Rabinowitch, E.
Saukkonen Finland
Szilard
Weinberg

WORKING GROUP 5

"Education, Technology and Development"

Conveners:

Gutteridge
Menon

Members:

Agblémagnon
Ahnlund
Aseffa
Burkhardt
Dillon
Ditchburn
Djerassi
Dubinin
Duri
Edozien
El-Bedewi
Elton
Esenov
Gresford
Gunnarsson
Hodgson
Holton
Kozesnik
Laponche
Lardner
Leclercq
Magat
Nilsson
Paulsson
Phelps
Plaude
Pozo-Olano
Quirino-Lanhounmey
Rabinowitch, V.
Revelle
Ritchie
Salam
Sutherland
Swartz
Voss
Zaheer

WORKING GROUP 6

"The Special Responsibilities of Scientists"

Conveners:

Alcock
Malecki

Members:

Alfvén
Baptist
Boyd
Calder
Cohen
Davidon
Davies
Feldman
Filkorn
Friedrich-Freska
Glass
Gueron
Hanga
Hedén
Lakany
Markovic
Matulis
Mayer
Medvedev
Pal
Revesz
Rollefson
Rotblat
Tiselius
Vinogradov
Wasawo
Whipple

WORKING GROUP 7

"Current Conflicts and their Resolution"

Conveners:

Bauer
Sandoshan.

Members:

Adams
Agarbiceanu
Arangio-Ruiz
Berner
Bukowski
Fisher
Galtung
Gryzlov
Hess
Kwee
Martin
Mates
Morgenthau
Nemec
Peierls
Reczei
Rich
Rubinstein
Shelepin
Smith
Sokolov
Stein
Wilhjelm

REPORT OF THE STANDING COMMITTEE
ON FUTURE ACTIVITIES

Introduction

This Committee was formally appointed on Sept. 3rd 1967 in order to lay down guide lines for the future activities of Pugwash, which, for the past five years, has operated on certain principles agreed by the London Conference of 1962. Some members of the Committee held three informal meetings in Stockholm on Sept. 1 and 2 in order to give preliminary consideration to these problems. The Committee has held two meetings jointly with the Standing Committee on Future Organization. Throughout the discussions in Stockholm and Ronneby, many of the members of the present Continuing Committee attended one or more of its meetings. In particular, the Secretary-General has been in almost continuous attendance; his ideas on future activities and his vast experience have been invaluable to the Committee in its deliberations.

The Committee considered that it was its function

- (1) to re-define briefly the raison d'être of the Pugwash Conferences, and the fields which these should cover;
- (2) to lay down some general rules for the organization of conferences and meetings of various types;
- (3) to consider the problems of publicity, publication and the issuing of statements in the name of Pugwash and to make proposals concerning these matters.

Problems of central organization, of the constitution and powers of the Continuing Committee and of finance were discussed and suggestions on these made to the Standing Committee on Future Organization.

Our conclusions and recommendations are as follows:

1. Continuance of Pugwash

It was our unanimous view that the Pugwash Conferences on Science and World Affairs should continue. Pugwash has considerable accomplishments to its credit in the past ten years, but, its original task is far from completed. Although new organizations with closely related objectives have come into existence since 1957 (many of them stimulated by Pugwash) the contributions which Pugwash can make to the solution of problems of world security and international co-operation are unique since scientists through their training and objective approach to problems should not only have a more detached outlook but a greater appreciation of the international possibilities (both dangers and opportunities) arising from scientific and technological developments.

2. Scope of the Pugwash Activities

The ultimate goal of Pugwash was and still is the establishment of lasting world peace. In order to achieve this goal Pugwash will be concerned with two main problems:

- (a) The prevention and cessation of wars through various means, with special emphasis on disarmament.
- (b) Acceleration of the improvement in the state of the less developed countries. This implies not only an absolute improvement but the elimination of the gap between standards in the developed and less developed countries of the world.

There are unique contributions which Pugwash can make in the field because of its non-governmental and unofficial status as an international group of scientists of some repute. However, care must be taken not to duplicate activities of other organizations working in the field, e.g. U.N. agencies such as F. A. O., W. H. O., etc.

In dealing with these two main problems Pugwash must devote considerable attention to two related and very important problems:

- (c) International co-operation i. e. science should have no national boundaries and Pugwash should continue to take the initiative in promoting new international projects in science, relevant to its two main problems.
- (d) Pugwash should try and promote a greater sense of social responsibility among all scientists regarding the political and social consequences of their scientific work i. e. their loyalty should not be merely to themselves nor to pure science but to mankind.

In order to achieve its objectives, it is essential to draw up a framework within which Pugwash will operate. We believe it is wise that this framework should not be too rigid nor defined in too great detail. The following general guide lines are proposed for the next quinquennium.

3. Types of Future Meetings

- (a) There should be an Annual Pugwash Conference covering the main activities of the Pugwash Movement. At this conference, the topics and approximate dates of Pugwash meetings which might take place in the next 18 months or so should be discussed. The Continuing Committee should make the final choices about the future programme at the conclusion of this conference.
- (b) There should be several Pugwash Symposia every year, each with a different and specific topic. In general, these should be limited to 30-50 participants in order to allow a professional treatment of the topic, i. e. following the pattern of a small specialized scientific conference. All papers should be pre-circulated and some would be specially commissioned. Possible topics are anti-ballistic missiles, chemical warfare, food from the oceans, nuclear and non-nuclear proliferation.

(c) In addition there would be meetings of Study Groups and Regional Conferences. The utilization of these and the procedures for their operation should be in the hands of the Continuing Committee, essentially as at present

4. Organization of Conferences and Meetings

(a) All Conferences and Meetings must have received the prior approval of the Continuing Committee. This does not apply to purely national meetings organized by the National Groups.

Formal openings and reading of messages at the start of conferences or meetings should be abolished or kept to an absolute minimum.

(b) The Annual Pugwash Conference would continue to be organized and financed as hitherto, by the Continuing Committee in conjunction with the host country.

(c) For Pugwash Symposia, the local arrangements and the financing would be the responsibility of the host country. With regard to the invitation list, main speakers and other matters of policy, these would be best done by an ad-hoc committee constituted by agreement between the host country and the Continuing Committee. Any national Pugwash Group should feel free to take the initiative over the proposal for a Pugwash Symposium.

It is hoped that about six National Groups will contract to act as host once a year (if requested) for such a symposium. This would considerably ease the financial problems involved in holding symposia. It would not preclude other National Groups acting as hosts at less frequent intervals.

(d) The problems of organization and financing of other international Pugwash meetings, e.g. Study Groups and Regional Conferences are left in the hands of the Continuing Committee.

5. Publication, Publicity and Statements

(a) Notes and brief reports of all conferences and meetings should continue to be published in the Newsletter.

(b) For the Symposia, publication, if considered desirable by the Continuing Committee, would probably be best done in the form of a monograph.

(c) All conferences and meetings should continue to be held in private (i.e. Press and public not admitted). The issuing of statements in the name of Pugwash must remain entirely in the control of the Continuing Committee. Press Conferences should be discouraged, except at the Annual Conference, but if considered essential by the host country, then it must be made clear that statements made to the Press are those of individuals and are not authorized by Pugwash.

(d) It was considered most important to get greater recognition of the work of Pugwash by scientists through the publication of reports of meetings and of important individual papers by existing journals widely read by scientists, e.g. Nature, Science, New Scientist, Nauka i Zhizn, etc.

6. Increase of the Activities of National Groups and in the Number of Participants

In order to carry out the tasks outlined above it will be necessary to increase the activities of the existing National Groups, to multiply considerably the number of scientists participating in the activities of Pugwash and to organize new National Groups in countries where they do not now exist and Regional Groups in areas where the organization of National Groups would be impracticable because of the small number of scientists. It is particularly important that a large fraction of new recruits should be young scientists.

Sir Gordon Sutherland (U. K.) Chairman

Dr. Aklilu Lemma (Ethiopia)

Dr. R. Björnerstedt (Sweden)

Prof. H. Brown (U. S. A.)

Acad. M. M. Dubinin (U. S. S. R.)

Dr. R. V. Garcia (Argentina)

Acad. P. L. Kapitza (U. S. S. R.)

Dr. M. M. Kaplan (U. S. A.)

Prof. M. Magat (France)

Prof. L. Mates (Yugoslavia)

Mr. T. Nemeč (Czechoslovakia)

Dr. S. H. Zaheer (India)

17th Pugwash Conference on Science and World Affairs

Ronneby, Sweden, 3-8 September, 1967

J. Rotblat
Secretary-General.

REPORT OF THE WORK OF THE CONTINUING
COMMITTEE SINCE 1962

1. Introduction

It was exactly five years ago, on the 3rd September 1962, that I reported to the Tenth Pugwash Conference in London on the first five years of Pugwash activities. There was then a general feeling that such reports should be given about every four or five years to a large gathering, representative of the whole Pugwash Movement. It is my honour to present to you, on behalf of the Continuing Committee, the report of our activities during the past five years.

In presenting this report, I shall assume that the members of the Conference have looked at the book "Pugwash: A History of the Conferences on Science and World Affairs", copies of which have been sent to all Pugwashites. The book brings the history of Pugwash up to April of this year, and as such it may be regarded as a report of our activities during the ten years since Pugwash came into being. I do not want to waste your time by repeating the account given in the book. I propose, therefore, to give a general summary of our activities, to draw attention to some conclusions and, in particular, to compare our achievements during the two quinquennia as a basis for our thoughts on the future.

2. International Conferences

The main guide-lines for our work were laid down by the London Conference, and although this Conference gave the Continuing Committee full discretion in directing and carrying out Pugwash activities, the Committee followed closely these guide-lines, and most of the programme laid down in London has been carried out.

The main activity was the organizing of the international conferences. Six such conferences were held since the London meeting in 1962, until the present meeting. Although we aimed at alternating the site of the conferences between Eastern and Western countries, it so happened that in this quinquennium three conferences were held in Eastern Europe, and one each in Western Europe, Africa and Asia.

Among the participants in these six conferences there were 140 new comers to Pugwash. It is worth noting that among the newcomers there were very few from the three countries, the U. S. A., U. S. S. R. and U. K., which previously accounted for more than half of all Pugwashites; the fresh blood came from other countries, particularly from Asia and Africa.

Table I

PARTICIPANTS IN PUGWASH CONFERENCES

	First <u>Quinquennium</u> (10 Conferences)	Second <u>Quinquennium</u> (6 Conferences)
Total numbers	287	140

Percentages

U. S. A.	28	10
U. S. S. R.	13	7
U. K.	13	7
Europe	32	41
America (other than U. S. A.)	4	5
Asia and Australasia	9	17
Africa	1	13

The six conferences were roughly of the same size, the average number of participants being 66, with a standard deviation of 6. This compares with an average of 43, with a standard deviation of 22 for the first nine conferences. Similarly the number of countries from which the participants came averaged 23 ± 4 , compared with 12 ± 5 during the first five years. These differences, on the one hand reflect the growth and spread of the Pugwash Movement, and on the other hand, they show evidence of our settling down to a more steady routine.

An interesting trend is seen when participants are grouped according to their profession or field of study. Figure 2 in the "History" shows the percentages of participants from the different disciplines in the various conferences. A gradual increase in the proportion of social scientists is seen, with a corresponding decrease in the proportion of physical scientists. The proportion of biological scientists, philosophers and educators remained practically unchanged, and quite low. The increase in the proportion of social scientists was particularly high among the newcomers to Pugwash. Thus, in the first quinquennium, social scientists represent 18% of the total, while of those who joined us in the second quinquennium 35% were social scientists. Various factors may have contributed to this change in composition, but the most important is probably the greater emphasis on political aspects of the problems on our agenda, which require the presence of what we call social scientists: economists, lawyers, sociologists and experts in international relations.

Table II

	First <u>Quinquennium</u>	Second <u>Quinquennium</u>
	%	%
Philosophy, Education, etc.	4	11
Physical Sciences	56	38
Biological Sciences	22	16
Social Sciences	18	35

This brings me to the next point - the topics of discussion at our conferences. In accordance with the decisions of the London Conference, disarmament has been our main theme. In five of the six conferences under review the term "disarmament" figured specifically in the title of the conference; only one, the Fifteenth Conference in Addis Ababa, was entirely devoted to problems of developing nations, but even there, one of the five Working Groups dealt with problems of security. Significantly, this working group had by far the smallest number of participants from the developing nations, thus showing that problems other than disarmament are considered to be of greater importance to the scientists from these countries. Various aspects of science and technology in developing nations were also discussed in working groups in Udaipur and Venice.

Under the heading "Disarmament and World Security" some topics were discussed repeatedly at several conferences. These include: progress toward general and complete disarmament, reduction of tensions, collective security, spread of nuclear weapons, comprehensive test ban, and nuclear-free zones. Security in Europe was also a recurrent topic, and it figured specifically in the title of the last conference in Sopot.

Apart from disarmament and the problems of developing nations, there were two other main topics: international co-operation in science and technology, and the responsibilities of scientists. Various aspects of these problems were discussed at several conferences.

The present procedure for summarizing the discussions and conclusions of Pugwash Conferences has been adopted as a result of trial and error. The main work of the conference is usually carried out in four or five working groups, each tackling some specific aspect of the main theme of the conference. Members of the other working groups are given an opportunity to comment on the draft reports from each working group, but ultimately each report is issued as a document from the working group, rather than from the conference as a whole. Although we aim at reaching agreement on the topics discussed, it is now our practice to include in the report important and original suggestions, even if they failed to gain full support of the working group. In this way ideas are recorded which the group felt merit further consideration and development. The final draft of the report is published in the Pugwash Newsletter, as well as in the Proceedings of the Conferences, and distributed to former Pugwashites, heads of government, and various international institutions.

The reports from the working groups also serve as basic material for the Continuing Committee in preparing the public statement which has been issued after each conference. At the earlier conferences, the statement used to be discussed and drafted by the conference as a whole, but after the Twelfth Conference in Udaipur, when it took a seven-hour session to agree on the statement, it was thought impracticable to work on a draft in a large gathering, and henceforth the Continuing Committee drafted and issued the statement as a document of its own. Even so, it takes the Committee about ten hours to prepare and agree on the draft. The statement is handed out to the Press at a press conference held the day after the conclusion of the conference. Usually, the publicity given to the statement is very good in the country in which the conference is held, but press coverage in other countries has on the whole been very poor. Perhaps the Committee should have paid more attention to publicity arrangements and to our public image. As it is, even after ten years of existence and some very significant achievements, many more people have heard of Captain Pugwash, the pirate, than of a Movement of eminent scientists aiming at the

preservation of peace on land and the seas.

I have just referred to our achievements. It is not easy to measure them because no numerical data are available. We have good reason to believe that the conferences have made important contributions towards greater understanding and convergence of views between East and West on disarmament problems. It was very gratifying to hear from U Thant that our deliberations receive careful attention at the United Nations and national governments. There were also specific items to our credit, for example, our contribution to the test ban treaty. However, on the whole, the progress made was much slower, and the tangible achievements fewer, than in the first quinquennium. Some reasons for this apparent decline are obvious. In the early years, there were very few ideas about disarmament and few people were thinking about them. Moreover, there were practically no contacts between East and West on these problems. Pugwash represented the first serious attempt to establish such contacts and to inject novel ideas about disarmament. Since that time, and largely stimulated by the success of Pugwash, many other bodies became concerned with these problems; a number of institutes, both national and international, have been set up in which studies are carried out on disarmament, arms control, and on peace; there are now many people engaged full-time in research on these problems. Another possible reason is that in the early days many of the disarmament problems were primarily of a technical nature, in which Pugwashites had a special competence, and on which agreement could be reached fairly easily among scientists. Although there are still many technical problems to be solved, even in the first steps towards disarmament, the emphasis in recent years has shifted towards political issues, in which we have no special expertise, and which are much more difficult to solve. A third reason is that when Pugwash started, the cold war was at its height. Now we are in a period of so called co-existence, and although the threat of a nuclear war is just as great, the whole problem of East-West relations has taken on a different aspect. Moreover, there is the growing threat arising from the disparity in standards of living between the developed and developing countries, and on this we have been spending far too little time. It may well be that an entirely new approach to the disarmament problem is now necessary, as well as a reappraisal of its relative position in our programme.

3. Regional and Special Conferences

I have dwelled at some length on the subject of the international conferences, since these constitute our major and most conspicuous activity. But the Continuing Committee is involved in a variety of other functions, including other types of conferences.

One of these, is the regional conference. The dilemma of maintaining the international character of the Pugwash Conferences without further increasing their size, combined with the problem of the very considerable travelling expenses from distant countries, can be partially solved by organizing regional conferences in different parts of the world, and which, in addition to our usual topics, would also deal with issues of specific interest to the region. The first regional conference in South-East Asian countries was held in January this year in Australia; its theme was "Scientific, Technical and Industrial Development in South-East Asia". Despite the absence of scientists from a number of countries in the region, the Conference was very successful, and has stimulated many scientists to take an active part in Pugwash. This prompted the Committee to encourage further regional meetings. Another conference in South-East Asia is planned for next year in Ceylon. Preparations are also afoot for a

regional conference to be held in Latin America.

Another type of conference organized by the Continuing Committee are small meetings to discuss more specific problems, and whose success depends on their being completely private. During the past five years, three such meetings were held: in March 1963 in London on the technical and political aspects of a nuclear test ban; in August 1965 in London, on the Vietnam problem; and in June 1967 in Paris, on the Middle East crisis. No reports are issued from these meetings and their main purpose is to provide an opportunity for an absolutely free and frank exchange of opinion, and to help in the understanding of the thinking on the particular problem; any consensus reached is conveyed directly by the participants to the governments concerned.

4. Study Groups

Apart from conferences a great deal of work has been going on in the Study Groups. At the present time we have two permanent Study Groups: on Biological Warfare and on European Security. We shall receive reports from them this afternoon, and therefore, I shall limit myself to general remarks. The Study Groups are international in composition, and the main difference between the Pugwash conferences and the Study Groups is that the latter represent a continuing effort, each meeting of a Study Group being a continuation of the previous meeting and planning the programme for the following meeting. In practice this has not always worked out in this way, and occasionally the meetings of the Study Groups tended to become too much like the ordinary Pugwash Conferences.

Both Study Groups did valuable work. The one on Biological Warfare was particularly successful. There are several reasons for this. One was that its problem is fairly precise, mostly technical and not very controversial. Another important reason was that it worked in close association with SIPRI, which provided financial backing for some projects and commissioned special papers. As you will hear in the afternoon, this Study Group has carried out a model experiment on inspection, has made definite proposals concerning detection of biological weapons and has worked out a concise programme for the future work of the Group.

In the case of the Study Group on European Security, the subject is very diffuse, mostly political and highly controversial. Despite these difficulties some very useful contributions towards understanding of the European problem have been made by the Group, a notable feature of its work being the close collaboration between scientists from both parts of Germany.

Summing up, our experience with both Study Groups has shown that if the subject of discussion is well defined and within the competence of the members, and if the homework is done properly, very good results may be expected. We should keep in mind these lessons when planning our future activities.

5. Liaison with Other Institutions

I shall now describe briefly some of the other activities, regular and ad hoc, in which the Continuing Committee has been engaged, either as a body or through its Officers. To the regular activities belong the liaison with the National Pugwash Groups, about which I shall have more to say in a moment, and with other organizations, which share common interests with Pugwash.

Foremost among these is SIPRI, or, to give it its full name, the International Institute for Peace and Conflict Research, which, as we all know, was conceived by the Prime Minister and endorsed by the Swedish Government and parliament. This Institute promotes research into many of the problems in which we have always been greatly interested. We are particularly grateful to SIPRI for financial support in organizing this Conference. We maintain close contact with SIPRI; several Pugwashites serve on its Government Board and Council, and the Director himself is an old Pugwashite. We hope to hear a report of the work of SIPRI in the afternoon.

Another body with which we maintain contact is IPRA, the International Peace Research Association; its Executive Committee has an observer on our Continuing Committee, and we have one on their Executive Committee.

We collaborated with UNESCO in sponsoring a Study Group on the Long Term Consequences of Disarmament. We have a keen interest in the East-West Study Group on disarmament and arms control which we fathered. We held a joint meeting with the United Nations Committee on the Application of Science and Technology to Development. We maintain contact with the Universities and the Quest for Peace, which is planning a World Congress of university representatives and scholars on the inclusion of the concept of peace into university curricula. We have also had observers at a meeting of the International Association of University Teachers and the recent Conference on International Penal Law.

Of the ad hoc activities, I have mentioned in the History our intervention during the Cuban crisis, the sponsoring of talks between Indian and Pakistani scientists, and the letter to the President of Argentina. We have also taken an active part in the International Co-operation Year in 1965, and we had extensive discussions on the needs to set up a World Health Centre. Two recent events were the sending of letters to the Presidents of Israel and the U. A. R. suggesting to arrange a meeting between scientists from these two countries in connection with the Middle East crisis, and a public statement on the non-proliferation treaty.

6. Organization of Pugwash

Since one of the tasks before this Conference is to elect a new governing body for Pugwash, I ought to say something about the present organizational set up. The Continuing Committee, as elected in London, consisted of two ex-officio members, the Chairman and the Secretary-General, and twelve members representing certain geographical areas, namely three each from the U. S. A. and U. S. S. R., two each from the U. K. and Western Europe, and one each from Eastern Europe and Asia. Subsequently, the Continuing Committee decided that there should be two representatives from Eastern Europe. Since our Chairman, Lord Russell, was not able to participate in our work, and Professor Powell chaired the meetings of the Continuing Committee when present, he was appointed as Vice-Chairman. To ease the work of the Secretary-General, Dr. Patricia Lindop was appointed Assistant Secretary-General. Apart from these, there were some individual changes in the representations from the U. S. A., U. S. S. R. and U. K.

The whole Continuing Committee meets about twice a year. The average attendance during the twelve meetings held since 1962 was 70%. * Each of the meetings usually last about three days, and the business includes planning of international conferences, preparing of

* members unable to come may send deputies, and sometimes other persons are invited to attend for some items on the agenda, so that the average number attending the meetings was sixteen persons.

statements from the conferences, and dealing with the various other activities.

In between meetings, the day-to-day affairs of the Continuing Committee are carried out by the Central Office in London, that is by the Secretary-General, Assistant Secretary-General and one full-time secretary. There also exists a small executive committee, with whom the Secretary-General can consult in an emergency.

The present set up of the Central Office, with only one person receiving a salary and no rent to pay for an office, is, of course, very economical; the average expenditure of the Central Office, including postage, cables and telephone was about \$3,000 p. a. The cost of the publications issued by the Central Office, the Proceedings of the Conferences and the quarterly Pugwash Newsletter, was on the average \$3,500 p. a.; travelling expenses for some participants and staff to conferences and committee meetings amounted to about \$4,500 p. a. The total budget comes to less than \$12,000 p. a. Considering the multitude of activities carried out by the Central Office this is a very modest budget indeed. It is about half of the budget which had been agreed by the Continuing Committee after the London Conference, but it had to be cut to the available income, which comes mostly from contributions from three countries, the United States, the Soviet Union and the United Kingdom.

This budget does not, of course, include the expenditure incurred in organizing the conferences themselves, such as hospitality offered to participants, secretariat, simultaneous translation, etc., and travelling expenses. Contributions towards the latter have been received from UNESCO, the Carnegie Endowment and from private sources, but the main cost of organizing the conferences is usually borne by the Pugwash Group in the host country. This brings me to the work of the National Pugwash Groups.

7. National Groups

National Groups form a very important aspect of Pugwash work, because they enable a large number of scientists to become involved in our activities, without making the conferences too large and unwieldy. Among the tasks of the National Groups is to prepare papers for conferences, and to recommend to the Continuing Committee names of their nationals to be invited to the conferences. In addition, National Groups may carry out a variety of other activities, e. g. organizing lectures and discussions, issuing pamphlets and regular publications, studying special problems. By 1962 ten National Groups were in existence; since then twelve more came into being, so that we now have National Groups in Australia, Austria, Canada, Czechoslovakia, Denmark, Federal German Republic, France, German Democratic Republic, Ghana, Hungary, India, Israel, Italy, Japan, Netherlands, Norway, Poland, Sweden, U. K., U. S. A., U. S. S. R. and Yugoslavia.

The various Groups differ greatly in their size, organization and programme. There are no rules or restrictions in this respect, and every Group can decide on its own method of work. Very often the liveliness of a Group depends on having a specific task to perform, for example, the organization of an international conference. Often, it depends on the type of relationship with the academies of science or other scientific bodies.

As a result of all this, there is an enormous variability in the achievements of and state of vigour among the various Groups. Some

of them are dormant, and they only spring to life when the Committee asks them to nominate participants to the international conferences. Other Groups have a very lively programme. Most of the National Groups have sent in reports of their work during the last five years, and these reports will be distributed to you. I should like to draw attention to a few high-lights of these activities, omitting the countries which send the largest contingents to our conferences since their activities are well known.

The Australian Group organized the first South-East Asian Regional Conference; it also issues a newsletter, which comes out every few months. The Canadian Group collaborates closely with the Canadian Peace Research Association, and has completed a study on the economics of disarmament in Canada. The Danish Group was co-initiator of the Study Group on European Security and host to a meeting of this group; it also participated actively in the work of the Study Group on Biological Warfare. The West German Group works through the "Vereinigung Deutscher Wissenschaftler", holds regular seminars, organizes meetings on a variety of topics, and has set up a small research institute in Hamburg for the study of problems of arms control, disarmament and security. The East German Group, working closely with the Academy of Sciences in Berlin, holds regular meetings, discussions and seminars. The Italian Group, apart from organizing the Fourteenth Conference in Venice, has held in 1966 a very successful international summer school on disarmament and arms control, and is planning another one for next year; it has also made an extensive study of the non-proliferation problem, with an effective impact on public opinion. The Japanese Group, working through "The Kyoto Conference of Scientists", has held several seminars, and published the findings in the form of statements. The Netherlands Group has also published a number of brochures dealing with various aspects of nuclear disarmament; it has a sister organization "Friends of Pugwash", with a membership of about 1,000. The Polish Group organized the Sixteenth Pugwash Conference in Sopot, and was very active in the work of the Study Group on European Security. The Yugoslav Group has organized the Eleventh Conference in Dubrovnik, and was host to a meeting of the Study Group on European Security; it also issues a periodical "Encyclopaedia Moderna".

The achievements of two of the National Groups deserve special mention. The Czechoslovak Group has carried out an amazing number of activities. The list includes the following: (i) organizing the Thirteenth Conference in Karlovy Vary; (ii) commissioning a documentary film on Pugwash under the title "To Be or Not To Be", and presenting copies of the film to other Pugwash Groups; (iii) co-initiating the Study Group on European Security, and being hosts to two meetings of this Group; (iv) taking an active part in the work of the Study Group on Biological Warfare and being hosts to a meeting of this Group in Mariánské Lázně; (v) arranging, through the Academy of Sciences, the printing of the History of Pugwash; distributing 1,000 copies to Pugwashites, and providing another 1,000 copies to be available for sale to the public by a commercial publisher; (vi) last, but not least, offering, through the Academy, hospitality to a Pugwash meeting to be held every year in Czechoslovakia.

And finally, our hosts, the Swedish Pugwash Group. This Group has taken a very active part in the work of the Study Group on Biological Warfare; it organized a pilot scheme for inspection of microbiological laboratories in four countries, and has been hosts to several meetings of the Study Group; it has played an important role in setting up SIPRI, and now - the most tangible evidence of their efforts -

the organization of this, the largest of our Conferences. The best evidence of the high standing of Pugwash in Sweden is, of course, the presence here of the Prime Minister. We are most grateful to you, Sir, for being with us, for delivering such a stirring message and for giving our Conference such a propitious start.

8. Pugwashites

In summing up the work of the National Pugwash Groups two conclusions may be drawn. One is that the best way to activate a Group is to entrust it with a well-defined, concrete task. The other is that the success of a Group depends enormously on there being one or two enthusiastic people, who are prepared to make an extra effort and who often, by their example, trigger the interest of others.

This dependence on enthusiasm of individuals applies, of course, to all Pugwash activities. Pugwash is a Movement of scientists. It is said to express the realization by scientists of their social responsibility. The majority of scientists have a social conscience, but this is often suppressed by the day-to-day worries, professional duties, absorbing research work, or the many other calls for administrative or national consultative functions which are made on such people. In the absence of a trigger, the needs to discharge one's obligation to society, to help to avert war and strife, is often pushed aside. Yet, scientists could make most valuable contributions to these issues, even if they devoted only 5 to 10% of their time. We are rightly proud in Pugwash of having among us the most eminent scientists of the world, but quality alone is not sufficient; it needs to be supplemented by quantity. The more people think of a problem, the greater is the likelihood of something new emerging, either through original ideas from individuals, or by mutual stimulation and cross-fertilization.

Although we often discuss in Pugwash the need to bring in more people, we have not done very much about it. In the sixteen Conferences held over ten years, a total of 427 scientists took part. Even if we add the 50 newcomers to this Conference, observers and members of the Study Groups and National Groups, the total number of Pugwashites is still less than one in a thousand of the scientific manpower. Even among the Pugwash participants the burden was not shared equally; half of all attendances at the Conferences was by one-fifth of our members.

There are also other anomalies in our membership. Among the 427 Conference participants, there were only 11 women, that is 2.6%, which is by an order of magnitude less than the proportion of women in science. Perhaps the more worrying is the age distribution. I do not have the exact data for all participants, but the British Pugwashites represent a fair sample, and their mean age is 59 years, which is at least 15 years higher than the average age of scientists. This is, of course, partly explained by the eminence of our members; wisdom is supposed to come with age; but old-age is not conducive to new ideas and this is what we need most.

Another disadvantage of the high mean age is that many of our colleagues go into retirement and cease to be active scientists; and we have always emphasized the need of our Movement being based on active scientists. And of course we lose members by death.

9. Obituary

During the last quinquennium 14 Pugwashites have died. Some of these had been very active in the Movement, and it is appropriate that we should pay tribute to them in this gathering.

Alexander Vassilievich Topchiev played a major role in the establishing of the Pugwash Movement. He attended almost every Pugwash Conference until his death, and was a member of the Continuing Committee since 1958. He was Chairman of the Soviet Pugwash Group and has made lasting contributions towards East-West understanding and co-operation.

Leo Szilard was one of our most remarkable personalities. Always ahead of others in his thinking, he enlivened and stimulated Pugwash Conferences with the originality of his ideas, good humour and tremendous drive. Although highly individualistic and unconventional, he has helped enormously in getting the Pugwash Movement going and making the Conferences successful from the beginning.

Morton Grodzins, one of the earliest social scientists in Pugwash, did a great deal to set up and strengthen the Pugwash Group in the United States. His incisive comments and commonsense interventions at Conferences did much to emphasize the useful role which social scientists could play in Pugwash.

Herman Muller was one of the signatories of the Russell-Einstein Manifesto of 1955, which gave rise to the Pugwash Movement; he was also a participant of the first Conference in Pugwash.

Homi J. Bhabha was a member of the Organizing Committee for the Twelfth Conference in Udaipur, and as Chairman of the Indian Atomic Energy Commission was host to the participants of that Conference.

Norayr Martirosovich Sisakyan took an active part in several of the earlier Pugwash Conferences as well as in the work of the Soviet Pugwash Group.

Sir Charles Darwin, took a lively part in the Second Conference in Lac Beauport and in the London Conference. He was also very active in the British Pugwash Group.

Other deaths during that period were of Academician Anushavan Agafanovich Arzumanyan and Professor E. A. Korovin of the U. S. S. R., Dr. Trevor Gardner of the U. S. A., Professor Vaclav Husa of Czechoslovakia, Professor Heinz Barwich of Germany and Professor F. G. Houtermanns of Switzerland. Very recently we recorded the death of Professor Nikolai A. Talensky, an ardent Pugwashite who attended eleven out of the sixteen Pugwash Conferences in each of which he was a very active participant.

Mr. Chairman, I should like, with your permission, to ask the audience to pay tribute to our departed colleagues by standing in silence for a short while.

10. Tasks Ahead

We must now turn our attention to the living, since it is our aim and purpose to ensure a lasting future for mankind. Even when presenting a report of the past activities, we should remember that

its main purpose is to show the way ahead. It is for this reason that I have pointed out our successes as well as failures, and that I have not confined myself merely to give facts and figures, but have also drawn attention to the lessons we can learn from our past experiences.

It is the task of this Conference to make decisions about the future, and to outline the scope of our activities for the next five years. We have had some remarkable achievements in the past, and were highly successful in bringing about greater understanding between East and West, and perhaps in reducing tension among nations. But our task has hardly begun. As we have just heard from the Prime Minister, the world is still in a turmoil, and mankind in danger. There is as yet no sign of a disarmament treaty being agreed to; the number of nuclear powers is growing, and biological and chemical weapons are being developed. The war in Vietnam is continuing with mounting ferocity and terrible suffering, and with the growing danger of escalation. There is misery and hatred in the Middle East, and civil war in Africa. There is increasing hunger in the world and greater disparity between the rich and poor peoples. Our premise, that in the atomic age disputes should be solved by means other than war, is far from being accepted; nor is there any realization among the general public of the implications of the tremendous advances of science and technology. And, as far as participation in Pugwash is concerned, our main weakness is the lack of contact with China, our inability to renew the links with our colleagues from the country with the largest population in the world.

All this means that the objects which we set before us when Pugwash was founded ten years ago have still to be achieved. We may have to change our methods and organization, but our goal remains the same; it is the same as expressed in the Russell-Einstein Manifesto and in the statements from our Conferences. Five years ago we concluded the statement from the London Conference with the following: "We reassert our conviction that the goal of full disarmament and permanent peace is realistic and urgent. This work is truly to be seen as a part of a long struggle for the progress of mankind, and it is one in which scientists have a responsible part to play. We call upon scientists everywhere in the world to join us in this task". I submit the struggle is still on, and the call is more urgent than ever.

17th Pugwash Conference on Science and World Affairs

Ronneby, Sweden, 3-8 September, 1967

PROGRAMME OF SESSIONS

Sunday, 3rd September 1967

09.30 - 13.00

First Plenary Session

Chairman: Professor A. Engström

Formal Opening of Conference
(for details see XVII - Adm. 11)

14.30 - 18.00

Second Plenary Session

Chairman: Academician M. D. Millionshchikov

'The Responsibilities of Scientists'

Stockholm Int. Peace Res. Inst.

1. Report on work of SIPRI by Mr. R. Neild.
2. Report on work of the Study Group on Biological Warfare by Dr. R. Björnerstedt.
3. Report on work of the Study Group on European Security by Professor A. Snejdarek.
4. Discussion on the Reports.
5. General discussion on 'The Responsibilities of Scientists'.

*German go.
techn. + ec. indiv.*

Monday, 4th September 1967

09.30 - 13.00

Third Plenary Session

Co-Chairmen: Professor E. Amaldi
Professor R. E. Peierls

Symposium on 'Arms Control, Peacekeeping and Security'

1. Paper by Academician M. D. Millionshchikov
'Arms Control, Peacekeeping and Security'
Brief discussion on this paper.

2. Paper by Professor V. A. Sarabhai
'Arms Control in a Multi-Polar World'
(this paper will be read by Professor
M. G. K. Menon)

Brief discussion on this paper.

3. Paper by Professor J. B. Wiesner
'What Hope for G.C.D.?'
(this paper will be read by Professor
F. A. Long)

Brief discussion on this paper.

4. General discussion. *Feld - Arnoldi -*

14.30 - 18.00 Meetings of Working Groups.

18.00 - Lille Salen (John Voss)
Tuesday, 5th September 1967

09.30 - 13.00 Fourth Plenary Session

Co-Chairmen: Academician I. Malek
Professor F. A. Long

Symposium on 'New Approaches in Disarmament'

1. Paper by Academician L. A. Artsimovitch
'New Ideas about Disarmament'

Brief discussion on this paper.

2. Paper by Sir John Cockcroft
'The Control of the Peaceful Uses of
Atomic Energy'

Brief discussion on this paper.

- ←
3. Paper by Mrs. Alva Myrdal
'New Roads to Disarmament'

Brief discussion on this paper.

4. General discussion.

14.30 - 18.00 Meetings of Working Groups.

Wednesday, 6th September 1967

09.30 - 13.00 Fifth Plenary Session

Co-Chairmen: Academician L. A. Artsimovitch
Professor E. Rabinowitch

Symposium on 'International Co-operation and
Development'

1. Paper by Professor H. S. Brown
'The Crisis in Economic Development'

Brief discussion on this paper.

2. Paper by Dr. R. V. Garcia
'International Co-operation and Development'
Brief discussion on this paper.
3. Paper by Academician I. Malek
'The Most Pressing Tasks of Collaboration of
Scientists for the Benefit of Developing
Countries'
Brief discussion on this paper.
4. General discussion.

14.30 - 18.00 Meetings of Working Groups.

Thursday, 7th September 1967

09.30 - 13.00 Meetings of Working Groups.
Afternoon free.

Friday, 8th September 1967

09.30 - 13.00 Sixth Plenary Session

Chairman: Professor B. T. Feld

1. Reports from Working Groups. *1. Rakhys 4. Nalpe*
3. Karelin 5.
2. Discussion on these Reports. *2. Snejdarak 6.*
7. Bauer
3. Report from Standing Committee on Future Activities.
4. Discussion on this Report.

14.30 - 18.00 Seventh Plenary Session

Chairman: Professor C. F. Powell

1. Discussion on draft, and adoption of Statement. *glass*
2. Report from Standing Committee on Future Organization.
3. Discussion on this Report.
4. Election of new governing body of Pugwash.
5. Close of Conference.

17th Pugwash Conference on Science and World Affairs

Ronneby, Sweden, 3-8 September, 1967

PROGRAMME FOR OPENING SESSION

Sunday, 3rd September, at 10.00

Chairman: Professor Arne Engström

1. Opening Speech by Chairman.
2. Formal Opening of Conference and Address by Mr. Tage Erlander, the Prime Minister of Sweden.
3. Messages of Greetings from Heads of State. *✓ Thailand ✓ Italy, ✓ CSR (Moravia), Pakistan, GDR (Ulbricht), FGR (Brandt), Poland,*
4. Messages of Greetings from Academies of Science. *Royal Swed. Acad. Sc. - Royal Pl. Sc. - USSR - US - AMs etc.*
5. Report by the Secretary-General, Professor J. Rotblat, of the work of the Pugwash Continuing Committee. *CSR - Italy Berlin - Arabia - Poland Hungary*
Rep. Conf. - Small priv. Conf. - Study group
 Break for Coffee
6. Questions and brief discussion on the Report of Secretary-General. *Africa - Latin America - Middle East - Arctic*
7. Setting up of Standing Committees. *Future Activities opening.*
8. Announcements
 (allocation to Working Groups, officers of the Conference, etc.)

IV.

Ego

PUGWASH: THE FIRST TEN YEARS

by J. Rotblat

The official history of the movement will be published in December 1967. If you would like to receive a copy immediately on publication please complete and return the enclosed form to the address below.



PUGWASH: THE FIRST TEN YEARS

by J. Rotblat (30s.net)

Please supply me with ... copy/ies on publication.
I enclose a cheque/postal order for
Please charge to my account at (name and address of bookseller)

.....
.....
.....

Heinemann Educational Books Ltd,
48 Charles Street, London W.1.

I. Rathjens

Sept 8

The working group considered the question of the proliferation of nuclear weapons, including particularly consideration of the nuclear non-proliferation treaty: the question of the strategic arms race including particularly the question of anti-ballistic missile defence; and, vary briefly, possible extension of the nuclear test ban treaty to include a prohibition on underground nuclear tests. Our comments follow

The Nuclear Non-Proliferation Treaty

We have examined the texts of the draft treaties submitted by the US and the USSR to the 18 Nation Disarmament Conference and conclude that acceptance of a treaty based on those drafts would be a major step in preventing the proliferation of nuclear weapons and in reducing the threat of a nuclear holocaust. We urge completion of negotiations on the treaty, including particularly resolution of any differences with respect to Article III, and acceptance of the treaty by all states at the earliest possible date.

In our consideration of the treaty we have focused our attention particularly on the following which have been identified by some members of the group as concerns which could possibly affect the decisions of some states regarding the treaty:

- (a) The suggestion that it might not be in the interest of some states to accept the treaty because of the possibility that by so doing they would be denied the benefits that might be realized through the use of nuclear explosions for peaceful purposes.
- (b) The suggestion that, because of the verification and control provisions that might apply were they to accept the treaty, certain non-nuclear-weapon states would be at a disadvantage, in competition for sales of reactors and services associated with the nuclear power industry, as compared with nuclear weapons states.
- (c) The suggestion that the asymmetry in obligations demanded of the non-nuclear-weapon states on the one hand and of the nuclear-weapon states on the other should be reduced by the latter undertaking to reduce armaments or enter into other agreements to halt or restrain the arms race.
- (d) The suggestion that if the non-nuclear-weapon states are to accept the treaty, they should be given assurances or guarantees against nuclear attack.

With respect to these points we offer the following comments.

While there might be a long term economic advantage in employing nuclear explosions for recovery of oil, construction of canals etc., there does not seem to be any significant present advantage in using nuclear explosions as compared with other means of realizing the same objectives. Indeed, we believe even the potential advantages of nuclear explosives for peaceful purposes to be sufficiently small so that such programmes should be prohibited if they appear to conflict with progress in arms control and disarmament.

Recognizing the impossibility of distinguishing between nuclear explosions for peaceful purposes and those which may result in weapons development, we see no satisfactory alternative for providing the non-nuclear-weapons states with advantages that may eventually be feasible with explosions for peaceful purposes within the context of a nuclear non-proliferation treaty other than that suggested in the preamble: i.e. to have nuclear explosions made available through appropriate international procedures to non-nuclear-weapon states on a non-discriminatory basis with the charge to such parties for the explosive devices being as low as possible and excluding any charge for research and development. In the event that nuclear explosions for peaceful purposes should prove to be economically and otherwise desirable we believe this procedure should be satisfactory.

It is our opinion that there is little real basis and in the opinion of some of us no basis at all, for believing that the non-nuclear-weapon states will be placed at a competitive disadvantage as a result of the application of inspection to their nuclear facilities while those of the nuclear-weapon states are not subject to such inspection. Despite the fact that we feel that concerns relating to compromise of industrial secrets as a result of inspection have been exaggerated, we nevertheless believe that it would be useful to allay such fears insofar as possible by minimizing the intrusiveness of the inspection system.

For the same reason, some members suggested that additionally it would be desirable eventually to have the peaceful nuclear facilities of the nuclear-weapons states subject to the same inspection as required in the case of the non-nuclear-weapon states. With regard to the question of providing for an effective but minimally intrusive inspection system we believe it much preferable to rely on an international agency's having authority to make changes in procedures as technology advances rather than attempting to include as a part of the non-proliferation treaty detailed procedures which may become rapidly obsolescent. Some members argued that the preferred control system, which should be entirely adequate for the treaty, should be that of the International Atomic Energy Agency (which has already been accepted by more than 90 countries).

Because of the very great importance of reaching early agreement on the non-proliferation treaty we believe it would be a mistake to make acceptance contingent on negotiation of any other specific arms control or disarmament measures. In this connection, we would expect that agreement on the non-proliferation treaty would have such a profound affect on the political climate in the world that the prospects for other arms control and disarmament measures involving the nuclear powers would be enormously improved. The concerns of those who are bothered by the fact that the treaty does to some extent impose greater obligations on the part of the non-nuclear-weapon states than on those having nuclear weapons should be substantially reduced by this realization. Nevertheless we believe it would be very helpful if, at this time, there could be expressions from the nuclear-weapons states of their willingness to at least initiate discussions and studies of other measures that might be implemented following negotiations of the nuclear non-proliferation treaty. Some members of the group suggested the following examples: an extension of the nuclear test ban to cover all environments; early discussion of measures to limit and turn back the arms race in both strategic offensive and ABM defence systems; a cut-off of production of fissile materials for weapons use; the establishment of nuclear free zones; and limitations on the traffic in conventional arms.

Finally, we are mindful of the fact that there is feeling, particularly in non-nuclear-weapon states, that those states eschewing the attainment of nuclear weapons capabilities should have some assurance against attack by the nuclear powers.

The majority of the group felt that a useful mechanism for moving this in this direction would be the undertaking of obligations by the nuclear-weapon-states not to use nuclear weapons against those states which accede to the treaty and neither possess nuclear weapons nor have them on their territories. They would urge that the nuclear-weapon powers give serious and urgent consideration to the possibility of their making such pledges. Some members felt that a preferable guarantee for the non-nuclear-weapon states would be a total prohibition on the use of nuclear weapons.

The Strategic Arms Race and Ballistic Missile Defense.

Participants from the Soviet Union stressed the importance of defence, particularly from the psychological point of view considering the experience of the Soviet Union in World War II. They particularly argued that it would be impossible to consider limitations on anti-ballistic missiles unless there were simultaneous consideration of reductions in offensive strategic systems.

While there was appreciation and some support for this view from Americans and others, the major concern expressed by the American participants was that if there were an extensive development of anti-ballistic missile defense systems at this time there would almost certainly be a further escalation of strategic offensive forces as a response. Many felt that the deployment of ballistic missile defence would be counterproductive not only for this reason, but also because with such deployment eventual achievement of meaningful arms reduction would be much more difficult. The Americans particularly stressed the point that we are at present at an especially critical juncture since, though ABM deployments are now non-existent or at low levels, they may soon become very significant.

There was concern expressed by some members that, in addition to the direct consequences arising from the increased arms race between the superpowers, ABM deployment would have a further adverse destabilizing effect on existing security systems throughout the world which have mutual deterrence between the superpowers as an important component. In particular, it was argued that local wars might appear to be less risky for the superpowers were they to deploy ABM, and that this could lead to a sense of insecurity in other countries. The consequences might be pressure to increase armaments and to abstain, or use the escape clause, with respect to the nuclear non-proliferation treaty. Those members who introduced these arguments suggested that efforts be made to direct the attention of decision makers and of public opinion towards appreciating these secondary consequences that decisions to deploy ABM's would have throughout the world so that they be taken into account in weighing the pros and cons of avoiding or restricting deployment.

There was a consensus that possible limitations on antiballistic missile defence systems should be linked with measures affecting strategic offensive systems. In the view of the Soviet members such measures would have to include reductions in strategic offensive systems. It is our unanimous opinion that limitations on ballistic missile defenses coupled with measures affecting strategic offensive systems should be thoroughly explored with high priority. We suggest that this problem area would be a

suitable one for a specialized Pugwash study group. The possibility of reductions in intermediate range missile systems may be another area for fruitful specialized study.

Other subjects

It had been our intention to devote some effort to the questions of nuclear free zones, the traffic in conventional armaments, and extension of the nuclear test ban treaty to prohibit underground nuclear explosions.

Though our discussions of the last subject were very brief we would like to record our endorsement of the report on this subject by Working Group IV of the 16th Pugwash meeting.

Because of lack of time we were unable to discuss the question of the traffic in conventional arms. We suggest this would be a fruitful area for a specialized Pugwash meeting.

Seg 8

17th Pugwash Conference on Science and World Affairs

Ronneby, Sweden, 3-8 September 1967

FINAL REPORT OF WORKING GROUP 2

"Peacekeeping and Security"

Part I

After a short meeting with Working Group 7, Working Group 2 considered the causes of international conflicts. Attention was called to the many situations around the world in which conflicts are likely to erupt, even where for the moment there is no violence. There are many causes of conflict in the present world, especially economic, social and ideological. All these causes must be clarified by constant research. It was agreed that also psychological causes of conflicts, which have been neglected in the past, should be studied in depth.

International conflicts, even of a local character, are sometimes aggravated by the sharp division of the world into military blocks, as well as by the escalation of conflicts throughout the world when one or more of these blocks become involved in a local situation. Unequal division of resources in the world constitutes another cause of the aggravation of the conflicts. The prohibitions against the use of force and interference in domestic affairs of states have been violated by several states. Consequently, the importance of stopping existing conflicts and finding new methods for preventing future ones is growing. (A joint declaration presented to the Working Group by a participant from the U. S. S. R. and a participant from the U. S. A. is contained in Annex A to this report. A polish participant presented a declaration against the use of force, which is contained in Annex B to this report.)

De-escalation of existing conflicts seems to be one of the most effective methods for creating a better atmosphere in international relations. The group believes that the United Nations should be universal and should play a greater and increasing role in settling and preventing international conflicts. For this reason the study of the problems how to make the United Nations more efficient and how to strengthen the peacekeeping capacity of the United Nations should be made.

Some members of the group felt that no significant improvement of the efficiency of the United Nations was attainable without a radical recasting of the composition, powers and procedures of the Security Council and the General Assembly and the establishment of certain subsidiary organs. Other members considered that changes in the Charter are not desirable or not possible to obtain.

The following proposals for research to be made are recommended by the group after a preliminary discussion:

1. Psychological aspects of the causes of violent conflicts.
2. Development of various techniques of de-escalation of existing conflicts.
3. The possibility of creating an international agency to explore outer space for the benefit of all mankind.
4. Better use of mass media for dissemination of objective information and of information for the promotion of peace and international understanding.

5. Improving the efficiency and the decision-making of the United Nations organs, especially with respect to peacekeeping processes.
6. Inclusion in the teaching curricula of study of international co-operation, including the subjects mentioned above.

Part II

The Working Group considered the report of the Study Group on European Security as well as other papers relating to European security and the problem of Germany. The Working Group endorsed the following conclusions of the Study Group:

The Study Group noted that "The present political situation in Europe has relatively improved and that the overall trend of the development of relations between Western and Eastern Europe aims - naturally with oscillations - at a lessening of tension and certain factual normalization of the relations between the European states of different social systems . . . Nevertheless, many states still feel that their security is somewhat endangered. The feeling of insecurity is caused by the massive accumulation of the latest military technique, especially by the non-recognition of the status quo in Europe, by a potential involvement of European states in conflicts occurring in other parts of the world. All European nations neither want to become parties to any conflicts, nor to be drawn into them. European security cannot be achieved for a long time exclusively by military means - even less so by the armament race. There exists a happy coincidence of the interests of European states with those of the superpowers on these issues.

"There is a community of interests of all European states without regard to ideology in the question of security, and even in their attitudes to the interests of the existing super-powers.

"General agreement has been reached that various measures conducive to a security system in Europe could lead to a general improvement in the international atmosphere.

"A step-by-step introduction of various measures could restore and later strengthen a new feeling of security of all states. The stability achieved would make possible a better solution of all problems of the present time precisely because of the certainty and security of all parties.

"It was noted that such stability does not mean the petrification of the present state of affairs, on the contrary it opens the way to positive and generally acceptable changes.

"The truth of these assertions could be demonstrated on the German problem. It has been established that there is an interdependence between the general development of the relations between the European states and the two German states. The general improvement in the relations of the European states requires a new approach in the relations between the German states.

"A final goal of these measures designed to serve European security and co-operation is the formation of a workable system of European security. It was agreed that the point of departure in this context is the present state of affairs in Europe and that the specific measures are to be studied individually, but also and primarily as components of the whole security system. "

The Working Group recommends that the study programme proposed by the Study Group on European Security should be implemented. The Study Group should be continued but to enable it to work effectively its membership should be limited, and the Study Group should be authorized to initiate specific research projects.

The Working Group agreed: that all existing European borders, including the borders between the two German states and West Berlin should be recognized; that both German states should be admitted to the United Nations; and that it would be important for European security if all states would recognize the German Democratic Republic, without prejudice to the possible future unification of the two German states.

The armaments and military budgets of both German states should be substantially reduced. All European states should sign a treaty forbidding the use of force in international relations, and should establish effective means for settling all disputes. It is in the interest of European security that as soon as a non-proliferation treaty is agreed upon, all European states, including both German states, sign and ratify it.

The Working Group recommends further study of various possibilities of co-operation between European states on economic, cultural and scientific questions. Special attention should be given to various joint research projects involving institutions of countries in both Eastern and Western Europe. This study should be based on the recommendations of the previous Pugwash Conferences.

The Working Group recommends that a conference of eminent scientists should be held to discuss problems of European security in preparation for an intergovernmental conference on this subject; and that the Study Group on European Security should be charged with preliminary work for that conference of the scientists.

Annex A: Draft Statement on Local Wars

The prevention of a global war has always been and still is the main concern of the Pugwash Movement. However, we deem it necessary to most strongly emphasize the dangers arising to mankind from local wars too, as there is a tendency to neglect it.

Fought in different parts of our world, the local wars cause death and bloodshed in a rapidly increasing measure. We are thinking of the sufferings of the population of Vietnam and the Middle East countries and in other parts of the world as well. Local wars threaten to grow into a world conflagration.

An additional menace arises from the idea irresponsibly advocated by some persons of using tactical atomic weapons in these wars. We stress that any war fought by nuclear means is a nuclear war. It would hardly be possible to stop such war spreading into a global thermonuclear conflict.

Aware of the terrible dangers constituted by local wars the governments must be bound to prevent them.

We solemnly urge the states now involved in local wars beyond their national boundaries against other states or striving by means of local wars to crush national revolutionary movements to stop these wars immediately.

We urge all states to abstain from starting such wars in the future under any pretext whatsoever.

Annex B: Draft Declaration against the use of force.

The historical praxis and a thorough factual analysis of our reality show that the most dangerous of the crises and conflicts which threaten humanity, are direct or indirect results of past and present policies from the position of strength, practised in different parts of the world through threats, intimidation, various kinds of pressure and violence. Some governments still try to resolve conflicts which are the result of such practices, through methods of this very policy.

It seems clear to us that in our time any attempts at resolving international problems through military means are bound to failure. Wars have been often used as means of settling international disputes. But whatever the rationale for the use of force might previously have been - conquest, economic gain, preservation or imposition of a way of life - nuclear weapons have made war and all policies from a position of strength completely irrational, unusable and self-defeating tools for the achievement of any of these goals. Even if we agree only on the limited premise that the survival of the human race is a worthwhile aim - then we must accept the conclusion that there is no other course than to eliminate threats and use of force from international relations. We must forever eliminate force as a method of settling international disputes and conflicts and find peaceful political, economic and social equivalents for it.

Sept 8

FINAL REPORT OF WORKING GROUP 3

Kargin

"New Approaches in Disarmament"

Introduction

In recent years progress toward substantial world disarmament has been very disappointing. The nuclear arms race continues; the U. S., U. S. S. R. and U. K. continue to expand their nuclear forces and two additional nations, France and China, have developed nuclear bombs. The world-wide build-up in conventional arms also continues. Tensions have risen in many parts of the world and local wars have occurred in several areas. Each of these has led directly to pressures for increased armament.

If we are to succeed in obtaining true disarmament, international security systems must be developed to permit local disputes to be settled short of war. International tensions must be relaxed. The U. S. and U. S. S. R., two of the largest nations, have a special responsibility to assist in these efforts.

But the press toward substantial disarmament must also continue. In view of the grave dangers from local conflicts and also from new weapons and weapons systems which may arise from modern technology, it is essential that the size and effort of our study and negotiation toward disarmament must increase greatly. Our goal is and must remain that of General and Complete Disarmament and we must greatly accelerate the world movement toward this.

2. On Local wars

The Group discussed causes of the ever growing levels of armaments. The Group believes that one of the main causes of this is the growing number and scope of local wars and intervention of great powers in them which make G. C. D. ever more difficult. Local wars destroy mutual trust between states and run counter to the basic principles of the United Nations, thus undermining the very foundation of G. C. D. The most striking and dangerous example of this is the war in Vietnam.

Apart from their grave moral and political consequences, local wars breed an ever increasing number of buyers of arms, which circumstance serves as a powerful stimulus to the manufacture of weaponry. This process is self-accelerated and stopping it is a most important step toward effecting G. C. D.

The second extremely dangerous aspect of local wars is the escalation of military effort and the types of weapons. Escalation in local wars makes each new step toward the intensification of this effort less noticeable, thus making world opinion less aware of the ever expanding scale and types of war which would have been impossible to accept had they been reached not by escalation but by a massive one-stage effort. The same is true of the production of ever more ingenious and dangerous types of weapons for which local wars serve

as proving grounds.

The Group believes that prevention and elimination of local wars constitute the most vital precondition for G. C. D.

3. BC-weapons

The Group discussed new ways to prevent the further development of biological and chemical weapons and the need to strengthen existing rules prohibiting the military use of such agents.

It was agreed, that in the present situation, groups of scientists could make a decisive contribution towards furthering these aims by presenting thoughtful analyses of the present and probable future characteristics of biological and chemical weapons, bringing forth the disastrous consequences to the world should these weapons ever be used on a large scale.

Scientists could also point out, in a forceful way, the existence of a number of loopholes in existing rules prohibiting the use of B and C weapons. It was considered that these loopholes introduced a serious risk for an escalation in the use of biological and chemical weapons. It was agreed that limited disarmament measures could be useful in helping to prevent the future development of B and C weapons, but it is important that these measures must never be pursued in such a way as to weaken the force of the Geneva Protocol and other rules of international law which prohibit the use of these weapons in war.

The Group noted that an authoritative publication on the problems of biological warfare would probably result from the efforts of the Study Group on Biological Warfare and SIPRI. It was concluded that these efforts were of an urgent nature. It was recommended that a similar approach should be taken with regard to chemical weapons and that a start could be made by assembling an international symposium, possibly under the auspices of Pugwash or SIPRI. The aim would be to assess the present situation and to prepare a monograph on the question of chemical warfare. This effort might be followed by the establishment of a Study Group on Chemical Warfare similar to that now active for Biological Warfare. Biological and chemical weapons, while different in technical aspects, should be considered by the respective Study Groups in liaison because of the many common factors involved when considered in the broad context of control and disarmament.

We have discussed the continuing activities of the Pugwash-SIPRI Study Group on Biological Warfare, and the report of the last meeting of this group which met in Marianske Lazne in May of this year. We note with satisfaction the progress being made by this group notably with respect to plans for East-West collaborative laboratory studies on detection methods, inspection procedures to determine whether development and production of such weapons are taking place, and international legal aspects of biological and chemical weapons. We endorse the activities of this study group which should go far in reducing secrecy and in promoting mutual trust between nations.

We are profoundly disturbed by reports of use of chemical weapons in Vietnam and Yemen. As stated before in the report of the 14th Pugwash Conference, held in Venice in April 1965, "the dangers to world security posed by all classes of biological and chemical

weapons are closely inter-related. Both in public opinion and in military practice it does not appear possible to maintain any lasting distinction between incapacitating and lethal weapons, or between biological and chemical warfare. The great variety of possible agents forms a continuous spectrum, starting from those that are temporarily incapacitating and ending with highly lethal ones. If the restraints on the practice of any kind of biological or chemical warfare are broken down, the entire spectrum of these weapons may come into use. "

We therefore call upon all nations to desist in the use of all chemical weapons whatsoever, whether anti-personnel or otherwise, in any conflict between nations; and to adhere to the Geneva Protocol of 1925, endorsed unanimously by the United Nations in 1966, with respect to the prohibition of the use in war of asphyxiating, poisonous or other gases and of bacteriological methods of warfare. We also urge vigorous efforts toward a formal treaty, to be signed by all nations, which would prohibit their use and in addition prohibit their dissemination.

4. Problems of disarmament related to possible new Weapons and Weapons Systems

The Group discussed the broad problem of the impact of new military technology on the arms race and on the probable need for further and perhaps different disarmament measures. Chemical and biological warfare itself includes a number of very dangerous possibilities: attacks on personnel, on animals and on crops, and the use of psychochemical weapons. There are also many possibilities for major developments in nuclear weapons systems: multiple warheads for rocket launched systems; very great increases in missile guidance accuracy; new methods for communications "blackout"; new missile defense systems. In the Group's opinion these possibilities are real and dangerous. They illustrate the fact that even the modest and uneasy stability which now exists among the great powers can one day be diminished or erased by the political impact of new scientific and technological developments. This is still another reason why efforts toward genuine disarmament must be generally increased. As an immediate Pugwash response to the dangers, the Group recommends that a small but expert Pugwash Symposium be convened soon to examine these new scientific and technological prospects in depth and to develop a monograph on their future implications to be available for wide public distribution.

In connection with this problem the Group discussed briefly a proposal for a treaty to ban military research. It recognizes that such a ban is not easily arranged and monitored but, in view of the importance of the problem, nevertheless believes that further Pugwash study of the possibility is desirable.

Of particular concern to the Group are the possibilities that the oceans of the earth and the space above it may increasingly be used for purposes of war. We recommend a study of a ban of nuclear powered submarines from the oceans or at least a monitoring of them. We recommend further a study on the question of providing a U. N. operated sonar detection system to monitor all missile-launching submarines. The Group believes that a study of this general problem as well as that of military use of space should be included in the agenda of the Pugwash Symposium recommended earlier.

Pugwash members, as scientists, have a special responsibility to study and analyse the dangers of application of science and technology to war and to assist in developing procedures for the prohibition or regulation of possible new weapons.

FINAL REPORT OF WORKING
GROUP 5

"Education, Technology and Development"

1. Resource Development and Utilization

The Working Group considered first the fundamental characteristics of the problem of world food supply. More than a fifth of the population of the poorer countries of the world is living on a near starvation diet well below their physiological needs. It was demonstrated that an annual 4% increase in the demand for food, which takes into account the increased needs on account of growth of population and also improvement in nutrition, meant an average 5.5% increase in the Gross National Product. In the case of India, for example, this involved an investment equivalent to 15%-20% of the G. N. P. The long-term need for a radical limitation of population growth was recognized; but the calculation that this, in optimum conditions, could lead only to a ten per cent reduction in demand by 1985 was accepted. If disaster is to be avoided, it is clear that immediate and dramatic action is necessary to increase food supply, primarily by improvement of yields; the extent to which this can be done by increasing the land under cultivation is limited. The following were listed as some of the essential elements in the requirement for this purpose:

Irrigation, better seeds, fertilizers, pest control, tools and machinery, transportation, storage and marketing, knowledge.

It was pointed out with regard to the last item that, whereas export crops like cocoa and rubber had been intensively studied, relatively little was really known about the production of essential food stuffs in the tropics. The problem was not one of transferring technology nor in itself exclusively technological; there are religious, economic and social factors. The need for local studies over a period of years by specialist experts actually residing on the spot in particular regions was reiterated. The success in the development of Mexican wheat, which in twenty years had converted Mexico from an importer into an exporter of grain, was mentioned as an example of what might be achieved. The need for a large increase in the number of agricultural scientists was emphasized. For this it would be necessary to create specialized agricultural universities which could work on the problems of particular developing countries.

The problem of food is not one which can be solved easily in a year or a few years. The solution will involve realistic, long-term continued joint efforts on the part of the developed and developing nations for a quarter of a century; the scale is one which has never before been tackled. Major concern on the part of the educated people in the developed countries is needed.

The Working Group took note of a report entitled "Increasing

the Production and Use of Edible Protein"*** recently prepared for the Economic and Social Council of the U. N. Advisory Committee on the Application of Science and Technology for Development. This emphasized the critical importance of the protein problem in developing countries and made a series of specific proposals whereby action could be taken by the international community and also at the national level. In view of the seriousness of the food situation, and the role of protein in human nutrition, the Group felt that concerted work in this field needs the initiative and strong support of all those in a position to further the proposals made in the U. N. Advisory Committee's Report. It urges that action be initiated at an early date on the recommendations made in the Report.

A proposal*** involving the combination and integration of recent major technological advances was then discussed. These advances were the possibility of: (i) producing an abundance of cheap nuclear power, (ii) new breakthroughs in heat exchange systems which could reduce the cost of desalination, (iii) new high-current electrolytic processes for large scale production of hydrogen for nitrogen fertilizer production. There was now the possibility of cheaper water and electric power from dual purpose power plants, and the large scale production of ammonia fertilizer, which would also be made possible by these developments, provide the opportunity for a revolution in agro-industrial development. There was now the possibility of the installation of agro-industrial power complexes in desert or semi-desert fertile areas near the sea which could boost local food supplies in an unprecedented fashion and create a breakthrough in industrialization. From the viewpoint of industrial microbiology, to increase protein production and improve the nutritional value of protein, it would be desirable to attach to each large power complex a fermentation plant since the prime need in the latter was for power for aeration and agitation. It was suggested that such a project could, in the 1970's, be the equivalent of the present "moon race". It was, moreover, pointed out that such projects would be in the general interests of peace in that they would involve not only close co-operation of major powers with developed nuclear resources and agricultural practices on an industrial pattern, but of peoples in particular regions who were at present in political conflict. It was, therefore, felt that Pugwash^{should} establish as a matter of urgency a group of scientists to evaluate the ways in which nuclear power could be used to increase resources, widen the alternatives for resource development, and lead to peaceful international co-operation in such areas as the Middle East, the Gujerat peninsula and the Ganges - Brahmaputra Valley. The study group should consist at least of representatives of the leading countries in the field of the utilization of nuclear power, namely the U. S. S. R., U. S. A., U. K. and France - and of those countries which would benefit from such schemes - the Arab countries, Israel, India and Pakistan; it should be arranged in consultation with F. A. O., I. A. E. A. and U. N. D. P. representatives.

*** Increasing the Production and Use of Edible Protein. Feeding the expanding world population: recommendations for international action to avert the impending protein crisis. United Nations Economic and Social Council E/4343, 25 May 1967 (available from the Office of Director for Science and Technology, United Nations, New York).

*** A. Weinberg: The Agro-Industrial Complex as an Instrument of International Understanding. Paper submitted to Conference XVII-66.

The Group should include not only all the relevant technical experts but social scientists to examine the utilization of the resources so developed and the whole effect on the local economies and communities.

The Working Group felt that the initiation of such a project would, if successfully carried out and publicized, form a basis and example for such developments relating to other areas of the world.

2. The Problem of the "Brain Drain"

The migration of scientists, engineers, doctors and technologists from one country to another is part of a natural sociological phenomenon. Over the past decade this migration has become a steady stream of scientific and technical manpower from the less developed to the more developed countries, constituting a serious drain on the resources of a large number of countries, primarily the developing nations but including even developed countries such as Britain and Germany. Some members of the Working Group expressed deep concern over this problem and felt that the financial and manpower losses were indeed very serious for the developing nations and the magnitude was increasing rapidly with time. They felt that this should not be allowed to continue unchecked.

The Working Group were of the view that it is not possible to give at present for all countries precise figures concerning the magnitude of the "brain drain". It felt that all countries should maintain a continuous record of the outflow and inflow of qualified scientists, engineers and doctors, and commends the international study now being made of this problem. Many of the Group were of the view that forms of legal control or restriction, which affect the freedom of individuals to live and work where they please, should not be employed to deal with this problem, since such restrictions and controls have their own built-in serious and undesirable characteristics.

The Working Group agreed that an important reason for the brain drain was that scientists and technologists were not provided suitable employment, facilities and opportunities for work commensurate with their training, qualifications and merit in their own countries and had to migrate to find them elsewhere. The main responsibility for creating conditions to cut down migration rests on the countries of origin: a view was also expressed that a major responsibility lies with the developed recipient countries. The Group recommends:

(a) Each country should endeavour to make the fullest use of its own trained scientists and engineers. It must ensure that their work is adequately rewarded, bearing in mind the existence of an international market for their services. Care should be taken to produce trained men in fields where their employment is most needed in their own countries.

(b) Each country should try to maintain contact with its migrant scientists and engineers and take all possible steps to facilitate return to the home country, to responsible and challenging posts. In this connection it would be advantageous to arrange for temporary migrants to be interviewed by several potential employers before they leave their home country. A man is less likely to emigrate permanently, if he knows at first hand of the opportunities and needs in his own country.

(c) Each government should endeavour to promote confidence in the scientific and technological future of its country by giving financial incentives to technological innovation, by industry and by giving generous financial support to those education and research institutions on which its technological future depends.

(d) The more highly developed countries should plan to have an excess of scientists, engineers and physicians in order to export some to the developing countries

It was pointed out that the developing countries should note that there is a pernicious loss of trained technical manpower when personnel are employed in a manner in which their training and qualifications are not utilized; the magnitude of this can indeed be serious but pass unnoticed.

The Working Group felt that in the case of scientists working in sophisticated fields it would be desirable to have a system of dual appointments. This would enable a scientist who spends time in his home country to assist in its development, to spend appropriate time periods abroad in a different challenging and invigorating atmosphere to enable him to remain active and fresh. It would be further desirable to enable appropriate exchanges of staff through bilateral fraternal relationships between institutions of higher learning in the developing and advanced countries and through the establishment of Centres of Excellence (see 3(c) further on) - in the developing countries. Such an arrangement would on the one hand prevent the loss of scientific "elite" from the developing nations, and on the other hand bring such an elite from the advanced to the developing nations.

3. Educational Systems and Research in Developing Countries

The Working Group considered aspects of the development of higher education and wishes to emphasize the need in all countries for an integrated and properly planned educational system, which relates the output of trained manpower to demand and which is appropriate to the cultural, climatic and other conditions of the country concerned. Particular attention was paid to the need for a balance, in particular the training of adequate technicians to support the advanced scientific and technological effort and the training of teachers. A system of community colleges for technical training in industry and agriculture was seen to have advantages. It was pointed out that local technical institutes did exist in several countries: reference was also made to the spare-time colleges and universities organized by the Chinese which are somewhat like community colleges and means to upgrade the education of workers. The rapid integrated development of higher education and science in Kazakhstan was noted from which many lessons might be drawn. The importance of catering for essentially rural communities was stressed and the need for assistance from developed countries at this level as well as in the universities was mentioned. A great effort must be made to give applied science at least equal prestige status with other subjects in the developing nations. The suggestion was made that to some extent many educational systems in recently independent countries had inherited weaknesses from Europe, but it was stressed that the initiative for change and adaptation must come from them and not from the developed countries themselves. It was pointed out that developing nations should give priority to efforts in directions which have

direct economic impact or where by virtue of climatic, geographic, or other reasons they have special advantages to offer.

A number of specific suggestions are listed below concerning areas in which Pugwash might stimulate collaboration between the developed countries and provide a valuable supplement to organizations like UNESCO and other U. N. agencies.

(a) Educational Technology

It is strongly urged that support be given to international projects examining all the implications and means of applying to education new technological developments. This consideration should include the use of satellite communications as well as the cheap manufacture, evaluation, distribution and development of teaching aids.

(b) Educational Planning

Discussion revealed an urgent need for the assembly of detailed case studies of the development of educational systems including such matters as the phasing and interrelation of the input into the different levels of education and the priority assigned to education relative to other sectors. It was felt that there was much successful experience and some failures from which developing countries would like to draw in making their own plans. The task of assembling such materials could be devolved upon a Working Group at Pugwash conferences from time to time.

(c) Centres of Excellence**

The establishment of "centres of Excellence" for research within or without existing universities is a matter of great interest to some developing countries and has been productive of outstanding scientific and economic results, for instance, in Mexico. A special feature of such "centres of excellence" in developing countries, who lack an adequate supply of highly trained scientists, is partial staffing through an international cadre of post-doctoral fellows emanating from the more developed countries who would spend 1-2 years each in such centres. The participation on a part-time basis of eminent scientists from developing countries was also envisaged. The difficulties lie in the relating of the appropriate discipline to the particular region and it may be that Pugwash could provide channels by which the necessary contacts could be made. Consideration could be given to the establishment of small panels of leading scientists who would be willing to advise the authorities in developing countries on the appropriateness of their area for such a development and to suggest means of putting it into effect.

(d) Research Organization

A separate study should be made of the problems of the organization and development of scientific research in developing countries so that local scientists might have an international document for reference and guidance when advising their own governments on this matter.

** Djerassi - The Problem of Establishing Centres of Excellence for Basic Research in Developing Countries - Paper submitted to Conference XvII-7.

5. 4. Recommendations of Earlier Conferences

The Working Group briefly re-examined the main conclusions of the Udaipur and Addis Ababa Conferences with regard to the subjects under discussion. Though clearly some progress has been made with the realization of certain of the recommendations, it is felt to be of great importance to reiterate these proposals and urge continued interest in them. The financial and manpower support of scientific and technological development in the poorer countries is of paramount importance. Research councils, academies and institutes require programmes of exchange of academic personnel at high intensity if they are to be successful. The need on the part of scientific societies and other institutions in the developed countries to establish committees on scientific and technical development with a view to providing assistance to developing countries has been recognized in some countries but is largely neglected in many others.

Specific recommendations made at these earlier conferences included: the establishment under U. N. auspices of an Institute of Resources Analysis, of a W. H. O. research centre with local field stations, suggestions for international co-operation in the survey and development of the Nile waters and of the Ganges - Brahmaputra river basins; some prospect of action in the latter case now exists. The attention both of local scientists and of the international community is drawn to their responsibility for sustaining regional interest in these propositions.

Proposals for the establishment of an International Peace Corps and for the assignment to the U. N. of revenue derived from the lease of rights to exploit the resources of the ocean bed and from the establishment of satellite communications were also made and deserve to be urgently pursued.

The tendency for important proposals to lapse between conferences and subsequently to be repeated reflects the urgent need to find effective channels of advocacy. It is not only a question of securing and maintaining the interest of national governments, but of establishing more definite relationships with the international agencies which have some hope of mobilizing the resources for the realization of major projects. It is felt not only that organizations like UNESCO would welcome suggestions from Pugwash, but that Pugwash can discuss issues which are for the time being politically difficult for international organizations in which governments are directly represented. It is also felt that the chances of Pugwash effectiveness would be greatly enhanced if participants in its discussions included a much greater proportion of applied scientists and technologists especially engineers of all relevant categories. In this way the proper emphasis on technical education and development might be better achieved.

4. 5. Multilateral and Bilateral Aspects of Technical Assistance Programmes and Transfer of Technology

Most technical assistance has been conducted under the belief that the task was simply to transfer knowledge and this demanded mainly advice and training. We now know that in many fields the developed countries have little technology to transfer, and in fact the needed technology does not exist. A new kind of technical assistance**

**R. Revelle - "On Technical Assistance of the Second Kind" Paper XVII-59.

is called for, based on co-operation between specialists in developing and developed countries working together and learning together how to solve problems for which, at present, there are no answers. New technologies must be discovered and new experiences gained, through research, experimentation and education. This can be accomplished only if research and teaching institutions in the developed countries become deeply and fully involved with their counterparts in the developing countries over decades and generations rather than years.

In this kind of technical assistance, both multilateral and bilateral modes of action are needed. The issue is not to choose between them, but to find ways in which each can be made most useful. The international agencies should play a central role in the first stages, those of formulation and analysis of the problems. Much of the planning, co-ordination and assignment of responsibility for assistance can be multilateral; but actual technical assistance based on relationships between institutions in developing and developed nations should probably be bilateral.

In many industrial fields, the needed technology does exist and can be transferred from an industrial enterprise in a developed country to a similar enterprise in an underdeveloped nation. Here also, a combination of multilateral and bilateral action may be desirable. Very often, transfer of such technology will involve appropriate licensing agreements and this could be arranged and facilitated by a United Nations Agency; the government of the developed country having the enterprise which possesses the technology could appropriately pay the licensing fees.

Consideration of the roles and interaction of multilateral and bilateral technical assistance programmes would seem to be particularly appropriate for Pugwash and we recommend that a study of these questions be the subject of a Working Conference.

17th Pugwash Conference on Science and World Affairs

Ronneby, Sweden, 3-8 September 1967

FINAL REPORT OF WORKING GROUP 7

"Current Conflicts and their Resolution"

The Group agreed that all so-called current conflicts are dangerous, entail the possibility of a thermo-nuclear war, and cause a tremendous amount of suffering.

1) The first point on the agenda was the Vietnam conflict.

On that subject a very wide and open discussion took place. Two main currents of opinion appeared. Some members felt that a guarantee of national independence should be provided to the countries of South-East Asia, otherwise a situation such as that which made the Vietnam war acceptable at its beginning to many U.S. citizens will probably arise again. Some members condemned the aggressive war conducted in Vietnam by the U.S.A., and were in favour of an immediate withdrawal of American troops from Vietnam. Some members drew attention to the necessity of giving asylum to all those who may feel threatened by a peace settlement.

A long discussion took place on the process of withdrawal of foreign troops, on the elections which would follow this withdrawal and its supervision.

The Group urges that a message be sent on behalf of the Conference to the President of the U.S.A., and to the Heads of State which are engaged in the Vietnam war.

The following draft was adopted:

"Taking into account the long suffering of the population of Vietnam and the risks of extension of the war, the 17th Pugwash Conference feel it necessary:

- (a) That the bombing of North Vietnam be stopped immediately and unconditionally.
- (b) That, following that cessation, negotiations should begin without any delay between all interested parties, including the F.L.N., to realize a cease-fire and to organize the withdrawal of all foreign troops, both under safeguards accepted by all parties.
- (c) That, subsequently a conference be convened to re-establish a stable peace in South-East Asia."

Some members expressed the thought that the Pugwash Movement should also call upon the allies of all the participants to use their influence to urge their governments to accept these points.

2) The second point on the agenda was the Israeli/Arab conflict.

A long and passionate discussion took place. No solution of this problem was agreed upon.

Some members thought that the situation has also long term aspects that cannot be handled politically in the situation existing today. We strongly call upon scientists, politicians and others, in the region as well as outside, to come together and discuss the problems of future relations between all the states existing in the area, on a basis of equality and mutual respect. We feel that such plans, if sufficiently detailed, could provide a basis not only for political action in the future, but also for diplomatic activity today.

3) The third point on the agenda was on some problems in Africa.

The view was expressed that we stand for the cause of national independence and democratic government in southern Africa. The movement towards democratic governments in southern Africa has been slowed down and even retrogressed in the twenty months since Pugwash met at Addis Ababa. Facts show the enhanced power of the Portuguese forces in Angola and Mozambique and the military establishments of Rhodesia and South Africa. Intensified military and economic co-operation within the white redoubt poses a great obstacle to change. At the same time the efforts of the OAU have been handicapped by internal problems besetting some of its strongest members.

Consequently, a pattern has developed of ever stronger statements of the need for action to liberate southern Africa. There is a contradiction between the understandably impassioned speeches at the United Nations and the failure to implement steps towards change. All great Powers should do much more to implement UN principles in Africa.

In a desire to enhance prospects for ensuring national independence and democratic government in Angola, Mozambique and within southern Africa generally, we call upon our African friends to make suggestions as to what is now practicable, and enter into a serious new dialogue for immediate steps towards strengthening the struggle against racialism.

At the same time we most urgently call upon the major powers to listen with greater care and to respond more concretely to the African suggestions advanced within and without the United Nations and the call for action, small or large, towards just societies for all peoples, whatever their race, religion or national origin, within southern Africa.

Among the practical steps that can be carried out even in the present very difficult situation we would like to call attention to:

1. A massive scholarship programme for African students from these areas. We have in mind programmes involving not only

thousands but tens of thousands of students, to be given the education abroad that they have been denied in their countries. Such programmes should be launched not only with a view to forming the specialists that will be able to govern the countries adequately when they attain their independence, but also with a view to supplying the liberation movements today with technical and organizational knowledge and abilities that are strongly needed in the struggle and for the post independence period.

2. Increased flow of strictly factual information about the situation in southern Africa, about conditions in prisons and detention camps, widely disseminated so as to increase world pressure on the present governments in the area.

3. We call upon and encourage the International Red Cross to investigate and report on detention conditions in southern Africa.

Some members expressed the ^{view} that we should help with all possible means the armed fight of those people who are engaged in war for their liberty and national independence.

4) The fourth point was on the situation in Nigeria.

Some members expressed the views that we deeply regret and deplore the tragic events in Nigeria with the murder of some 30,000 people in the past two years and the suffering of over two million refugees in the country, and regret the supply of arms to both Federal and Biafran forces at a time when peace was in prospect. We call upon Nigerian scientists from both the Federal Government and Biafra, many of whom know each other very well and have co-operated together for many years, to exercise their personal influence to bring about a cessation of hostilities, and appreciate the efforts they are already making towards achieving this goal.

*It: Joz - R No change
Rilliensther - R settlement of pol. problems for
Loup - ad 4) re - draft
Morgenstern - §3, p.1. - §1, p.2*

POST- UND TELEGRAPHENVERWALTUNG

Dienstliche Vermerke:

Telegramm

Gattungsbezeichnung _____

Ankunft / Durchgang

TF05357-360KIRCHBERG =

= GERTRUD SZILARD

HOTEL TYROLERHOF

6365/KIRCHBERG KITZBUEHL

Aufgenommen
01173 TZST WIEN

am 16 um 1730

durch *U*

Arbpl. _____



Aufgabeamt Aufgabennummer Wortanzahl Aufgabedatum Aufgabezeit

STOCKHOLM 30332 11 16 1614 =

Zugemittelt

an _____

am _____ um _____

durch _____

Arbpl. _____

Gebührenfreie Dienstvermerke

= ROOM RESERVED RONNEBY BJOERNERSTEDT

COL TF05357-360KIRCHBERG SZILARD 6365/ BJOERNERSTEDT

CONTINUING COMMITTEE
OF THE
PUGWASH CONFERENCES ON SCIENCE AND WORLD AFFAIRS

Secretary-General: Professor J. ROTBLAT

Chairman: The Earl Russell

Telegraphic Address: Pugwash, London

Members:

Prof. E. Amaldi; Academician L. A. Artsimovitch; Prof. Bernard Feld;
Prof. Bentley Glass; Prof. L. Infeld; Academician V. M. Khvostov;
Academician I. Malek; Dr. H. Marcovitch; Academician M. D. Millionshchikov;
Prof. R. E. Peierls; Prof. C. F. Powell; Prof. Eugene Rabinowitch;
Prof. V. Sarabhai.
Assistant Secretary-General: Dr. Patricia J. Lindop

8 ASMARA ROAD,
LONDON, N.W.2.

HAMPstead 1471

3rd August 1967

Mrs. Trude Szilard,
Hotel Tyrolerhof,
6365 KIRCHBERG BEI KITZBUEHEL,
Tirol,
Austria.

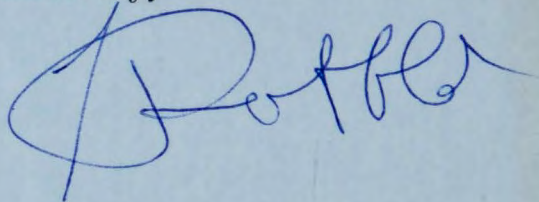
Dear Mrs. Szilard,

Thank you very much for your letter of 31st July. We shall certainly be very glad to have you with us at the Ronneby Conference. There will be many scientists who knew Leo intimately and who shared many of his views, and I am sure that you will find the Conference very interesting.

I enclose some information concerning the Conference. I am informing the Stockholm office and they will send you information about the place, accommodation, etc.

I look forward to seeing you.

Yours sincerely,



Aug 11 -
written - no info from
Stockholm
Kaplan after 20.

Aug 14 - re Sweden
res. quest. group 4, or 3

Ronneby Sweden

Address:
Sveavägen 166
Fack
Stockholm 23

Telephone: 34 19 39
Cable: Pugwashsweden,
Stockholm
July 18, 1967.

*Envelope dated
Aug 11
rec. Aug 14*

Dear Conference Participant,

Referring to previous correspondence we give you below final information on the transportation facilities that are available for those arriving in Sweden on September 2 or 3.

A. Arrival in Malmö via Copenhagen

On Saturday, September 2 a complimentary bus service will operate between Malmö Central Railway Station/Bulltofta Airport and Ronneby.

Buses leave the Central Station at 12 noon, 3, 4.30, 6, 7.30 and 9 p.m. Passengers will be picked up at the airport 5 minutes later.

RESO transfer guides wearing "Pugwash" signs will assist the conference members.

We kindly ask you to check with your travel agency whether you can take advantage of this transfer service. The Central Station is located at the harbour where the boats from Copenhagen arrive.

As Sweden will change from left into right hand traffic during the night of September 3, several restrictions will make road transportation inconvenient after 11 p.m. on September 2. We therefore recommend those arriving in Sweden after 9 p.m. on September 2 or on September 3 to go from Malmö to Ronneby by train (about 3 hours' ride).

There are three daily connections, at 7.15 a.m., 2.45 and 6.52 p.m.

B. Arrival in Stockholm

Trains from Stockholm:

7.25 a.m. 8.15 a.m.^{x)} 10.50 a.m. 1.30 p.m. 4.35 p.m.

Arriving at Ronneby:

2.15 p.m. 5.05 p.m. 6.51 p.m. 9.45 p.m. 11.27 p.m.

x) on September 2 only

*(p.u.)
Real
2:35
2:15
3:50*

17TH PUGWASH CONFERENCE ON SCIENCE AND WORLD AFFAIRS

Ronneby Sweden

Address:
Sveavägen 166
Fack
Stockholm 23

Telephone: 34 19 39
Cable: Pugwashsweden,
Stockholm

May 2, 1967.

Dear Conference Participant,

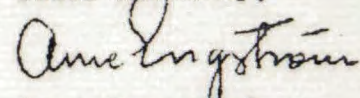
The Swedish Organizing Committee for the 17th Pugwash Conference welcomes you to the Conference. For many reasons we look forward to this meeting and expect that it may lead to important results. This is a feeling shared not only by the scientists but also by the politicians in Sweden. It is therefore significant that our Prime Minister, Mr. Tage Erlander, will open the Conference.

The 3rd of September is an important date also for another reason. Between 4.50 and 5.00 a.m. Sweden changes over from left hand to right hand traffic. You may therefore have the opportunity to observe at close hand what may be termed a very large experiment. In connection with the change-over there are some traffic restrictions but we do not expect that this will in any serious way affect your visit to Ronneby.

Enclosed you will find information about the Conference, a pamphlet describing Ronneby Brunn and a questionnaire that should be returned to us before July 15, 1967. We ask you to return this questionnaire at your earliest convenience and to bring the other material when coming to Ronneby. Additional information will be sent out in the beginning of August. In the meantime, should you want our help, please write using the address given in the letter-head.

With kindest regards,

Yours sincerely,



(Arne Engström)
Professor

Input July 25
Rec. u 29

17th PUGWASH CONFERENCE

GENERAL INFORMATION

Site of the Conference

The Conference will be held at Ronneby Brunn, Ronneby, Sweden, between September 3rd and September 8th, 1967.

Ronneby Brunn - once a spa, today a tourist centre - is a comfortable hotel of high standard. The rooms are located partly in the main building, partly in villas in the surrounding park. It has a very good restaurant and a bar, and all the sessions of the conference will be held within the hotel.

Golf, tennis, fishing, riding, walking, sailing, swimming in the olympic-sized swimming-pool (water is temperate) - almost any kind of recreation facilities you want will be provided.

Ronneby is easy to reach - by railway, air, bus or car.



Participation

Conference members are kindly requested to notify the Swedish Organizing Committee of their intention to take part in the Conference by returning the enclosed registration form to the 17th Pugwash Conference, Fack, Stockholm 23 by no later than July 15, 1967. If not, the committee will not be able to secure accommodations.

Family members

The Organizing Committee welcomes family members of the participants. The cost of board and lodging - bed in double room and 3 meals a day - will be Sw.Crs 50:- per day. Children under 15 will get a 50% reduction, provided they share room with their parents.

Costs for family members are to be paid at the cashier's office at Ronneby during the Conference.

Transfer service Malmö-Ronneby on September 2nd

To facilitate the transportation between Malmö and Ronneby on September 2nd, the Organizing Committee will provide bus transfer as below:

Buses will leave Malmö harbour and Malmö airport for direct ride to Ronneby (abt 2½ hours). Further information (hours of departure etc.) will be circulated after July 15th to all those who have sent in their registration forms.

Please observe, however, that air passengers wanting to use this service, should book their flights to Malmö via Copenhagen.

In this connection we also want to stress the fact that on September 3, Sweden will change into right hand traffic.

We are aware that certain difficulties will occur and recommend that members pay attention to the information that will be circulated.

Registration

The Conference Bureau will be open for registration on Saturday, September 2nd between 10 a m and 11 p m and on Sunday, September 3rd between 8 a m and 7 p m. The Bureau will operate as Information Bureau during the Conference week.

Accommodation

Accommodation will be provided partly in the main building, partly in the villas. The Organizing Committee, in cooperation with the International Committee, will make the distribution of the participants, trying to make as good arrangements as ever possible.

Tourist programme

During the week a special tourist programme will be offered to the family members. Tours will be arranged e g to the glass works district in Southern Sweden. Further details on this programme will be available on registration.

Conference excursion

On Thursday, September 7th, the afternoon is free. Participants and family members may join the conference excursion. Details to be given on registration.

Banquet

In the evening of Thursday, September 7, the Swedish Pugwash Committee invites the participants and family members to a Conference banquet.

Interpretation

The Conference languages will be English and Russian. During plenary sessions simultaneous interpretation service will be provided.

Transportation Ronneby - Malmö on September 9

On September 9 a half-day excursion will be arranged from Ronneby to Malmö, going by bus through the province of Skåne. Visits will be made to some of the well-known castles. Arrival in Malmö at 1 p m.

Further information on this tour will be given after July 15th.

Those wanting to leave for Stockholm or Copenhagen immediately after the closing of the Conference on Friday, September 8th, have good rail connections (e g leave Ronneby at 6,33 p m, arrive Malmö 9,39 p m, Copenhagen before midnight). For Stockholm there is also an evening connection by air.

Travel Bureau

RESO Travel Bureau will operate a branch office at the hotel to take care of all kind of travel arrangements.

Bank

AB Svenska Handelsbanken will operate a service counter at the hotel for the convenience of the participants.

Post

The Post Office at Ronneby will use a special cancellation mark of the Conference for all mail sent from the hotel.

Cable address

Pugwashsweden

Telephone

Stockholm 34 19 39

Mailing address

17th Pugwash Conference, Fack, Stockholm 23.

Organizing Committee

Professor Arne Engström, Chairman
Docent Rolf Björnerstedt, Secretary
Mr. Jan Prawitz, Press Officer
Professor Hannes Alfvén
Director General Martin Fehrm
Professor Carl-Göran Hedén

PUGWASH CONTINUING COMMITTEE

8, Asmara Road, London, N. W. 2.

Secretary-General: Professor J. Rotblat

20 June 1967

17th Pugwash Conference on Science and World Affairs

Ronneby, Sweden, 3-8 September 1967

Here is some further information concerning the Conference:

1. Topics for Working Groups.

At its last meeting the Continuing Committee approved the provisional programme and list of topics for working groups which I sent to you some time ago, with the following modifications:

(i) Attention of participants is drawn to the importance of topic 3 (a) "Methods of eliminating the development and use of biological and chemical weapons". A report of the Pugwash Study Group on Biological Warfare relating to this topic will be circulated in the near future.

(ii) The problem of food will be included among the topics for discussion. This will come mainly under Working Group 4 in conjunction with co-operative programmes, but will also be discussed in Working Group 5 in relation to developing countries.

(iii) A seventh Working Group was added on the following topic:

"7. Current conflicts and their resolution, e. g. Vietnam.
Procedures for resolution of developing conflicts."

If you wish to be allocated to this Group, please let me know as soon as possible.

N. B. If you have not returned your questionnaire, please do so immediately, together with abstracts of papers you wish to submit.

2. Symposia at Plenary Sessions.

The following participants were invited and have accepted to give the keynote papers at the plenary sessions:

Symposium I "Arms Control, Peacekeeping and Security"

Academician M. D. Millionshchikov

Professor V. A. Sarabhai

Professor J. B. Wiesner

Symposium II "New Approaches in Disarmament"

Academician L. A. Artsimovitch
Sir John Cockcroft
Mrs. Alva Myrdal

Symposium III "International Co-operation and Development"

Professor Harrison Brown
Professor R. V. Garcia
Academician I. Malek

We hope to circulate all these papers well before the Conference.

3. Papers.

This is to remind you that papers should be sent in not later than July 1st. It is our intention to circulate all papers before the Conference, and it will be very difficult to do this if papers are sent in later.

Papers should not exceed ten pages of typescript and should be in either English or Russian, which are the only official languages of the Conferences. I regret that we have no facilities for translation from other languages.

4. Future Activities.

The Ronneby Conference will be asked to decide on the future activities and organization of Pugwash. For this purpose standing committees will be set up on the first day of the Conference to prepare reports for discussion at the plenary sessions on the last day. However, the Continuing Committee felt that the matter should be given some thought well before the Conference, and we are asking a few participants to meet and discuss this issue before Ronneby. All participants in the Conference are invited to send to me their ideas about the future activities and organization of Pugwash.

5. History of Pugwash.

The book "Pugwash: a History of the Conferences on Science and World Affairs", is now ready and will be despatched to you from Prague during the next few days. This book will also be on sale to the public in October, when it will be published by Heinemann Educational Books Ltd.

6. Administrative Notices.

You have already received, and will probably receive some more, administrative notices both from the Central Office in London and from the Organizing Committee in Stockholm. In order to avoid confusion, here is the division of responsibilities: all matters concerning invitations to participate, programme, working groups, abstracts and papers should be addressed to me; matters concerning travel, accommodation for families, tours etc. should be addressed to: 17th Pugwash Conference, Fack, Stockholm 23, Sweden.

Yours sincerely,

TRobbt

On September 2 there is also a night train leaving Stockholm at 11.30 p. m. , arriving at Ronneby at 10.10 a. m.

Air connections from Stockholm on September 2 at 6.30, 9.40 a. m. and at 6.30 p. m. On September 3 at 12.35, and 6.30 p. m.

Tickets can be booked at your travel agency when arranging your trip to Sweden.

C. Visa for Sweden

The Organizing Committee has informed the Swedish Embassies in those countries that have visa arrangements with Sweden of the names of participants from that country. If you need a visa to go to Sweden you are therefore asked to contact the Swedish Embassy in your country as soon as possible.

D. Registration form

You will find enclosed a registration form for the conference. In case you have already completed and returned the previous form you need not return this one unless you now have more definite information about your time of arrival in Malmö. Many participants, however, have still not returned the questionnaire and they are urgently asked to do so in order to make possible an effective organization of the conference.

*Sent Aug 14
ARRIVAL Air or railway, Malmö
Sept 2, p.m.*

*Kirchberg until 19.
Kaplan from 20.*

E. Dietary requirements

In case you have special dietary requirements we would appreciate that you let us know in advance. We would then be able to arrange with the conference hotel that your requirements are met.

F. The switch to right hand traffic

Enclosed you will also find information about the switch to right hand traffic in the morning of September 3. Particularly if you plan to come to Sweden by car you should study this pamphlet carefully.

Yours sincerely,

Rolf Björnerstedt
(Rolf Björnerstedt)

T

THE AGRO-INDUSTRIAL COMPLEX AS AN
INSTRUMENT OF INTERNATIONAL UNDERSTANDING¹

Alvin M. Weinberg

Recent developments in the technology of nuclear power, in the growing of new, high yield wheat and rice, and in the technique of large scale desalting, have opened the possibility of combining these three breakthroughs into instruments for helping develop countries and removing economic want as a source of international tension. What is conceived are "nuclear powered agro-industrial complexes" located in coastal desert areas. These complexes would cluster around very large nuclear reactors and desalting plants; associated with the complex would be large integrated chemical industry, and, where the soil is available, highly rationalized farms or "food factories". Many suggestions for such complexes have been made in the past, particularly at the Pugwash meeting in Udaipur. The most recent suggestion, which has received considerable attention in the United States, was put forward by former President Eisenhower. He visualizes three such complexes producing power, water, and possibly chemicals, located in the Middle East, and providing an economic and agricultural base for the rehabilitation of the Arab refugees. The purpose of this memorandum is to set forth the technical basis for such proposals as the Eisenhower plan, and to speculate on the possibilities of its implementation.

The Technical Basis for the Agro-Industrial Complex

A most important gain has been achieved in nuclear power, especially nuclear power based upon very large pressurized or boiling water reactors. In the United States, some 40 million kilowatts of nuclear reactors are now under construction or have been firmly committed. The capital cost of these reactors reached the very low figure of \$100 per kilowatt last year, but has since risen. It is now

¹For presentation before the 17th Conference on Science and World Affairs, Ronneby, Sweden (September 3-8, 1967).

estimated that a 1000 Mw water reactor can be bought in the United States for about \$135 per kilowatt. This figure does not include the initial inventory of fuel (which may amount to around 30 million dollars) since this cost is included in the fuel cycle cost. Estimates of fuel cycle costs run around 1.2 to 1.5 mills per kwh; the total cost per kwh of electricity from 1000 Mw plants ranges now from a low of 2.4 mills per kwh (Brown's Ferry No. 1 and No. 2 plants of TVA) to perhaps 4 to 4.5 mills per kwh for reactors that are privately financed. Reactors built in underdeveloped, new areas undoubtedly would be more expensive; one would be very safe to estimate their cost at twice the U.S. cost.

Important advances in desalting technology, such as the use of fluted tubes and multi-level construction, suggest that an evaporator capable of producing 400 million gallons of water would cost as little as 30¢ per daily gallon. I would estimate that such evaporators could be built by 1975. The cost of water from a dual purpose power and water system producing, say 600 Mw electricity and 400 million gallons of water per day, might come to around 15¢ per 1000 gallons at the plant, with the power going for perhaps 3 to 4 mills per kwh. These figures are based on public financing, with a 7% fixed charge on the entire investment.

A third, perhaps crucial, development has been the observation of R. Philip Hammond, that by assuring good (but not the highest) recorded yields of new wheats and rices, the amount of water required to grow 2500 calories of grain can be reduced to the remarkably low figure of 150 gallons per day per person fed. This is to be contrasted with the 2000 gallon per day average requirement in most predominantly vegetable eating societies. It must be recognized that to achieve this very low water budget, the most rational agricultural practices must be exercised: Water must be applied at precisely the right time; fertilizer and

pesticides must be available; general good practice must be observed. Yet it does seem likely that Hammond's estimate is substantially correct - viz., 150 gallons per day per person. Thus, if distilled water is available in a coastal desert at 15¢ per 1000 gallons, the cost of water required to produce the food necessary to feed a man amounts to only about 2.5 cents. This figure is low enough to make such agriculture interesting to underdeveloped countries.

This coastal desert agriculture based on distilled water would require a very high degree of sophistication. It is for this reason that we would describe such farms as "food factories"; this connotes the very strong technical components required to conduct the agriculture successfully. However, the expertise could well be supplied by relatively few high level experts, in much the same way as relatively few experts have created viable petroleum refineries in underdeveloped countries with natives carrying out the bulk of the more routine labor.

Finally, there are a number of very new interesting possibilities in the production of heavy chemicals electrically. Perhaps most important is the large scale electrolysis of water with very high current density electrolytic cells. Technology developed for advanced fuel cells suggests that the current density of large electrolytic cells could be increased by as much as a factor of 10 over present practice. As a result, hydrogen from electrolysis (and thence ammonia for fertilizer) may well become a competitive source of hydrogen in many countries that do not possess sources of naphtha or methane.

The Current Middle East Plan

The proposal put forward by Mr. Eisenhower involves construction of three very large nuclear power and desalting complexes in the Middle East. Two would

be built in the Mediterranean, possibly near the Gaza Strip and the northern tip of Israel, a third on the Gulf of Aqaba. The three plants would produce around 1 billion gallons of water per day; this represents more than the total flow of the Jordan River and its tributaries. The amount of by-product electrical power is rather flexible, but probably would range around 2 million kilowatts. Most of this electricity would be used in the chemical industry clustered around the energy source.

It is difficult to estimate the cost of such a complex. Leaving out the chemical industry, but including desalting and electrical generation capacity, I would estimate the cost of the three installations as lying between one and two billion dollars. The water produced from the complex would be capable of feeding about five million people, assuming that 200, rather than 150, gallons is required to feed one person each day.

The financing of such a plan is of course a key question. The Middle East Plan visualizes establishing a stock company which would be subscribed to by individuals and governments. Thus all the capital raised for the venture would be equity capital rather than borrowed capital. This greatly reduces the pressure for an immediate return on investment, and increases the apparent economic feasibility of the proposal.

General Observations

Several general comments might be made on the use of nuclear powered agro-industrial complexes:

1. The technology is almost surely at hand - that is, this is not a case of using tomorrow's technology to solve today's problems. If we decided today to go ahead, the first large scale plant could be built by about 1975.

2. With future developments in both desalting and reactor technology, one can expect capital costs and operating costs to fall. I am confident that by about 1980 to 1985 desalted water from the sea could be achieved at less than 10¢ per 1000 gallons, with by-product power going for 2 mills per kwh or less.

3. The Eisenhower plan envisages employment of refugees for building the original plants and then, after the plants are built, employment of refugees as agricultural and eventually as industrial workers. The agricultural "food factories" would require expert supervisors; in general, we visualize the operation to be rather analogous to the famous Gezira cotton growing scheme in the Sudan.

4. There is no fundamental reason why the project should not involve many countries - for example, the U.S. might provide the reactors, the U.S.S.R. and U.K. the evaporators. Perhaps the locations of the complexes might dictate which countries supplied which components; for example, some countries might help with construction in Israel and others in the Arab states.

5. As for financing, I would visualize such projects as having some of the glamour of the space enterprise, and therefore possibly commanding public money that would not be otherwise available. One suggestion is to describe the agro-industrial complex as the "Apollo of the 70's". However, the financing of the projects should be considered from all possible points of view; no reasonable means of support should be rejected.

6. The possibility of using agro-industrial complexes in other parts of the world must also be considered. The Gujarat Peninsula in India, Sonora in Mexico, and the coastal deserts of Peru are possible sites for such complexes. Particularly attractive is the upper Ganges Basin in India. Here nuclear power

would be used not for desalting, but rather for pumping ground water during the nine months between monsoons. It has been estimated that 10 million kilowatts of electricity used to pump water from, say 2 million tube wells, and to produce ammonia, could eventually create a vast granary that might actually provide adequate food for India during the next 20 years.

August 13, 1967

GERTRUD WEISS SZILARD, M.D.
DEL CHARRO
2380 TORREY PINES ROAD
LA JOLLA, CALIFORNIA 92038

September 28, 1967

To : U.S. Members of Pugwash Continuing Committee - Prof. F.A. Long
Prof. B.T. Feld
Prof. E. Rabinowitch

Dear

When I was in New York last week I made a social telephone call to Harry Schwartz of the New York Times at his home (I got to know him and his family very well during my illness in New York last year). In chatting about my European trip, when I mentioned that I had just come from Ronneby, Harry really blew up and told me as follows :

The New York Times was never notified that the Pugwash Conference was going to take place. He would have loved to have covered it. The New York Times was not even sent a copy of the Final Statement from the Continuing Committee. The only coverage that he was aware of was an article in the New Statesman during the week of September 11. He seemed very much disturbed about this and I therefore feel that I should call it to your attention, in case it was an oversight.

I told him that I do not ^{know} anything about this, but I would assume that it was overlooked because the meeting was arranged and took place in Europe, and suggested that he get in touch with one of you. He said it was too late now, because it is no longer news.

This, of course , explains the lack of coverage in the U.S. press.

I returned to La Jolla a few days ago and I would like to tell you how very grateful I am for the privilege of attending the Conference. It was a great experience and gave me a great deal to think about, and meeting so many of Leo's old friends means that I am feeling less lost now than I felt before.

Thank you again. Best wishes,

as ever,

Room 26-409

2 October 1967

Mr. Harry Schwartz
Editorial Staff
The New York Times
New York, New York

Dear Mr. Schwartz:

I learned with dismay from Trude Szillard that you had not been kept informed of preparations for and results of the recent Pugwash Conference in Sweden. I, myself, was out of the country all of the past academic year (on sabbatical in Paris) and only returned recently, but I regret that some of the other US participants didn't think more about contacts with the news media.

In any event, even though much too late, I enclose a copy of the statement issued after the Conference, and the list of participants. If you would be interested in any other material or information, please let me know.

Yours truly,

Bernard T. Feld

Mrs. Leo Szilard
2380 Torrey Pines Road
La Jolla, Calif. 92038

September 28, 1967

Dear Joe:

Returned to La Jolla a few days ago. Romeby was the highlight of my European trip and I would like to tell you how very grateful I am for the privilege of attending the Pugwash Conference. Organizing this must have been a tremendous task for you, and I really admired the way you did it. I also enjoy very much having your book, and it helps me in straightening out the papers in Leo's Archives. And I was so moved when you flashed Leo's picture on the screen and by your succinct and lively description of his contribution.

I do hope that all will go well for you - whatever decision you will make.

FOLD SIDES OVER AND THEN FOLD BOTTOM UP
MOISTEN FLAP WELL AND APPLY PRESSURE TO SEAL

Sept 9

STATEMENT FROM THE CONTINUING COMMITTEE

The Seventeenth Pugwash Conferences on Science and World Affairs, marking the 10th Anniversary of the foundation of the Conferences, met in Ronneby, Sweden, from September 3-8 1967. It was attended by about 200 participants from more than 40 countries.

The discussions showed that there was a broad and deep concern among the participants at the gravity of the world situation. Armaments multiply and their destructive power increases. There is no progress in disarmament and nuclear weapons are spreading. Radical new weapons are continually developed. Local wars break out, devastating the populations involved, and threatening escalation into major conflicts. The gap between the rich and poor countries grows wider, in nutrition, in industry, in science. Urgent and sustained efforts are necessary to avoid an impending crisis and to create the prosperous, stable and peaceful world which science has made possible.

Science and technology have brought many benefits to the world and can continue to do so in the future. But scientists must increasingly broaden their activities into still wider fields. They must put all their strength into helping to solve the many problems involved in ensuring a peaceful future. The reputation of scientists, of science itself, the future directions of our civilization, all are at stake.

It was under the spur of this sense of urgency that the 17th Pugwash Conference went about its work. To accomplish its studies the Conference divided into seven working groups and in what follows the findings of these working groups are summarized.

Problems of Disarmament

Texts of the drafts on the nuclear non-proliferation treaty submitted by the U. S. A. and U. S. S. R. to the 18-Nation Disarmament Conference were examined by one of the working groups. It was concluded that acceptance of a treaty based on these drafts

would be a major step in preventing further proliferation of nuclear weapons and in reducing the threat of nuclear war. Completion of negotiations on the treaty, in particular the resolution of differences arising with respect to Article III, dealing with the control system, and the acceptance of the treaty by all states should be accomplished at the earliest possible date.

The group examined objections to the treaty. Although it regarded objections relating to the control system as exaggerated, it believed that it would be useful to allay such fears, as far as possible, by minimizing the intrusiveness of the inspection. For the same reason, it was suggested that it would be desirable eventually to subject the peaceful nuclear facilities of the nuclear weapons states to the same inspection as ^{is} required of the non-nuclear states. The control system of the International Atomic Energy Agency, which has already been accepted by more than 90 countries, appears to be entirely adequate for the required inspection.

Because of the very great importance of early agreement on the non-proliferation treaty, it would be a mistake to make acceptance contingent on any other specific arms control or disarmament measures. It can be expected that agreement on the non-proliferation treaty would have such a profound effect on the political climate in the world that the prospects for other arms control and disarmament measures involving the nuclear powers would be improved. It would also be very helpful if, at this time, nuclear weapon states would express their willingness at least to initiate discussions and studies of other disarmament measures that might be implemented following negotiation of the nuclear non-proliferation treaty. Some examples suggested include the following: an extension of the nuclear test ban to cover underground tests; early discussion of measures to limit and reverse the arms race in both strategic offensive and ABM defence systems; a cut-off of production and reduction of stocks of fissile materials for weapons use; the establishment of nuclear free zones; and limitations on the traffic in conventional arms.

It was suggested that a useful mechanism for moving in this direction would be the undertaking of obligations by the nuclear-weapons-states not to use nuclear weapons against those states which accede to the treaty, which do not possess nuclear weapons, and which give assurance that no nuclear weapons are

located on their territories.

Other Measures towards Disarmament

In considering the problem of limiting levels of strategic nuclear weapons, it was concluded that the possibility of coupling limitations on ballistic missile defences with limitations on strategic offensive systems, should be thoroughly explored with high priority.

In considering a comprehensive test ban it was agreed that technical capabilities now exist for extending the test ban to include testing underground; the nuclear powers should be urged to undertake negotiations to this end at the earliest possible date.

Turning from the problems of arms limitation to those of disarmament, it was noted that there has been no progress toward substantial world disarmament in recent years. A serious complication has been the repeated outbreak of local wars - often fearfully damaging in themselves. Moreover by increasing international tension and weakening international security arrangements, they make negotiations towards disarmament much more difficult. An additional serious complicating factor is that military research continues to produce new or greatly improved weapons and weapons systems. These new weapons tend to accelerate the arms race and seriously complicate the search and negotiation for agreed measures of disarmament.

A treaty to ban further research on weapons of mass destruction was proposed as meriting further study, even though the problems of negotiating and monitoring such a treaty appear formidable.

It is particularly important to take all possible measures to avoid further militarization of the oceans and outer space. Internationalization of the ocean floor, with a prohibition of all military use, is an interesting possibility. A specific suggestion was to establish, under U. N. auspices, a sonar detection network to permit world-wide monitoring of all submarines capable of launching nuclear weapons.

The development and use of new and more dangerous chemical and biological weapons is one of the major problems of the coming years. Scientific and technical analyses of these weapons could increase public awareness of the dangers inherent

in them.

It is extremely important that all nations adhere strictly to the Geneva Protocol of 1925, which was unanimously endorsed by the U. N. in 1966. We therefore call on all nations to refrain, in any conflict between nations, from the use of any chemical and biological weapons whatsoever. We also urge vigorous efforts towards a formal treaty, to be signed by all nations, which would prohibit both the use of and the transfer to other nations of all chemical and biological weapons.

Prevention and Resolution of Conflicts

Working groups which considered these issues arrived at the following conclusions. International conflicts, even of a local character, are aggravated by the sharp division of the world into military blocs, leading to the danger of world-wide escalation of conflicts when these blocs become involved. It is therefore more and more important to stop existing conflicts and to find methods of preventing future ones. Even de-escalation of existing conflicts would be a step towards creating a better atmosphere in international relations. The United Nations should be universal and should be given an increasing role in settling and preventing international conflicts.

In Europe, in particular, all existing frontiers should be recognized. It would help European security if all states were to recognize the German Democratic Republic, with its present borders, and if both German states were admitted to the U. N. , all this without prejudice to their possible future ^{re-}unification. The armaments and military budgets of both German states should be substantially reduced. All European states should sign a treaty forbidding the use of force in international relations, and should establish means for settling disputes. It is in the interests of European security that, as soon as a non-proliferation treaty is agreed upon, all European states, including both German states, ratify it.

Current conflicts in Vietnam, the Near East and Africa are causes of terrible suffering and can at any moment evolve into a world-wide thermonuclear war.

As regards Vietnam, it is necessary

(a) that the bombing of North Vietnam be stopped

immediately and unconditionally;

- (b) that following that cessation, negotiations for a peaceful settlement begin without delay;
- (c) subsequently a conference be convened to establish a stable peace in all of South-East Asia.

The Middle-East conflict was the object of a long discussion, but no general agreement was reached.

In the southern part of the African continent the movement towards national independence and democratic government has been retarded and has even retrogressed. While, understandably, calls at the United Nations for action are becoming more and more impassioned, there is no sign of effective action through the United Nations, or even of full implementation of U. N. resolutions. All great powers should do much more to implement U. N. principles in Africa.

Serious concern was expressed about the tragic events in Nigeria which caused thousands of deaths and millions of refugees.

International Scientific Projects

In the discussion on international scientific projects particular attention was directed to the earlier Pugwash proposal to establish an International Science Foundation. This would permit young scientists in the developing countries to undertake research programmes for which their countries are not able to provide. Such a Foundation would help to reduce the loss of scientists from countries for which the retention of their scientifically trained youth is vital.

An appropriate U. N. organization should consider the feasibility of establishing the International Science Foundation within the framework of the U. N.

In reviewing progress of the International Biological Programme, attention was directed to its satisfactory progress in the richer countries but the failure to develop it in the poorer countries, due largely to shortage of funds. Yet, for such countries, the implementation of the Programme is particularly important; and ways to obtain the necessary support must be found.

There has been important progress in international co-operation in space research, in the development of global communications by the use of satellites, in planning for a global atmospheric research programme. It was recommended that the Meteorological Programme should be developed through a co-operative organization of several autonomous centres, one of which should be located in the Southern hemisphere.

Previous recommendations were endorsed that efforts must be made to facilitate the travel of scientists to international conferences and to increase the opportunities for scientists to work temporarily in other countries.

Development, Education and Technology

The Problem of World Food Supply was discussed. More than a fifth of the population of the poorer countries of the world is living on a near starvation diet, well below their physiological needs. Limitation of the growth of populations is essential, but will be of little help in the short run. If disaster is to be avoided, immediate action is necessary to increase food supply, primarily by improvement of crop yields.

Relatively little is known about the production of essential food stuffs in the tropics. The problem is not simply one of transferring technology nor in itself exclusively technological: there are religious, economic and social factors.

Intimately linked to the problem of increased food supply is that of rapid economic development. The developed nations can greatly help here, utilizing a combination of multilateral and bilateral modes of technical assistance. There should also be a study of methods for facilitating a transfer of technology from industrial enterprises in developed countries to similar organizations in developing countries. Intimate collaboration between scientists of developing and developed countries is essential for the success of all these programmes.

An example of a feasible and potentially very useful technical project is the creation of agro-industrial power complexes in coastal deserts or semi-desert fertile areas. These could boost regional food supplies in an unprecedented fashion and create a breakthrough in industrialization. They would be based

on large nuclear reactor systems producing cheap heat, energy and electric power for desalination of water and for fertilizer production. The economies of entire regions could be profoundly transformed by large projects of this sort.

The total supply of scientists and engineers is barely adequate for the needs. Furthermore, there is a large scale migration of scientists, engineers, and physicians especially from the developing to the developed countries. Forms of legal control or restriction of this migration are conceivable but were considered generally objectionable. The developing countries have a responsibility to match output of trained manpower more nearly to the needs of local development, and to make attractive working opportunities for their scientists and technologists. The developed countries ought to aim to produce more scientists than they need so that some could be available to work in other parts of the world.

A possible immediate step to help increase numbers of scientists and engineers in developing countries is to create a massive scholarship programme for students from these areas to be trained in developed countries and ultimately to be available for the many technical organizations and other tasks in their home countries.

Further recommendations include aid in the world development of technology; a study^{of} the application of technology (satellite communication, new methods, aids, etc.) to education; and to consider means of assisting developing countries to establish well equipped international centres of research.

Social responsibilities of scientists and the future of
Pugwash

In the face of the dangerous conflicts now raging, and the many hard long-range problems facing mankind, scientists must increase their efforts to help in the creation of a peaceful and increasingly prosperous world. Many of the dangers facing mankind are associated with the advancement of science, and their resolution depends critically on a constructive application of science and technology. In this situation, it is an evasion of responsibility when scientists withdraw complacently into their laboratories, and are indifferent to the consequences of their discoveries and the fate of mankind.

The scientists involved in the Pugwash Movement accept these responsibilities. At this 17th Conference the participants agreed to expand the Pugwash activities, by involving more scientists, engineers, and scholars, particularly those of the younger generation, in its work. It is planned to arrange, in addition to annual general conferences, symposia for a more thorough exploration of such difficult problems as disarmament, education for life in the scientific age, and development of the technologically underdeveloped parts of the world.

24 August, 1967

DRAFT TREATY ON THE
NON-PROLIFERATION OF NUCLEAR WEAPONS

The States concluding this Treaty, hereinafter referred to as the "Parties to the Treaty",

Considering the devastation that would be visited upon all mankind by a nuclear war and the consequent need to make every effort to avert the danger of such a war and to take measures to safeguard the security of peoples,

Believing that the proliferation of nuclear weapons would seriously enhance the danger of nuclear war.

In conformity with resolutions of the United Nations General Assembly calling for the conclusion of an agreement on the prevention of wider dissemination of nuclear weapons.

Undertaking to cooperate in facilitating the application of International Atomic Energy Agency safeguards on peaceful nuclear activities.

Expressing their support for research, development and other efforts to further the application, within the framework of the International Atomic Energy Agency safeguards system, of the principle of safeguarding effectively the flow of source and special fissionable materials by use of instruments and other techniques at certain strategic points.

Affirming the principle that the benefits of peaceful applications of nuclear technology, including any technological by-products which may be derived by nuclear-weapon States from the development of nuclear explosive devices, should be available for peaceful purposes to all Parties to the Treaty, whether nuclear-weapon or non-nuclear-weapon States.

Convinced that in furtherance of this principle, all Parties to this Treaty are entitled to participate in the fullest possible exchange of scientific information for, and to contribute alone or in cooperation with other States to, the further development of the applications of atomic energy for peaceful purposes.

Declaring their intention that potential benefits from any peaceful applications of nuclear explosions should be available through appropriate International procedures to non-nuclear-weapon States Party to this Treaty on a non-discriminatory basis and that the charge to such Parties for the explosive devices used should be as low as possible and

exclude any charge for research and development.

Declaring their intention to achieve at the earliest possible date the cessation of the nuclear arms race.

Urging the cooperation of all States in the attainment of this objective.

Desiring to further the easing of international tension and the strengthening of trust between States in order to facilitate the cessation of the manufacture of nuclear weapons, the liquidation of all their existing stockpiles, and the elimination from national arsenals of nuclear weapons and the means of their delivery pursuant to a treaty on general and complete disarmament under strict and effective international control.

Noting that nothing in this Treaty affects the right of any group of States to conclude regional treaties in order to assure the total absence of nuclear weapons in their respective territories.

Have agreed as follows:

ARTICLE I

Each nuclear-weapon State Party to this Treaty undertakes not to transfer to any recipient whatsoever nuclear weapons or other nuclear explosive devices or control over such weapons or explosive devices directly, or indirectly; and not in any way to assist, encourage, or induce any non-nuclear-weapon State to manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices, or control over such weapons or explosive devices.

ARTICLE II

Each non-nuclear-weapon State Party to this Treaty undertakes not to receive the transfer from any transferor whatsoever of nuclear weapons or other nuclear explosive devices or of control over such weapons or explosive devices directly, or indirectly; not to manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices; and not to seek or receive any assistance in the manufacture of nuclear weapons or other nuclear explosive devices.

ARTICLE III

(International Control)

ARTICLE IV

Nothing in this Treaty shall be interpreted as affecting the inalienable right of all the Parties to the Treaty to

develop research, production and use of nuclear energy for peaceful purposes without discrimination and in conformity with Articles I and II of this Treaty, as well as the right of the Parties to participate in the fullest possible exchange of information for, and to contribute alone or in cooperation with other States to, the further development of the applications of nuclear energy for peaceful purposes.

ARTICLE V

1. Any Party to this Treaty may propose amendments to this Treaty. The text of any proposed amendment shall be submitted to the Depositary Governments which shall circulate it to all Parties to the Treaty. Thereupon, if requested to do so by one-third or more of the Parties to the Treaty, the Depositary Governments shall convene a conference, to which they shall invite all the Parties to the Treaty, to consider such an amendment.

2. Any amendment to this Treaty must be approved by a majority of the votes of all the Parties to the Treaty, including the votes of all nuclear-weapon States Party to this Treaty and all other Parties which, on the date the amendment is circulated, are members of the Board of Governors of the International Atomic Energy Agency. The amendment shall enter into force for all Parties upon the deposit of instruments of ratification by a majority of all the Parties, including the instruments of ratification of all nuclear-weapon States Party to this Treaty and all other Parties which, on the date the amendment is circulated, are members of the Board of Governors of the International Atomic Energy Agency.

3. Five years after the entry into force of this Treaty, a conference of Parties to the Treaty shall be held in Geneva, Switzerland, in order to review the operation of this Treaty with a view to assuring that the purposes and provisions of the Treaty are being realized.

ARTICLE VI

1. This Treaty shall be open to all States for signature. Any State which does sign the Treaty before its entry into force in accordance with paragraph 3 of this Article may accede to it at any time.

2. This Treaty shall be subject to ratification by signatory States. Instruments of ratification and instruments of accession shall be deposited with the Governments of _____, which are hereby designated the Depositary Governments.

3. This Treaty shall enter into force after its ratification by all nuclear-weapon States signatory to this Treaty, and _____ other States signatory to this Treaty, and the deposit of their instruments of ratification. For

the purposes of this Treaty, a nuclear-weapon State is one which has manufactured and exploded a nuclear weapon or other nuclear explosive device prior to January 1, 1967.

4. For States whose instruments of ratification or accession are deposited subsequent to the entry into force of this Treaty, it shall enter into force on the date of the deposit of their instruments of ratification or accession.

5. The Depositary Governments shall promptly inform all signatory and acceding States of the date of each signature, the date of deposit of each instrument of ratification or of accession, the date of the entry into force of this Treaty, and the date of receipt of any requests for convening a conference or other notices.

6. This Treaty shall be registered by the Depositary Governments pursuant to Article 102 of the Charter of the United Nations.

Article VII

This Treaty shall be of unlimited duration.

Each Party shall in exercising its national sovereignty have the right to withdraw from the Treaty if it decides that extraordinary events, related to the subject matter of this Treaty, have jeopardized the supreme interests of its country. It shall give notice of such withdrawal to all other Parties to the Treaty and to the United Nations Security Council three months in advance. Such notice shall include a statement of the extraordinary events it regards as having jeopardized its supreme interests.

Article VIII

This Treaty, the English, Russian, French, Spanish and Chinese texts of which are equally authentic, shall be deposited in the archives of the Depositary Governments. Duly certified copies of this Treaty shall be transmitted by the Depositary Governments to the Governments of the signatory and acceding States.

In witness whereof the undersigned, duly authorized, have signed this Treaty.

30 August 1967

Draft Text of an Article on International Control
to be inserted in the Draft Treaty on the
Non-Proliferation of Nuclear Weapons
submitted to ENDC by Sweden

Article III

For the purpose of providing assurance that source or special fissionable material, covered by this article, shall not be diverted to nuclear weapons:

1. Each State Party to this Treaty undertakes
 - (a) not to allow source or special fissionable material, or equipment or material especially designed or prepared for the processing, use or production of special fissionable material, to be transferred to any other State unless such material and equipment are subject to the safeguards of the International Atomic Energy Agency, and
 - (b) to apply the safeguards of the International Atomic Energy Agency on all such material and equipment, transferred to its territory or territory under its jurisdiction after the entry into force of the Treaty.
2. Each non-nuclear-weapon State Party to this Treaty undertakes, in addition, to accept the full application of the safeguards of the International Atomic Energy Agency on all nuclear energy activities within its territory or territory under its jurisdiction.
3. Each nuclear-weapon State Party to this Treaty undertakes, in addition, to co-operate in facilitating the gradual application of the safeguards of the International Atomic Energy Agency on the peaceful nuclear energy activities within its territory or territory under its jurisdiction.
4. For such transfers referred to in paragraph 1 of this article, or such nuclear energy activities referred to in paragraph 2 of this article, as are regulated by bilateral or multilateral arrangements entered into before the date of the original entry into force of this Treaty, the obligations stipulated in paragraphs 1 and 2 shall be implemented as soon as practicable, but not later than three years from the date of the original entry into force of the Treaty.