



# Pugwash

NEWSLETTER

*issued by the Council of the Pugwash  
Conferences on Science and World Affairs  
Nobel Peace Prize 1995*



*The Nuclear Threat*

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# Pugwash

Volume 39 ■ Number 2  
December 2002

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1957 Nuclear Weapons Test  
US Department of Energy

# To the Pugwash Community

## Nuclear Weapons and Global Security

The opening days of 2003 witnessed a number of critical challenges to international security in general and the nuclear non-proliferation regime in particular. War in the form of a US-led attack on Iraq loomed in the Middle East as UN inspectors continued their search for weapons of mass destruction, while tensions rose on the Korean peninsula and North Korea withdrew from the Nuclear Non-Proliferation Treaty.

As much as at any time in the recent past, and certainly since the end of the Cold War, the world is perched precariously on the knife edge of the nuclear dilemma. The world's major nuclear weapons power, the US, revises its nuclear doctrine to include the possibility of nuclear pre-emption, continues efforts to develop and deploy a national missile defense, and hints at the possibility of a resumption of nuclear testing that would destroy the Comprehensive Test Ban Treaty. In South Asia, India and Pakistan are engaged in a stand-off across their common border, with little resolution in sight of the issues underlying their conflict. Israel continues to get a free ride as an undeclared nuclear-weapons state, with little prospect of a settlement to the Israeli-Palestinian conflict. And now, nuclear weapons play a major role in the crises involving the US, Iraq, North Korea and the international community.

Ominously, the international community faces in the coming months and years the very real danger that nuclear weapons might be used in conflict. Pugwash and the scientific community that gave birth to such weapons must do all in their power to mobilize global public opinion to prevent such a catastrophe and redouble efforts to eliminate nuclear and other weapons of mass destruction.

## The 52nd Pugwash Conference and the 10th Quinquennium

Some 225 participants from 40 countries convened in La Jolla, California this past August for the 52nd Pugwash Conference, *Science↔Sustainability↔Security*, that was held on the campus of the University of California, San Diego. Blessed with typically beautiful San Diego weather, the 10th Quinquennium Conference agenda included a wide variety of working group topics, plenary and panel sessions, and special public events to discuss how new developments in science and technology can address the challenges to global sustainability and security facing the international community.

Noteworthy as well in San Diego was the inauguration of new Pugwash officers, including M.S. Swaminathan as President, Paolo-Cotta Ramusino as Secretary General, Marie Muller as Chair of the Pugwash Council, and Jeffrey Boutwell as Executive Director. New members of the Pugwash Council were also selected, and the roster of the Council for 2002-2007 can be found on pp. 107-108 of this Newsletter.

Participants at the 10th Quinquennial Conference formally adopted new guidelines that will shape the activities and governance of Pugwash for the period from 2002 to 2007, and these can be found on page 5.

The success of the 52nd Pugwash Conference would not have been possible without the sustained and enthusiastic cooperation of the UC, San Diego community. Pugwash would like to thank the many people on the La Jolla campus, from the Chancellor's office to various academic departments, IGCC, and the School of International Relations/Pacific Studies, to Conference Services and the Price Center, and others, who contributed to the conference both intellec-

tually and organizationally. Pugwash would also like to thank its funders and individual supporters, including: The San Diego Foundation, Ploughshares Fund, Heinz Family Foundation, Cyrus Eaton Foundation, Toda Institute for Global Peace and Policy Research, Harle Montgomery, the office of Chancellor Robert Dynes, and the William Y. Turner Fund.

Looking ahead, Pugwash greatly anticipates the convening of the 53rd Pugwash Conference, *Advancing Human Security: The Role of Technology, Politics and Ethics*, in Halifax, Nova Scotia from 16-22 July 2003, with a special day trip on Sunday, July 20 to the birthplace of Pugwash, the Cyrus Eaton home at Thinker's Lodge, Pugwash, Nova Scotia.

## Acknowledgments

Pugwash would like to thank Götz Neuneck and his wife, Christa Ochs, and Andre Mechelynck for the many wonderful photos they contributed of the La Jolla Conference.

Pugwash is grateful to the Italian National Research Council, the German Research Society, the Cyrus Eaton Foundation, and the John D. and Catherine T. MacArthur Foundation for their support of the *Pugwash Newsletter*, the Pugwash website, and other Pugwash publications.

## *The Editor*



*Thinker's Lodge, Pugwash, Nova Scotia*

THE 10TH QUINQUENNIAL CONFERENCE

**52nd Pugwash Conference on  
Science and World Affairs:**

*Science↔Sustainability↔Security*

10–14 August 2002

University of California, San Diego–La Jolla, California



## THE 10TH QUINQUENNIAL CONFERENCE

**52nd Pugwash Conference on Science and World Affairs:  
*Science↔Sustainability↔Security***

10–14 August 2002, University of California, San Diego–La Jolla, California

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**Statement of the Pugwash Council**

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*15 August 2002*

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**T**he Pugwash Council, meeting during the 52nd Pugwash Conference in La Jolla, California, expresses its concern over accelerating threats to global sustainability and security that will require intensified multinational cooperation and the strengthening of international institutions to safeguard human security.

The most immediate of these is the prospect of military action against Iraq, whether carried out unilaterally by the United States or in coalition with other countries, without a UN mandate. A military conflict in Iraq would surely cause widespread human suffering and could lead to political destabilization across the entire region. The Pugwash Council calls on the United Nations and all countries to exhaust every possible option short of military force to compel Iraq's compliance with UN Security Council resolutions to allow the return of weapons inspectors in order to certify the absence of efforts to develop weapons of mass destruction. It also calls on the US and other

governments not to take military action against Iraq without a UN mandate.

More broadly, the shock to the international system caused by the events of September 11, 2001 still reverberates around the world. While much of the coordinated international action to combat organized terrorist groups is both necessary and urgent, the Pugwash Council deplores the fact that the campaign against 'terrorism' has become an excuse for increased defense budgets and military deployments, the curtailment of civil liberties, and support for authoritarian regimes on the part of some governments and organizations.

In the nuclear field, woefully inadequate is the recently concluded agreement between Presidents Bush and Putin to lower American and Russian arsenals to 1,700 – 2,200 deployed weapons by the year 2012. Far too many nuclear weapons will remain stockpiled for possible use and too few resources are being devoted to totally eliminating excess plutonium and especially weapon-

grade uranium, which represents the greater danger regarding possible terrorist manufacture of a crude nuclear device.

Moreover, US withdrawal from the ABM Treaty has voided important restraints preventing the weaponization of space, while the US Nuclear Posture Review (to the extent made public) signals alarming new trends in terms of the threat to use nuclear weapons against non-nuclear states and the prospect of developing new, more potentially usable, small yield and fissionless-fusion weapons. The Pugwash Council is especially concerned that the latter could lead to a resumption of nuclear testing that would totally unravel the Comprehensive Test Ban and the Non-Proliferation treaties.

Accordingly, the Pugwash Council calls on all the nuclear weapon states to recognize the illegality and immorality of nuclear weapons and to move expeditiously to eliminate such weapons in the near future. In addition, a massive, broad-based education campaign is needed to alert all peoples to the very real and continuing risk of a nuclear catastrophe.

Regionally, the failure to reach a final and just settlement between the Palestinians and Israelis breeds a hor-



**Marvin Goldberger, George Rathjens, Joseph Rotblat, Ruth Adams, Herbert York.**

rendous cycle of violence between the two peoples and could well spark a wider Middle East conflict. In South Asia, the military confrontation between India and Pakistan carries with it the risk of a major conflict that could also involve the catastrophic use of nuclear weapons. The international community has a responsibility to assist in the conclusion of equitable settlements of both conflicts.

The need for greater and more equitable international cooperation, especially between industrial and developing countries, extends as well to sustainable development, individual responsibility, and the role of science and technology in promoting true human security for all individuals.

Recognizing the links between the lack of basic resources such as energy and water, and the potential for conflict, the Pugwash Council calls on the leaders meeting at the World Summit on Sustainable Development that begins August 26, 2002 in Johannesburg, South Africa, to implement measures to foster cooperation in energy research, sustainable use of resources, and in achieving global greenhouse gas reductions.

Greater risk assessment, transparency and capacity-building is also needed on the part of both industrial and developing countries regarding the use of new biotechnologies in agricul-

ture, medicine and other fields.

In all areas of human endeavor, scientists must anticipate and evaluate the full range of possible consequences of scientific and technological developments, and promote debate and reflection on the ethical obligations of scientists in taking responsibility for their work.

In recalling the founding document of Pugwash, the 1955 Russell-Einstein Manifesto, the Pugwash Council appeals to the scientific community and all peoples to “remember your humanity and forget the rest” in the continuing effort to renounce war and improve the human condition in every region of the globe.

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### **Goals of Pugwash in its Tenth Quinquennium: 2002-2007**

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*At the beginning of each quinquennium, the Pugwash Council issues a statement relating the enduring mission and objectives of Pugwash to its evolving agenda in the context of recent international developments. The following contains the goals of Pugwash for its Tenth Quinquennium, from 2002 to 2007, adopted at a plenary session of the 52nd Pugwash Conference at the University of California, San Diego, in August 2002.*

**T**he overriding peril which preoccupied the founders of Pugwash in 1955-1957, and which has claimed much of the attention of Pugwash participants in the intervening 45 years, is the danger posed to human-

ity by the vast destructive power of nuclear weapons, the accumulation of these weapons in huge numbers in the arsenals of the United States and Russia, and their spread into the possession of the United Kingdom, France, China, India, Pakistan and Israel. To these ongoing challenges must now be added the increased threats posed by the possible acquisition and use of weapons of mass destruction by other states and by non-state groups.

Pugwash is strongly committed to the goal of abolishing all nuclear weapons. It is imperative that Pugwash constantly remind the international community of the immorality, illegality, and peril inherent in nuclear weapons, and to propose concrete steps

towards their elimination.

Despite promising steps in the early 1990s to reduce the numbers of nuclear weapons, more recent developments give rise to serious concern about a reversal in this process of controlling, reducing and abolishing nuclear weapons. The nuclear peril, while somewhat abated, nonetheless persists:

- in the tens of thousands of weapons still deployed (many in rapid response alert),
- in doctrines calling for the first use of nuclear weapons, and also for the possible use of nuclear weapons against non-nuclear countries,
- in the presence of nuclear weapons in regions having a significant risk of conflict
- in the risk of the further spread of nuclear weapons,
- in the risk of theft of nuclear weapons or nuclear-weapons material from widely dispersed and sometimes inadequately guarded stockpiles,
- in the risk of the use of nuclear weapons by international terrorist groups,
- in the development of new types of nuclear weapons, that may call for the resumption of nuclear tests,
- in the challenge to arms control and strategic stability posed by the development of missile defenses and the deployment of new types of weapons.

The whole system of nuclear arms control is, moreover, under strain, with treaties that are renounced by one party (the ABM Treaty), treaties that are not ratified (Comprehensive

Test Ban Treaty), proposed treaties where no apparent progress is made (Fissile Material Cutoff Treaty), and commitments for nuclear arms control and disarmament, such as the 13 steps of the 2000 NPT Review Conference, that are assumed but largely disregarded in practice. Most importantly, the implementation of Article VI of the NPT that mandates nuclear disarmament is far from being the basis of the policy of the nuclear powers.

Thus the Pugwash goal of reducing and eliminating the nuclear peril will be more important than ever in the Tenth Quinquennium. Specific points on the Pugwash agenda will include prescriptions for much deeper cuts in nuclear arsenals, for the effective dismantlement of retired warheads, for much greater transparency and control of all the deployed forces and warheads in storage, for stronger non-proliferation measures and verification, especially regarding the safety of nuclear materials, for fast disposal of fissile material, for the entry into force of the nuclear test ban, for a stop to the production of new weapons and new weapon-grade material, and for the abandonment of nuclear policies that allow an early use or a first use of nuclear weapons. Pugwash will also consider as an essential element of the non-proliferation agenda the prevention of the proliferation of expertise, where nuclear weapons experts may be induced to work for countries or subnational groups wishing to acquire nuclear weapons

The need to reduce and eliminate the dangers posed by chemical and biological weapons has likewise long

been on the Pugwash agenda. The entry into force of the Chemical Weapons Convention (CWC) in 1997 completed the process of the comprehensive prohibition of chemical and biological weapons that began with the Biological and Toxic Weapons Convention (BTWC) of 1972. But much remains to be done to make these prohibitions fully effective, especially in light of failed efforts to implement a comprehensive monitoring and verification protocol for the BTWC. Pugwash will continue to contribute to efforts at strengthening the implementation and verification of both the CWC and BTWC.

In the case of chemical and biological weapons, there is also the risk of proliferation to state and non-state actors. This risk is enhanced by the fact that some CB agents can be produced with relatively limited means and that some of the CBW material deriving from past activities of many countries is still stockpiled in precarious conditions and its destruction delayed. Pugwash is committed to the prevention of the spread of any weapons of mass destruction and to the elimination of all such weapons; this applies to nuclear weapons as well as to chemical and biological weapons.

Nuclear, chemical and biological weapons do not, however, exhaust the categories of weaponry that will continue to be of concern to Pugwash in its Tenth Quinquennium. Conventional weapons, ranging from small arms to antipersonnel mines to new high-technology weapons, are all too often the instruments of indiscriminate destruction, especially for civilians. Accordingly, the pursuit of further international monitoring and



restriction of conventional arms development, production, and transfer will remain an important priority for Pugwash.

One of the great strengths of Pugwash during the Cold War was the ability to bring together scientists, experts, and policy makers from countries situated at opposite sides of world politics. Through continuous, patient work Pugwash was able to create a climate of mutual understanding and trust, which eased East-West tensions and avoided war. Pugwash needs now to use its international membership to carry on the same policy of bringing together scientists, experts and policy makers belonging to countries or group of countries divided by different perceptions of security, antithetical interests, different ideologies or religious hostility of any kind. This task is particularly significant for Pugwash if these potential conflicts or tensions involve countries that possess or may possess weapons of mass destruction as is the case in South Asia, the Middle East and Northeast Asia.

At a more general level, Pugwash has recognized from the start the indispensability of the goal of minimizing and finally eliminating the incidence of war itself. As Pugwash has historically done in a wide variety of contexts, this means seeking creative ways for resolving disputes before they break out in armed conflict, and for ending quickly and with minimum destruction those armed conflicts that do occur.

It also means working to transform and reverse the conditions of economic deprivation, environmental deterioration, and resource scarcity



*Price Center, UC, San Diego.*

and unequal access that are deplorable in themselves and give rise to despair, resentment, hostility, and violence around the world. Pugwash will continue to address this broad web of inter-related dangers, and to work for the sustainable use of energy and natural resources and the constraint of anthropogenic disruption of climate.

Ways have to be found to address the causes and motivations for terrorism, other than by military action. To that end, Pugwash in its Tenth Quinquennium will strengthen its efforts at finding and promoting solutions that reduce the dangerous gaps within and between countries. Pugwash will seek means of maximizing the benefits of new developments in science and technology, and conversely, of foreseeing the possible negative consequences of developments and applications of new tech-

nologies that could endanger humankind and the environment and exacerbate tension and strife in the world community.

From weapons of mass destruction to new developments in biotechnology and other sciences, Pugwash will continue to stress the ethical and moral responsibility of scientists in furthering the beneficial applications of their work and preventing their misuse. The global community at the start of the 21st century stands on the threshold of an era that holds great promise for advancing the human condition. Following the dictum of Rabelais that “science is but the conscience of the soul,” it will remain the enduring task of Pugwash to ensure that science and technology are employed for the benefit of humankind, and not its destruction. [14 August 2002]

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## Presidential Address

SIR MICHAEL ATIYAH

14 August 2002

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As you know I am stepping down as President of Pugwash after five years in office. It is natural that I should look back and see how the world has changed in these five years. Have things got worse or better, in what ways, and how should this affect the Pugwash agenda? I would like to share my thoughts with you and point the way ahead for the new officers and Council.

I should emphasize that I speak in a purely personal capacity, and that none of the officers or Council of Pugwash know in advance what I am going to say. The fact that, tomorrow, I will no longer be President encourages a certain brash courage! I adopted a similar line when I gave my final Presidential Address to the Royal Society in 1995, when I attacked (not physically) the British Nuclear Deterrent. The result of the speech was that I was thought suitable to become President of Pugwash. I hasten to add that, on this occasion, I intend fully to retire and I am not angling for further presidencies!

Although the Cold War is over and the threat from nuclear weapons is subsiding the world is as far from peace and stability as it was five years ago. The problems keep changing. For a time we had regional conflicts emerging from the collapse of Communism and now we have the events of September 11th and the response to it.

At the Pugwash conference in Agra, just six months ago, I felt I had

to address this last issue - that of terrorism. I did so by analyzing four case histories: Ireland, South Africa, Kashmir and Palestine, to see what general lessons might be learnt from such comparisons. The last six months have seen a slight diminution of the threat of an Indo-Pakistani war, but an unfortunate escalation in the Israeli-Palestinian conflict, where the Old Testament injunction to exact an “eye for an eye and a tooth for a tooth” is being relentlessly pursued. I do not think that, in either case, my speech or any of the actions of Pugwash had any influence whatsoever. But perhaps I should add that we took advantage of our personal contacts with Government Ministers in both India and Pakistan to write letters urging caution and restraint.

Today, and since we are meeting in the United States, I would like to look at the whole issue of terrorism in a broader context and from a global perspective.

As expressed so eloquently in the UNESCO Constitution of 1945, “Since wars begin in the minds of men, so it is in the minds of men that the defences of peace must be constructed”. I want to look into the minds of men—of different men—to search for the roots of our problems. Since I want to look at the issue from different geographical and political vantage points I must digress to give you a potted history of my own life, so that you can see where my experiences lie.

Most of my life has been spent in Britain which (despite what you read in the English tabloid press) is part of Europe. Having shrugged off its imperial past, with its vast colonies, and having endured two major wars, Europe is now struggling to find its feet in the 21st century. A unique experiment is going on, inching hesitantly towards economic and political integration, while maintaining its traditional variety of cultures. It will shortly bring together over 500 million people in an economy that will rival that of the United States.

Being a European I believe this is a good thing and that the new Europe can be a bulwark for peace in the world. But diversity will remain and there will be a wide range of opinions in those 500 million minds.

Although my working life has been mainly spent in Britain I have lived and worked in the United States over long periods. Many of my professional collaborators and closest friends are American and I have come over for short visits on literally innumerable occasions. In recent times, when I have applied for a US visa, I have had to fill in the very small form that is provided and one question that is asked is “Have you ever been in the United States before, and if so give the dates”. There is a small box for the answer, just large enough for me to insert the words “more than 50 times since 1955”. That is almost certainly an underestimate by now.

Finally, let me revert to my childhood. My father was Lebanese, I was brought up in Khartoum, had my secondary education in Cairo and Alexandria, and spent vacations with my grandmother in Lebanon and my



*Paolo Cotta-Ramusino, George Rathjens, Richard Attiyeh, Joseph Rotblat, Ana María Cetto, Jeffrey Boutwell*

Aunt and Uncle in Haifa. Although English was literally my mother tongue I spoke fluent Arabic and of course I loved Lebanese food. I left the Middle East when I was 16, but I have returned on various occasions and I still have close relatives in Beirut.

Having a mixed background may not make one totally impartial but at least it does provide a basis for a better understanding of different viewpoints. So let me use my experience to describe the view from these three different parts of the world. Before I start let me emphasize one general point. In every region, large or small, there are men (and women) with very different views, depending on their background, experience and individuality. So, in strict sense, there is no such thing as “the American point of view”. There is the view of the President, of the Democrats in Congress, of the media, of the opinion polls and of the American participants in this conference. In such a complex and varied society these may diverge widely. Nevertheless, since no-one is uninfluenced by his milieu, there tends to be a centre of

gravity - a mean point, about which things fluctuate. It is like people looking out of the windows of a large house - there are many views to be seen depending on which window you look out of. But the fact that the house is in the middle of a wood or on top of a hill affects everyone.

So, after this long preamble, let me try to describe the world as currently seen by the American people - we are in the United States for this conference, so this is the natural starting point. I might add that, earlier this year, I spent six weeks in the US and had a chance to imbibe the political atmosphere at first hand.

We have to begin with the events of September 11th and the devastation in New York and (to a lesser extent) in Washington. Those of you who are not American may have to be reminded what a traumatic experience it was to see the heart of New York devastated. You have to put it into your own context: if you are from London, imagine Big Ben or St. Paul’s destroyed (something even Hitler failed to do), while Parisians may like to contemplate the collapse

of the Eiffel tower and Notre Dame. Rome offers even more choice. The physical destruction together with the death of thousands has been compared with Pearl Harbour, and so it is very understandable that it produced a similar reaction - this is a war and we must unite to defeat the enemy. But the parallels with Pearl Harbour stop there - the Japanese were a visibly powerful force about to embark on military expansion across Asia and the Pacific. The new enemy was much harder to identify, a loose shadowy organization blending into the landscape. Afghanistan, a poor backward country devastated by decades of war with Russia and internal struggles, provided the only reasonably clear target. In due course it was dealt with, the unloved Taliban regime was obliterated and the first phase of the war was over.

But what happens next? The war on terrorism has been defined in such a vague way, and the public has been led to expect such a long war, that there are not many options. One is to increase vigilance on the home front and vast resources are being devoted

**52nd Pugwash Conference on  
Science and World Affairs:  
*Science↔Sustainability↔Security***

University of California, San Diego–La Jolla, California  
10–14 August 2002

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**Schedule**

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[Events listed in bold were open to the public]

**Saturday, August 10:**

- 9:00 – 10:30: **Conference Plenary (Open) – Price Center, Ballroom**  
**Chair - Sec. Gen. George Rathjens**  
**Welcoming Remarks: Ruth Adams, Marvin Goldberger and Herb York**  
**Response from Dr. Jeffrey Boutwell, Executive Director, Pugwash**  
**Pugwash Obituaries – Sir Joseph Rotblat**
- 10:30 – 11:00: Coffee Break
- 11:00 – 12:15: **Conference Plenary (Open) continues**  
**Chair – Sec. Gen. George Rathjens**  
**Keynote Address – Dr. William Perry, former Secretary of Defense**
- 12:30: Lunch – Canyon Vista, Warren College
- 14:30 – 18:00: Working Groups #1-6 Meet in Break-out Sessions
- 18:30: Dinner at Canyon Vista, Warren College
- 20:00: **Lecture in Price Center Theater:**  
**Christopher Chyba (Stanford University)**  
**“The Asteroid/Comet Impact Hazard”**
- 21:00 – 22:00: Secretary General and Pugwash Council meet with national Pugwash groups and members of International Student/Young Pugwash

**Sunday, August 11:**

- 9:00 – 12:30: Working Groups #1-6 Meet in Break-out Sessions
- 12:30: Lunch at Canyon Vista, Warren College
- 14:00 – 16:00: **Concurrent Panel Discussions, Price Center**  
**New Challenges to Climate Change Science**  
**Chair: Richard Somerville (Scripps Institution)**  
**Panelists: John Holdren (Harvard Univ.) and Kevin Trenberth (NCAR)**
- The Bioterrorist Threat: Scenarios and Responses**  
**Chair: Mark Thiemens (UCSD)**  
**Panelists: Kathryn Nixdorff (Univ. of Darmstadt), Ronald Atlas (American Society of Microbiology) and Larry Smarr (UCSD)**
- The Future of Nuclear Weapons**  
**Chair: Herbert York (UCSD)**  
**Panelists: Michael May (Stanford Univ.), Air Commodore Jasjit Singh (India), and Gen. Pan Zhenqiang (China)**
- 18:30 – 20:00: Dinner at Canyon Vista, Warren College
- 20:00: **Film/discussion in Price Center Theater: “Pakistan and India: Under the Nuclear Shadow”, with Pervez Hoodbhoy (Pakistan) and Jasjit Singh (India)**

to this objective. Foreigners may question this use of America’s wealth, but if you are an American citizen it all seems perfectly reasonable, even if it is going to cost you more money and waste your time at airports. But this is a merely passive activity. There is a natural inclination in a war to do more - to search out the enemy before he launches an attack. This is now what is expected. Find the crooks and go after them. You line up the usual suspects, starting with Saddam Hussein, but with secondary characters such as North Korea and Iran not far behind.

At this stage there is, from the American point of view, a side-issue that needs to be addressed. An attack on Iraq might produce a back-lash in the Arab world and destabilize an area which, with its vast oil reserves, is of vital interest to the US. The Arab opposition might be mitigated if the Palestinian issue could be resolved in some way, but here again terrorists become involved, no progress is being made and there is an impasse. Moreover, to the Israelis and to the Americans the Palestinian suicide bombers are lumped together with those who flew their planes into the Twin Towers - Islamic extremists, driven by a blind hatred of America and its friends. Similar measures in response are necessary: Arafat and his henchmen play the role, in lower key, of Bin Laden and Al-Qaeda.

I think this is the best I can do to explain American attitudes to terrorism though I am conscious that some latent scepticism may have slipped through the net.

Let me now turn to the Middle East and try to describe the world

through the eyes of the Arabs. We must begin by looking at the history of the 20th century.

This was the period when the Arabs (together with peoples in Africa and Asia) were emerging from a colonial background, first under the Ottoman Empire and then under the British and French. Except for Algeria this process was relatively peaceful, with the Arabs adapting to, or even welcoming, the modern western world.

However there was one major exception - the creation of Israel. At the same time as the West was withdrawing from power in the region it fostered an intrusive new entity. The British Government, with its Balfour Declaration, decided to support a National Home for the Jewish people, with the proviso (almost as an after-thought) that this should not prejudice the rights of the indigenous inhabitants (i.e., the Palestinians). It was a recipe for disaster. With the weight of British, and subsequently American, backing it developed into a very one-sided conflict, so that now the Palestinians are either in exile or live under a brutal Israeli occupation in a small fraction of their original territory.

It should come as no surprise that this situation has produced, in desperation, a violent reaction and led to the growth of extremist groups.

Although it is the Palestinians who are directly affected by the creation and expansion of Israel all the Arabs (as well as the wider Muslim world) feel deeply involved, in part because of the religious importance of Jerusalem. For the Arabs the conflict with Israel, so far from being the

## Schedule *continued*

### Monday, August 12:

- 9:00 – 12:30: Working Groups # 1-6 Meet in Break-out Sessions  
 12:30: Lunch at Canyon Vista, Warren College  
 14:00 – 15:30: Conference Plenary (Closed) – Price Center, Ballroom  
 Chair: Prof. Francesco Calogero, Chair, Pugwash Council:  
 Presentation and affirmation of Pugwash Officers, election of new Council Members, and adoption of Quinquennial Bylaws  
 16:00 – 17:00: Depart by bus for San Diego Zoo  
 17:30: Excursion and Dinner at San Diego Zoo  
 21:00 – 22:00: Return by bus to UCSD

### Tuesday, August 13:

- 9:00 – 12:30: Conference Plenary (Closed): Brief Q&A on Working Group Summaries  
 Chair – Prof. Ana María Cetto, Chair, Pugwash Executive Committee: Secretary General's Report (George Rathjens and Paolo Cotta-Ramusino); Discussion of Current/Future Pugwash Initiatives  
 12:30: Lunch at Canyon Vista, Warren College  
 14:00 – 15:45: Conference Plenary (Open): *"Science and Society: Public Perceptions of Complex Scientific Issues"*  
 Chair: Richard Attiyeh, Vice Chancellor, Research University of California, San Diego  
 Panelists: Daniel Yankelovich, founder, Public Agenda  
*"Science and Society: Narrowing the Gap"*  
 Charles Kennel, Director, Scripps Institution  
*"Stabilizing the Climate for Climate Change Science"*  
 15:45 – 16:15: Coffee Break  
 16:15 – 18:00: Conference Plenary (Open): *"Islam and the West: Science, Security and September 11"*  
 Chair: Prof. Paolo Cotta-Ramusino (Univ. of Milan)  
 Panelists: Pervez Hoodbhoy (Univ. of Islamabad, Pakistan)  
 Graham Fuller (formerly, RAND Corporation)  
 18:30 – 20:00: Barbeque Dinner at Canyon Vista, Warren College

### Wednesday, August 14:

- 9:00 – 10:30: Conference Plenary (Open) – Price Center, Ballroom  
*Dorothy Hodgkin Memorial Lecture*  
 Prof. M.S. Swaminathan, "Science and Achieving the Goal of a Hunger-Free World"  
 Co-Chairs: Prof. Ana María Cetto and Sir Joseph Rotblat  
 10:30: Coffee Break  
 11:00 – 12:00: Conference Plenary (Open) continues  
*Presidential Address* – Sir Michael Atiyah (delivered by Prof. Richard Attiyeh)  
 Concluding Remarks – Secretaries General George Rathjens and Paolo Cotta-Ramusino  
 12:30: Lunch at Canyon Vista, Warren College  
 Conference Participants depart



*La Jolla coastline.*

minor side-show it is for the Americans, is the focal point of their world. Hostility to America has arisen, to a great extent, from this single source, and it is ultimately a large factor behind the terrorist attack on New York.

If Americans want real security nothing would enhance it more than a solution of the Israeli-Palestinian problem which was acceptable to the Arab World. The outlines of such a solution were in fact recently put forward by Saudi Arabia and are within the bounds of political reality, provided the leaders of the western world have the wisdom and determination to achieve them.

Having put into opposite poles the American and Arab views let me now look at Europe. As one might expect the view here is somewhere in the middle. Europe and North Africa share the Mediterranean coast-line and a common history. They lived together for centuries. While Israel was primarily a European creation,

and there are close contacts in particular with Israel at the cultural and scientific level, there is also a good understanding of the Arab position: Lawrence of Arabia was after all an Englishman. Spain, with its long Moorish heritage, has deep links with Arab civilization which will survive the current skirmishes over a few rocks in the sea. It is no coincidence that Madrid was the venue for the last serious attempt at a peaceful resolution of the Palestinian issue. Italy, with its appendix of Sicily, extends close to the North African coast and Cyprus, which is negotiating with the European Union, is not far from the shore of Lebanon.

The Arab world, or at least the Mediterranean part of it, is closer to Europe in most respects than Latin America is to the United States. Europe has a really vital interest in the whole region and it should have a key role to play in searching for peace. So far it has only taken tentative steps, playing second fiddle to

America. As a European I hope it can do more.

Europeans understand the American need for security after the events of September 11th but they think the US Government is in danger of over-reacting and perhaps embarking on a dangerous path, which will lead to less security for us all. In particular they do not see the Israeli-Palestinian conflict in the same light as the Americans

Having put forward these three different world-views on the subject of terrorism, which illustrate how divergent they are, let me return to US policy in a more general way. The aftermath of September 11th has seen a seismic shift in US attitudes across a broad band, not just on the issue of terrorism. In almost every single area, military, diplomatic, economic, environmental, the US has decided to go its own way. International treaties and conventions are seen as unacceptable restraints on US freedom of action. Conscious of its sole superpower status, it no longer sees the need to take account of the views of others, even of its close allies. American interests and security come first. A very cogent analysis and explanation of this new American policy has been given by our Pugwash colleague Steve Miller, and I found his conclusions stark and daunting. A vast gulf has opened up between the United States and the rest of the world, with Europe and in particular Britain caught unhappily in between.

So far all our political leaders put a brave face on it, papering over the cracks, emphasizing the unifying role of NATO and saying that the com-

mon ground is much greater than the differences. I hope they are right, but the arguments are not convincing. There is a danger that the US and Europe are on a collision course, not of course in a military sense, but on all important economic and political issues.

When ships or aircraft are on a collision course, mishaps can be avoided by using radar and careful steering. I am not sure what the political equivalent of Radar is — perhaps it is bodies like Pugwash which can bounce ideas backwards and forwards. As for steering, political leaders come and go and new captains may take the helm, so I am not predicting catastrophe. But, as I leave Pugwash, this divergence of world-views is to my mind the most disturbing event of our time. The Atlantic Ocean has become much bigger.

Talking of new captains taking the helm brings me naturally to the internal affairs of Pugwash and the fact that Professor Swaminathan from India is to be my successor. He will be the first Pugwash President from outside Europe and he will preside at a time when Asia is playing an increasingly important role on the world stage. With the largest populations of the world, India and China are now emerging as major economic powers and it is highly appropriate that the Pugwash President should come from this area.

Professor Swaminathan's interests have been primarily in fostering the Green Revolution and feeding the vast populations of Asia. He will undoubtedly bring a new perspective to Pugwash and I wish him well in the difficult times ahead.

Finally, let me say a few words to the younger members of this audience and in particular to the Student Young Pugwash members who are present. I have felt it my duty to describe some of the serious problems of the world as I see them. In doing so I may have painted too gloomy a picture. Our problems are not insoluble, we can hope for a bet-

ter world and it will be for succeeding generations to bring this about. The young have energy and enthusiasm, two vital qualities that will be needed for the future.

*For family reasons, Sir Michael was unable to attend the conference, and his Presidential address was delivered by his cousin, Prof. Richard Attiyeh.*

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## Report of the Secretary General

**GEORGE W. RATHJENS**

*13 August 2002*

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**A**s I believe most of you realize, this will be my last report as Pugwash Secretary General. In the circumstances, I intend to focus not on the events of the last year, but rather on those of the whole five years I have served as Secretary General, weaving in comments about particular workshops that I think might be of special interest. I would note here that we have had excellent reportage of the work-shops during these years and that many of the best papers have been published, largely due to the work of Jeffrey Boutwell. I will in no sense attempt to cover all that ground. I intend to conclude with observations about future challenges.

My focus will be particularly on the United States, in part because we are meeting here, and because an unusually large fraction of you are from this country: mainly though because it is the only super-power in the world and because, since the election of President Bush, the policies of the American government have moved so dramatically and so far

towards unilateralism.

Should we, in hopelessness, rail against this or alternatively confine our activities largely to problems in which the Bush Administration is likely to be so little interested as to not get involved? In my view, quite the contrary, a point I will develop in my concluding remarks, but I feel I should say now that I see no basis at this time for believing that President Bush and most of those in the next couple of levels down in his Administration will experience a Saul-on-the-road-to-Damascus kind of conversion or epiphany.

### The International Scene: 1997-2002

Now, I would turn to the events of the last five years, first commenting briefly on changes in the international scene and then on what Pugwash has tried to do in the context of that changing scene.

The Cold War is over, and in my view, was so a dozen years ago. But this has not been fully reflected in



*Taking a break at the San Diego Zoo.*

important circles in the United States and Russia, and most particularly in a large part of the arms control and disarmament community, including Pugwash.

Even as recently as in the last several years we have heard and read much about balanced force reductions in Russian and American nuclear stockpiles: reductions from tens of thousands of nuclear warheads by factors of around two and of operationally deliverable strategic nuclear warheads down to the range of 2000 or so, as if such reductions were militarily and politically meaningful. I, in contrast, believe that very likely there is a threshold of delivery capability above which there is essentially no *political and/or military utility* in increasing force levels—and to which there would be advantage in reducing them because of the likelihood of reduced damage should nuclear weapons be used destructively and because of the greater cost and likely greater possi-

bility of accidents and/or proliferation with high force levels. I would suggest that the threshold level may be in the range of 50 deliverable weapons for the United States (and Russia)—and perhaps as low as zero for the U.K. and France. Others will certainly disagree with my number of 50, but I come up with it believing that other states' political-military decisions regarding the use of force are not likely to depend significantly on whether the United States retains a capability of delivery of 50 nuclear weapons or 2000: for example, Iraq's again taking aggressive actions against its neighbors. I believe, however, that at some lower level, perhaps in the range of 10 to 20 weapons, Japan, South Korea or Taiwan might so question the American security guarantee under which they now live as to decide to acquire national nuclear capabilities. And, I'm not at all sure that that's a happy trade-off: having the United States (and perhaps Russia) reducing their effec-

tive nuclear capabilities down to the range of a dozen weapons each if the price is the emergence of new nuclear powers in the Far East and/or Southwest Asia.

The other most important change in the international scene I have already alluded to: the emergence of the United States as king of the hill, with an Administration committed to unilateralism and with a phobic reaction to international arms control and disarmament agreements, both existing and prospective; and with a belief in the continuing and perhaps expanded utility of a broader range of nuclear capabilities, not so much for deterrence or other political purposes, as for actual use for preemptive attack including most especially against hard-to-destroy targets.

Consider the American withdrawal from the ABM Treaty. The Administration had come to believe, quite misguidedly in my view, that a National Missile Defense that would be both technically effective and worth deploying could be built. It then decided that continuing adherence to the ABM Treaty would be an inhibiting factor in the realization of its objective but would have no corresponding effect on Russian aspirations—or on those of any of the other successor states to the Soviet Union. None were in a position economically to pursue such a program, nor would the ABM Treaty have any inhibiting effects on any other nation since no others were either parties to the Treaty nor had any apparent interest in developing defenses that would be affected by it. Discounting, then, the opinion of other nations—and many Americans



—the Administration could logically conclude that the Treaty was outmoded and disadvantageous to the United States, while having no meaningful effect on the aspirations of any other state. So, why not withdraw from it?

And, why negotiate seriously with Russia—or any other state—on reductions in strategic arms or, for that matter, about many other issues, given that other states would generally be far more constrained by economic and technological limitations in what they could do than would be the United States?

I would here make a side comment about negotiations with the Soviet Union at the height of the Cold War. We had some success in the ABM, SALT and START negotiations, but these were all carried out under very special conditions that are unlikely to obtain at any time during at least the foreseeable future (except possibly as between India and Pakistan). There was an extraordinary degree of symmetry in the situation of the two superpowers. Both appeared to be able to run a competitive race in missile delivery capability and neither had an effective ABM defense capability or much prospect of developing one that could not be easily countered at less cost by adversary improvements in offensive capabilities. By analogy one might have thought that if the ABM Treaty made sense, why not negotiate similar treaties on anti-aircraft defense and anti-submarine warfare? This was never even tried. The Soviets had too much of a lead in the former and the United States too much of a lead in the latter. We talked a little in the

early 70s about limiting work on, and deployment of, multiple independently targetable re-entry vehicles (MIRVs), but never even got to the point in those days of negotiations about them. The United States was so far ahead that the American military was unwilling to forswear what they saw as an advantage, and the Soviets were not interested in being frozen in a position of inferiority.

And, if we got nowhere with these problems of asymmetry in bilateral negotiations with the Soviets, consider how poor the prospects must be for serious negotiations with the Russians, given the asymmetries that now exist; and, worse yet, how poor the prospects must be for progress in multilateral negotiations, given the classic problem of  $n > 2$  game theory: the possibility of coalitions. (And this may be a problem even in the Indo-Pakistani case: the possibility that other significant powers might get involved, perhaps China siding more or less with Pakistan and Russia more or less with India.)

Does this mean that approaches to arms control and disarmament through negotiated agreement are outmoded? Not quite. There is still the possibility of agreements that are unambiguously advantageous to all parties to them, even if the advantage to some may be greater than to others. Controls on exports of some kind of weapons and/or of critical components to third parties are examples; and dealing with the problems of loose nukes, inadequately protected fissionable materials, and loose, impoverished scientists and engineers in Russia with weapons expertise is another. And, there is the possibility

that the American administration would go along with limitations and/or reductions in arms that it might not consider narrowly advantageous to it *if* other parties would make concessions to American interests in unrelated areas.

But I do suggest that the era of ABM/SALT/START kinds of agreements that dominated the thinking of many of us throughout the Cold War has come to an end, at least in so far as the United States might be involved.

## The Pugwash Agenda

I turn now to the questions of criteria for deciding on the allocation of Pugwash's efforts to different problem areas.

1. Pugwash should focus on problems of importance, and, in general, since it is an international organization, on those of direct concern to more than one country. This seems so obvious as to hardly merit mentioning.
2. It should concentrate its efforts in areas where it has comparative advantage over other like-minded organizations. This turns out to be a very difficult proposition or dictum for it to live by, and I think it is only fair to say that the majority of our Council members do not agree with me on this matter. It is especially troublesome that with respect to most nuclear weapons issues, where Pugwash once had a probable lead over other NGOs, this is no longer the case. At least, the CISAC (Committee on International Security and Arms Control) of the US National Academy of Sciences and



*Peter Buckley, Haruyo Ohnishi, Madelaine Gilinsky,  
Sophie Nalecz, Haifa Baramki, Sara Boutwell.*

the analogous group of the Russian Academy can typically mobilize groups with more expertise than can Pugwash. (I call your attention to the lean participation of Russians here, including the fact that only one was scheduled to be in the working group dealing most directly with nuclear weapons issues—and, because of visa problems, he did not get here). The only significant areas where I think we now have an unequivocal comparative advantage over other NGOs are in chemical and biological warfare.

3. Pugwash must concentrate its efforts generally on what I call knife-edge problems: on decisions where the forces on the two sides of an argument are close to being in balance; problems where possible Pugwash involvement might be instrumental in pushing the decision one way or the other—and on a time-scale measured in months or years; not one measured

in decades. The uncertainties about world politics are just too large (and the personal discount rates of most of us are just too high.)

If I had more time, I would here get into a systematic discussion about criteria for measuring success of our efforts. As it is, I will do so only episodically as I discuss a selected sample of those workshops we have had in the last five years. I would, though, mention that such an assessment is, I think, highly desirable. I have proposed, with essentially no receptivity, that Pugwash would benefit by having an audit or visiting committee largely composed of non-Council people to review and evaluate its work.

### **Pugwash 1997-2002**

I will turn first to two workshops that we had in Paris in May and December 1998.

We had had an extensive discus-

sion at the 1997 Lillehammer conference of the American proposal that NATO be enlarged to include Poland, Hungary and the Czech Republic, and the Council included in its Lillehammer Statement a number of arguments against such an expansion. Most of the Council—but not all—were, I believe, opposed to expansion; and mobilizing opposition struck me as an extraordinary “knife-edge” opportunity for Pugwash. All that would have been needed to defeat the proposal was a dissenting vote by any one out of 16 (NATO) parliaments; and how often is Pugwash likely to have 16 shots at killing a bad idea? So, I, with the help of Venance Journé, organized the May workshop in the hope that at least one parliament might be persuaded to vote against NATO enlargement. It was too little, too late. But why had Pugwash not taken up the issue before Lillehammer? Could it have been because of its rule that all important decisions must be made by consensus? If so, I suggest it is a strong argument for abandoning this rule. But I doubt that this was the reason, since I am unaware of any Pugwashites except Hugh Beach and myself vigorously opposing NATO enlargement in 1997. Was it just blindness to opportunities or general unwillingness in the Council to oppose the United States?

The second Paris workshop, a Franco-British initiative, was on nuclear power. I was skeptical about this because I had been involved earlier in two large American studies and a much larger 60-nation one, and was unaware of significant new developments in the intervening

years. My skepticism was in large measure justified. Notwithstanding the participation of some very highly qualified people and the production of excellent papers, which were then collected in a book, I am unaware of the workshop having had any impact on significant decisions by governments or international institutions. Our scale of effort was perhaps too small, but more significantly, the timing was, I believe, not propitious. Still, I would count the effort at least a qualified success in that we provided an opportunity for worthwhile, sophisticated exchanges between people, some of whom had not been previously acquainted; and we brought new expertise into the Pugwash fold, something I have felt should be an important secondary objective of all of our activities

I turn now to two workshops that we had in Havana in October 1998 and February 2001 on public health and medical research. I had initiated these mainly as a bridge-building effort between Cuban scientists and the broader international community, including particularly Americans, at a time when it seemed opportune. Even though the Bush Administration, many right-wing Republicans, and many Miami Cubans had been strongly opposed to normalization of Cuban-American relations, sentiment for it was growing in the American Congress, much of the business and agricultural communities, and among many other Americans. It seemed like another “knife-edge” opportunity. I picked public health and developments in the pharmaceutical industry as topics for discussion because these, particularly the for-

mer, were areas where Cuba quite clearly led the developing world. I cite this effort here particularly because I think it the best example in my experience as Secretary General of follow-through to work-shops. Jeffrey Boutwell produced the first of our *Issue Briefs*, and it has been widely distributed, including to all members of Congress; and he, Ken Bridges of the Harvard Medical School, and Elliot Schiffmann of the US National Cancer Institute met with a number of members of the US Congress and their aides to discuss the workshops and the importance of terminating the US embargo of Cuba. The fact that three Cubans whom we invited to this meeting were denied visas suggests that we still have work to do, but it does seem to me that our efforts relating to Cuba deserve high marks. We have been on the right side of a battle that can be won.

Now, brief comments on two workshops we had in Sigtuna, Sweden. The first, in October 2000, was to inform Europeans about American programs for anti-ballistic missile defenses and, most notably, to mobilize discussion of U.S. National Missile Defense efforts. This seemed sensible because the NMD proposal seemed nonsensical to most technically informed Americans and to a number of European governments, and it seemed likely that Pugwash might, considering its large European constituency, have some advantage over US NGOs in trying to stop this foolish program. Moreover, it seemed likely that upgrading of radar stations in the UK and Greenland would be important parts of the program, so we made an effort, as it

turned out, a successful one, to get highly qualified participants from these two countries, including, I believe, unprecedentedly, an Inuit woman from Greenland who was active in opposing upgrading of the Thule radar. We produced an *Occasional Paper* based on the workshop. Whether or not our efforts will have any impact remains to be seen.

The second Sigtuna meeting, with emphasis (at the Swedes’ request) on tactical nuclear weapons, had an unexpected pay-off for this audience in that one of the background papers was the one you heard discussed here by Mike May. On the basis of my reading of it, and the exceedingly favorable reaction to it in Sigtuna, I urged Mike to present it here, and with his permission, am now trying to get hearings built around it before the US Senate Foreign Relations and Armed Services Committees.

In early September, 2001 we had another workshop, this one in Como, Italy, on Nuclear Stability and Missile Defenses. With the September 11 terrorist attacks just a few days later against the World Trade towers in New York and the Pentagon in Washington, DC, world attention shifted to those events, and one can only speculate about whether the Como workshop had, or ever will have, any direct impact on international affairs. I mention the workshop with a particular point in mind. I had made a special effort to get participants who could knowledgeably discuss the domestic politics of decision-making as regards weapons development, acquisition, deployment and use, where there are very powerful actors with radically

different views involved. I hit the jackpot, particularly as regards the United States. We had not only Steve Miller, who is always very good on such topics, but 5 or 6 other Americans with great knowledge. In addition, we had very informative interventions from several other countries.

I turn now to what has been for me a perplexing anomaly about our work of the last five years. In, I believe, all of the 19 annual conferences in which I have participated, the working groups on nuclear weapons issues have always been the most popular. Yet, we have had, since I have been Secretary General, great, and increasing, difficulty, in getting effective, knowledgeable people from the nuclear weapons states, other than the United States, to participate in our workshops on nuclear matters. Our meeting in Moscow on Strategic Stability last month is dramatically illustrative. We had no one from China, India, Pakistan or Israel; only one each from France and the UK; but 12 from the United States; and while many Russians participated part time, several of those with whom we have had the most useful discussions in the past did not show up at all. With very little information about possible participation even up to the day of departure for Moscow, I seriously considered canceling the meeting.

In turning to what I think are some of the major programmatic areas to which I believe the Pugwash Council should give urgent attention, I begin with the questions of humanitarian intervention, sovereignty, international security and human

rights. My work in this area began in the mid-1990s with a seminar that I and Carl Kaysen organized for senior graduate students at MIT. It ran for about three years, more-or-less concurrently with another effort by the two of us and more senior participants on presenting the case for a volunteer UN military force. Pugwash efforts emerged out of a workshop in Castellón de la Plana, Spain that was ostensibly to be about the utility of NATO. However, by the time we met in early July, 1999, the much-debated allied intervention in Kosovo had become a hot topic, and much of our July meeting focused on this.

This was followed by four more work-shops on intervention and sovereignty, culminating in one in Pugwash, Nova Scotia in July 2001 held jointly with the Canadian-managed International Commission on Intervention and State Sovereignty. We had an unusually diverse group of participants in these workshops, most from outside the usual Pugwash circles, including notably two hard-to-get people with needed specialized knowledge of international law. Two commendable volumes in our *Occasional Paper* series were published in February 2000 and January 2001. Notwithstanding our having had four plus meetings, I see this effort as very much a work in progress. Most intervention efforts have not worked out well: to cite extreme cases, those in the Congo in the 60s and those more recently in Rwanda, Somalia and Haiti have left these countries in scarcely better shape than before the interventions occurred. Yet, more such problems

are likely to be with us for as far into the future as I can see. I remain deeply troubled about the criteria for intervention, about who should be involved, and about post-conflict reconstruction and governance.

Next, I would highlight the problems of terrorism. With societies increasingly interdependent and in many ways increasingly fragile, and with means of massive destruction and disruption becoming increasingly available, I have little confidence that the problems can be largely dealt with through denial of capabilities and physical protection of valued assets. I suggest that the causes of terrorism, and which kinds of actions even merit the sobriquet, ought to get a lot more attention than they are now getting by governments and NGOs, and that Pugwash can have a comparative advantage in considering them—and those of intervention, as well—given the diversity of its constituency.

### **Concluding Thoughts**

I would close by noting that during the years I have been Secretary General we have commonly had at the end of the agenda for our Council meetings an item, “Situation in Troubled Regions”, followed by a short specific list, but I can recollect no instance of our ever having gotten to this agenda item. I suggest that the Council should in the future find time to do so, if necessary by extending its annual meetings.

One of the problem areas which has not been on Pugwash’s troubled regions agenda, but which I feel must be there, is sub-Sahara Africa, given the AIDS pandemic, and that, in

recent years, internecine slaughter and genocide has resulted in an enormous number of fatalities; in Rwanda and the Congo alone, roughly ten times as many as were produced by the Hiroshima and Nagasaki bombs.

This year, I suggested very seriously, and probably without precedent, that, in light of the Bush Administration's commitment to unilateralist approaches to international affairs, the United States should also be included in the Pugwash list of troubled regions.

But, I would now conclude my remarks by hypothesizing that with its somewhat complex separation-of-powers kind of government and some very powerful interest groups opposing many aspects of the Administration's policies, the United

States might equally be in what I have characterized as a knife-edge situation: one where there is in the public, in the higher echelons of the military services and in the very evenly divided US Congress, such strong and growing opposition to much of what the Administration would like to do that there is a real possibility of many of President Bush's wishes regarding unilateralist approaches to international relations and the use of force being largely thwarted—if war in Iraq can be forestalled until after America's mid-term election this November. I much regret that I did not have the wit to schedule for this Conference a panel discussion on this hypothesis.

I apologize for the length of my remarks. Thank you for your attention.

Humankind cannot have a better common future without a better common present. Unsustainable life styles on the part of a few, and unacceptable poverty on the part of large numbers should not continue to co-exist, if we are to achieve the new Paradise referred to in the Russell – Einstein Manifesto.

My initial acquaintance with the mission of Pugwash was in 1958, when at the second UN Conference on the Peaceful uses of Atomic Energy held in Geneva, Prof. H. J. Muller explained to me the purpose of Pugwash. Since then, I have followed with great admiration the statements issued after Pugwash Conferences, and rejoiced along with numerous other like-minded persons the recognition given to Sir Joseph Rotblat and to Pugwash in 1995 through the Nobel Peace Prize.

During my tenure as President, I shall do my best to draw public and political attention to the catastrophic consequences of the use of nuclear weapons, as well as to the moral and ethical responsibility of scientists for their inventions. Anthropogenic threats to human security are increasing day by day. In addition to the nuclear peril, we should fight the biological and chemical perils now looming large on the horizon. For human induced maladies, only human beings can find remedies. I am confident that together with our young Pugwash members, we can continue to keep Pugwash an affirming flame, and a powerful moral force in the midst of the growing violence in the human heart we are witnessing today.

While there are many forms of

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## Remarks by PROF. M. S. SWAMINATHAN following his election as President of the Pugwash Conferences

*12 August 2002*

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I feel very humble standing before you to accept the Presidency of this unique organisation, considering the eminence of those who have occupied this position before. I am happy that Sir Joseph Rotblat, one of the founders of this organisation is with us. We do miss Sir Michael Atiyah, who along with Prof. George Rathjens, has done so much during the past 5 years to strengthen the contemporary relevance of Pugwash. We are indebted to both of them for their monumental contributions to the organisation.

I am particularly happy that we have at this meeting large numbers of International Student / Young Pugwash members. Their participation helps to bridge the generation gap in perceptions and priorities.

I realize that I am the first from a Third World Country to be elected President. This imposes on me the obligation to bring to your attention the threats to human security arising from poverty, hunger and unemployment. Clean drinking water is becoming a chemical curiosity in several parts of the developing world.



M.S. Swaminathan.

threats to a sustainable human future, we should not relax our efforts in getting a Comprehensive Test Ban Treaty on all kinds of nuclear weapons approved by all nations by the year 2005, which marks the 50th anniversary of the Russell-Einstein Manifesto, and the 60th anniversary of the dropping of atomic bombs on Hiroshima and Nagasaki. I consider the launching of an Agenda 2005 programme designed to terminate nuclear, biological and chemical perils forever, will meet with widespread support from concerned citizens worldwide who are all bewildered at the direction human civilization is taking following the September 11, 2001, events. We should focus our moral and intellectual resources to fostering harmony within humankind and between humankind and nature.

In all such efforts, we should keep in mind what Mother Theresa once said, "My work may be a drop in the ocean; but the ocean will be less with that missing drop". Let us continue to strive to be an organisation which helps to make a difference to human destiny – a destiny where the uncom-

mon opportunities opened up by modern science and technology help to confer on every child, woman and man on our planet the four freedoms which President Roosevelt advocated 60 years ago – freedom from fear, freedom from want, freedom of expression and freedom of worship.

I thank you again very much.  
M. S. Swaminathan

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*Prof. M.S. Swaminathan, UNESCO-Cousteau Professor in Ecotechnology and Chairman, M.S. Swaminathan Research Foundation in Chennai, India, has long been recognized for his singular contributions to sustainable agriculture and food security, Prof. Swaminathan helped launch the "green revolution" which dramatically increased crop yields and converted India from a net food importer to a food exporter. Prof. Swaminathan received his Ph.D. from the School of Agriculture, University of Cambridge, UK, in 1952, and is the recipient of numerous honorary degrees and international awards, including most recently the Franklin D. Roosevelt Four Freedoms Award (2000) and the Planet and Humanity Medal of the International Geographical Union (2000).*  
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## Working Groups

### WG 1:

#### Eliminating Nuclear Weapons

- Future of US-Russian arms control
- China, South Asia and the Middle East
- Future of the CTBT, NPT and goal of eliminating nuclear weapons

### WG 2:

#### Missile Defense and the Uses of Space

- After the ABM Treaty: NMD and military uses of space
- Growing tensions between military and civilian uses of space
- European and international perspectives; multilateral cooperation

### WG 3:

#### CBW and WMD Terrorism

- Strengthening the CWC and BTWC
- Terrorist use of CBW
- Nuclear terrorism

### WG 4:

#### International Governance and Security

- the phenomenon of terrorism
- resources and conflict
- strengthening multilateral security cooperation

### WG 5:

#### Globalization and Technology

- equity in the global economy
- information technology haves and have-nots
- biotechnology and development

### WG 6:

#### Climate Change, Energy and the Environment

- scenarios of global climate change
- climate change and energy needs (e.g., nuclear energy)
- policy implications of climate change

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**REPORT OF WORKING GROUP 1**
**The Elimination of Nuclear Weapons**

*Jo Husbands and Sverre Lodgaard, Co-Convenors*  
*Tom Milne, Rapporteur*

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**Eliminate or Marginalize?**

Following the end of the Cold War a debate began between those favouring explicit policies intended to eliminate (more properly, prohibit) nuclear weapons on a timescale of practical interest, and those preferring instead to seek the ‘marginalization’ of nuclear weapons in world affairs, by which was meant the gradual de-emphasizing of nuclear weapons in defence planning. Among the marginalizers were those who were *not* wholly convinced of the desirability of a nuclear-weapon-free world, and continued to believe that the retention of minimum nuclear forces by a few nations would be beneficial to international security. Others believed that, as a matter of tactics, it would be unwise to concentrate from the outset on the goal of zero for fear of dissipating the political will needed to take even the first important steps to roll back Cold War excesses.

There was widespread agreement, however, on the main requirements of an immediate agenda of reductions and reform of nuclear arsenals and operational practices. For several years, in the latter part of the 1980s and early 1990s, significant progress was made in reducing nuclear dangers, culminating in the prospect of the verified destruction of warheads in the context of a prospective START III. While for some progress

was painfully slow and faltering, headway clearly was being made – nuclear weapons *were* becoming less prominent in defence planning – and bodies such as Pugwash could look ahead to the problems of moving to low numbers of nuclear weapons and eventually zero.

This was all well and good, but the primary argument against marginalization had always been that a condition of ‘low nuclear salience’ would not be sustainable. Unless the nuclear weapon states made a nuclear-weapon-free world their determined and explicit objective, the argument went, then sooner or later progress in disarmament would be derailed and the world would return to *high* nuclear salience – that is to say, arms racing and proliferation. The precise reasons for returning to high nuclear salience could not necessarily be foreseen. The point was the more general one, that a situation in which nuclear weapons had been marginalized would forever be vulnerable to unavoidable processes of political change. The analogy could be made with a forest fire: as long as embers persist there would be the danger that a change of wind could re-ignite the flames.

**Renewed Emphasis on Nuclear Weapons**

The acquisition of nuclear weapons by India and Pakistan, and developments in US nuclear weapons policy,

reinforced by the events of September 11th, were seen by many in the group as potentially presaging just such a return to a new era of weapons development and proliferation.

The leaked 2002 Nuclear Posture Review and the recent Bush-Putin nuclear arms reduction treaty, in particular, together with the Bush Administration’s open aversion to arms control, convey attitudes to nuclear issues and apparent policy directions disquieting to most if not all of the Working Group. Criticism can, of course, be made of the nuclear policies of many other countries (the continuing deployment by Russia of large numbers of tactical nuclear weapons was deplored, for example), but in view of the dominant role that it plays in world affairs it was considered futile to discuss prospects for eliminating nuclear weapons without ‘focusing intensely on the role of the United States.’ Among these attitudes and intentions are the following:

- That nuclear weapons are legitimate weapons, which the US plans to retain in large numbers for the indefinite future.
- That the US may be prepared to use nuclear weapons in a widening range of circumstances, in particular in operations such as attacks on underground military facilities, or to pre-empt or respond to chemical or biological weapons attack.
- That the US will invest heavily in its nuclear weapons infrastructure; that new warheads may be developed and nuclear explosion testing may resume.

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- That the US is unlikely to allow itself to be constrained by existing arms control commitments, and unlikely to engage in additional meaningful measures of nuclear arms control and disarmament.

Little enthusiasm was expressed in the Group for the Bush-Putin Strategic Offensive Reductions Treaty (SORT), which commits each side to reduce its strategic nuclear weapons to 1,700-2,200 by 31 December 2012 when the treaty expires. The general feeling was that it constituted not much more than a 'statement of intent to carry out actions already planned.' By failing to require destruction of infrastructure, delivery vehicles or warheads, moreover, and specifying no schedule of reductions between now and the treaty's expiry date, the US has effectively abandoned the bilateral process of *verified* nuclear disarmament that had been developing through the INF and START agreements and which, it had been hoped, would eventually broaden to include the other nuclear weapon states. Similarly, by flouting several of the 'steps towards disarmament' agreed at the 2000 NPT Review Conference – for example, in developing ballistic missile defence, withdrawing support for the comprehensive test ban, and planning under SORT to retain thousands of intact warheads and warhead components in reserve, thus ensuring that reductions being made to the US arsenal can rapidly be reversed – US policy-making would appear now to disregard almost entirely the obligation ('unequivocal undertaking') to disarm under Article VI of the NPT.



*Sverre Lodgaard, Gwyn Prins, Marie Muller.*

The nuclear confrontation in South Asia is, of course, of more immediate grave concern. There has been an apparent willingness on both sides to take enormous risks since nuclear weapons were introduced into the region, with nuclear threats being made during periods of great tension that have seen massive and sustained military confrontation along a long border. The possibility that a conventional war could escalate to nuclear use clearly cannot be discounted.

Tensions have diminished from the most recent crisis point in the spring of this year, but the presence of nuclear weapons means that the situation is still very dangerous and a further 'cooling off period' is needed. There was some discussion in the group of measures that might be taken to reduce the nuclear risks, including an agreement on non-deployment of nuclear forces given that neither nation yet deploys nuclear weapons on a routine operational basis. It was

argued that this might be easier to achieve than an agreement on no first use of nuclear weapons, which Pakistan would find difficult to accept, although India has set out its long-term intention to deploy land, sea and air-based nuclear forces.

In briefly discussing the situation in Iraq, the Group stressed the urgency of bringing the UN weapons inspectors back to the country. In varying degrees, those who expressed an opinion warned against the grave risks of a military attack to change the Iraqi regime.

### **Recommitment to Nuclear Disarmament**

While regretting the content and tone of recent US policy, not everyone in the group was inclined to draw the same conclusions about the appropriate way to respond. There were some, for instance, who cautioned against exaggerating the significance of current adverse developments; taking a longer-term perspective, the role



of nuclear weapons may still be seen to be diminishing and the nuclear establishment atrophying, they argued. While it would have been preferable had the SORT agreement provided for the destruction rather than storage of decommissioned nuclear weapons, the treaty does at least prescribe a continuing reduction of deployed weapons and, in this respect, should be welcomed. Similarly, although the NPR might be 'needlessly imprudent,' the recommendations that it makes will not necessarily be put into practice. After all, it seems hard to understand why the US would want to widen the role of nuclear weapons (the great potential equalizers) when, as demonstrated in recent wars, it has quite unrivalled conventional military capabilities. A similar point was made about the decision of India to develop and deploy nuclear weapons, given the likelihood that Pakistan would do the same.

But this was not the prevailing sentiment in the group. The wider view was that the actions of the US, India and Pakistan among others could best be explained as evidence of a continuing belief in the value of nuclear weapons as a source of security. Longstanding fundamental questions about the utility and legitimacy of nuclear weapons remain unresolved. Until these issues are addressed, discussion of the details of nuclear weapons policy will be peripheral and, ultimately, ineffective.

In this context there were a number of impassioned pleas, which found a resonance in the group as a whole, amounting to a call for Pugwash to recommit itself to the

elimination of nuclear weapons, and together with the broadest possible coalition of like-minded bodies launch a campaign aimed at rekindling public interest in the nuclear issue. First and foremost this should be because reliance on nuclear weapons is immoral. They are the worst of all weapons, carrying a unique threat to civilization. Second, it should be on the basis that nations *must* adhere to international law, including the obligations undertaken under the Nuclear Non-Proliferation Treaty in particular. In the meanwhile what should be sought is a consensus that the sole legitimate purpose of nuclear weapons, for as long as nations retain them, is to deter the use of nuclear weapons by others, which is to say attempts should be made to persuade each of the nuclear weapon states to announce policies of no first use.

Nothing will be accomplished if further proliferation of nuclear weapons is not prevented. A key function of Pugwash, therefore, should be to help provide the ideas, research and argumentation needed to protect, strengthen and revitalize the global non-proliferation regime. Among the suggestions put forward in the group for Pugwash activities in this respect were the following:

(1) that Pugwash does all that it can to ensure that there is not a resumption of nuclear explosion testing by any nation (should the United States begin to test again, for example, then this would almost certainly be followed by testing by other nations with potentially extremely adverse consequences for arms control and disarmament);

(2) that Pugwash study the means to strengthen enforcement of the non-proliferation provisions of the NPT;

(3) that Pugwash study the means to foster the development of nuclear-weapon-free zones, as well as any other supplementary regional arrangements, including, for example, zones free of weapons of mass destruction; and

(4) that Pugwash provide a source of innovative thinking on means to increase multilateral and international cooperation in the nuclear field, including but not limited to a revitalization of the Conference on Disarmament, and covering areas such as de-alerting of nuclear weapons, global material controls and accounting, anti-terrorism, and the science and technology underlying verification and other aspects of nuclear arms control, non-proliferation and disarmament.

If the conclusions reached by this group are accepted, then logically Pugwash would hold a continuing series of workshops on nuclear forces debating these and other issues, and aimed at achieving a nuclear-weapon-free world, comparable to those concerned with nuclear arms limitation and control held in the Cold War period.

REPORT OF WORKING GROUP 2

Missile Defenses and the Uses of Space

Catherine Kelleher and Jasjit Singh, Co-Convenors:  
Götz Neuneck, Rapporteur

The Working Group on Missile Defenses and the Uses of Space was composed of 22 members from 11 countries. The discussion focused on the status of U.S. plans to develop and deploy both theater and national missile defense systems, the linkage of those systems to the increasing danger of the weaponization of outer space, the possible consequences for future civilian space activities, and the prospects of future space arms control measures. There was in general a high level of consensus within the group.

The group started with an analysis of the technologies and wider implications of the current U.S. administration's declared plans, which include the placement of strike weapons in space. Space weapons are on the one hand devices deployed in space whose mission is to destroy or permanently disable satellites or targets on land, air, sea or space. On the other hand, they comprise weapons on the ground, at sea, or in the air that target satellites, inevitably including exoatmospheric ballistic missile defenses into the subject.

The demise of the ABM Treaty removed important restrictions on the deployment of weapons in space. Current U.S. plans for a multi-tiered missile defense system include not only previously prohibited space-based components but also an inherent capability to destroy from the ground satellites in low-earth orbits.

If U.S. plans were to be realized, it would pose an enormous challenge not only for potential US adversaries, but also for the commercial space industry. The treaty prohibited the testing and deployment of not only sensors in space, but also space-based interceptors which have also an anti-satellite capability. The distinction between ABM and ASAT systems has now been lost and a new treaty-based definition is urgently needed.

In the absence of such an agreement, the United States and subsequently other nations with access to space are free to test and deploy space weapons. It is feared that this process could result in a costly and dangerous arms race in space.

It was noted that advocacy for space weapons in the United States has picked up increasing momentum despite the huge technical, financial and political obstacles that have prevented the development of these weapons to date. A small group of space enthusiasts, especially in the U.S. Space Command, have envisioned missions and technologies for controlling outright the use of space and using the domain of space as a medium for the direct application of military force. A fanciful set of exotic weapons underlies the aspirations of these "space fundamentalists," and there is a wide range of weapons conceivable (if still technically infeasible): maneuverable kill vehicles, space mines, parasite satellites,

lasers, trans-atmospheric vehicles, "brilliant pebbles," and others. It was observed that the Commission to Assess United States National Security Space Management and Organization, which was chaired by Donald Rumsfeld prior to his becoming Secretary of Defense, echoed more extreme formulations with its call for the "development of doctrine, concepts of operations and capabilities for space, including weapons systems that operate in space and that can defend assets in orbit."

Despite all efforts to push forward the weaponization of space by a small group of space advocates, it is not yet the policy of the U.S. to weaponize space. Nevertheless funding for the kinetic energy ASAT and the space-based laser continues, albeit on a limited level. A more aggressive program is conceivable.

A discussion about the relation of offensive and defensive technologies in space was conducted. It was suggested not only that it is difficult to distinguish between offensive and defensive weapons in space but also that weapons for destroying satellites are likely to be less costly and more effective than weapons for defending assets in space. In such a context, many countries could interpret the placement of defensive weapons in space as an offensive move and would consider in advance the use of countermeasures. The result would be a competitive weaponization of space. Today there are no strike weapons in space. However, it should be recognized that perceptions of the intentions of others, rather than technical capabilities, will drive the future planning of various states with ambi-

tions in space and trigger new R&D in this field.

Many participants expressed the fear that the vision of a small group of “space warriors” could lead to a condition of U.S. supremacy in space. The U.S. might develop the capability to intervene anywhere on the planet from space if these plans were to materialize. US domination of space could result in a feeling of helplessness and degradation for many countries. In some states this would trigger a call for counteractions. Other countries and their space industries could become totally dependent on the United States. There was considerable skepticism in the group that such dominance would be feasible, but even the perception of such steps could cause harm in the international relations.

Often it is argued that the medium of space is comparable to that of the sea, where navies with a variety of weapons for offense and defense have long been present. This picture seems to be seductive but does not hold up to deeper analysis. Behavior at sea is also regulated by the international law of the sea. It should be clear that space is different: No country “owns” space; unlike the sea, space is not a medium for transporting goods, but rather one for transmitting information; and the loss of assets at sea is not likely to have consequences of a magnitude comparable to the loss of assets in space. A closer analogy to space might be Antarctica, where the major powers have agreed to share responsibility for its safekeeping, and have pledged not to place weapons there.

An examination of existing space

regulations revealed that the provisions apply to specific military activities, but do not prohibit the deployment, operation, and the use of conventional weapons in and from space. The preamble of the 1967 Outer Space Treaty (OST) recognizes the common interest in the use of outer space for peaceful purposes and prohibits the orbiting around the earth, and the stationing in outer space of weapons of mass destruction. The 1963 Partial Test Ban Treaty prohibits nuclear weapon tests “or any other nuclear explosions” in outer space. The OST did not define the term “space weapon,” though this might now be an advantage because it provides room for introducing new definitions. By asserting that space belongs to everyone, the OST builds a strong norm against the domination of space by one power. The OST was signed by approximately 100 countries and constitutes an important barrier against the deployment of nuclear weapons in space. The regime should be strengthened.

It was generally agreed that the US withdrawal from the ABM Treaty created urgent need for a new system to regulate the peaceful use of space. Although individual proposals exist, the arms control community should devote more time, creativity and awareness to work out new regulations for space arms control. A revival of the ABM-treaty or any similar initiative is quite unlikely as long as the present US administration remains in office. A new government with interest in arms control might come to other conclusions. Active, anti-satellite platforms with “shoot-

ing” capabilities must be the next major focus of the arms control community. One key issue is finding an appropriate forum for developing new space regulations. Another is finding arms-control allies in the military as well in the space industry and in space-faring nations including Russia, China, Canada, France, Germany, Sweden Japan, Brazil or others—perhaps even within the United States. The current body of space law needs to adapt to the current political situation and to the new technological realities.

Another subject of the group was the threat and the vulnerability of space assets. Satellites are certainly fragile against other high-velocity objects in space. Geosynchronous orbit can be “poisoned,” but doing so would take time, resources, and determination.

Most of the scenarios that are mentioned in US planning documents as justification for weapons development are highly unlikely and can be matched with different measures. A “space Pearl Harbor” is an unjustified exaggeration. A space system consists of several ground stations with uplink and downlink connections to a space segment. It is more than an single object. The threat of physical attack on ground stations by states or terrorists might be conceivable, but the best protection would efficient safeguards on the ground of key facilities. Communications satellites are mostly in geostationary orbits and are safe given present technologies. With regard to space launchers which are necessary to hit satellites in space, only a threat from major space-faring nations seems to

be possible. Conventional ASATs against GEO satellites are not easy to field and need much time for maneuvering and testing. Many in the group felt that a threat to satellites is remote and reminiscent of claims about the long-range ballistic missile threat.

While the threat of ASAT weapons is remote, payload verification and the notification of launches and satellites were believed by many to be problems that were not insoluble. One advantage of space is its transparency. Satellites emit a lot of data. Not only would “killer satellites” look quite different given their function and data flows, they would have to be tested, which could be observed.

On the issue of testing ASAT weapons, the issue of debris was discussed. Testing or launch failures or accidents would aggravate the threat for civilian satellites in low earth orbits.

The group also considered the implications of the US plans to deploy ballistic missile defense systems for space arms control. The planned land or sea based interceptors are also capable of intercepting satellites in LEO. There are strong arguments, that the planned U.S. midcourse missile defense system will not work, or if it works, it will not be efficient. It seems to be also clear that the BM threat is not ballistic, but stems from nuclear weapons or other WMD delivered by simple carriers such as ships or cars. The group felt that an invincible Maginot-line in the sky and in space is illusionary and creates a false sense of security.

Future intercept-technologies,

such as the Airborne or Space Based Laser could not only deny the access to space by shooting down space launchers but could also intercept satellites. The “Brilliant Pebbles” concept which consists of some 1500 satellites could either be used for missile defense or as an attack system to destroy satellites in orbit.

The implications of BMD for nuclear deterrence and for regions such as South or South East Asia were also discussed. Missile defense can turn defense into offense and might trigger new arms races in different regions. For the regional context, the situation for countries such as Japan, India or China is more complicated, if the U.S. deploys Theater Missile Defenses. The combination of missile defense, space support and the ideas of the “Nuclear Posture Review” will increase the risk of the use of nuclear weapons in local conflicts.

The working group session ended with several proposals and recommendations for future work and action:

(1) With respect to actions for Pugwash, it was recommended that Pugwash should become more deeply engaged with the problem of the weaponization of outer space. There was unanimous support for the idea that Pugwash establishes a continuing working group to study the subject in depth. The group should examine issues such as the nature of the ballistic missile threat, missile defense and its linkage to outer space activities, the dual-use problem, future space threat scenarios and their likelihood, the possibility for a space arms control treaty or “rules of the road,” as

well as the regional and global consequences for nuclear disarmament and arms control. The group could start with a workshop that would include not only scientists and policy experts from like-minded nations but also officials from the space industry and the military. One participant proposed that the chairman of such a group should not be from Russia, China or the United States. The group welcomed a paper by the Student Pugwash-Group that outlined their vision of the problem and proposed a full set of concrete steps. Pugwash should emphasize the space issue in their Goals for the tenth Quinquennium. Pugwash should be also be present at the “Space Policy Summit” in Houston, USA in October 2002. The next Pugwash conference in Halifax, Canada should establish the working group on the subject.

(2) Regarding options, the “easy-to-handle” proposal would an amendment to the Outer Space Treaty which should prohibit the placing in orbit of any kind of weapon, not only objects carrying nuclear weapons or other WMD, as it is the case today. Many countries have signed the Treaty and this amendment would increase the pressure on the U.S. to abide by the principle of the treaty, which recognizes the common interest in the use of outer space for peaceful purposes. An exclusion of the United States should optimally be avoided. The so-called Registration Convention of 1976 which provides for the recording of all space objects launched from earth, which is adhered to by over 40 states, should be expanded.

(3) Another concrete step favored by the working group would be an effort to internationalize the agreement on non-interference with “peaceful” assets orbiting in space, enlarging upon the thirty-year old examples contained in the SALT and START dealing with the protection of “National Technical Means.” This effort could perhaps take the form of an United Nations Resolution.

(4) Concerning the international level and the appropriate fora, a set of ideas for strengthening existing treaties were discussed. First, there is some hope but not much confidence that the CD would overcome its stalemate. The new joint Chinese-Russian working paper was welcomed as a useful starting point for a fruitful discussion on the subject. Second, there was a proposal to initiate an Ottawa-II Process, modeled after the Landmine treaty to establish an international movement for the prevention of an arms race in Outer Space. Such a conference could start with a common statement to create common set of principles and standards. Like-minded governments, NGOs, and representatives from the space industry could elaborate details. A goal for the future is certainly a comprehensive and freestanding treaty that would forbid attack vehicles in space and weapons against space objects and include verification measures. Additionally, an international space agency could be founded

- to bring international capabilities such as PAXSAT into Outer Space,
- to regulate and maintain space traffic and

- to help less developed countries to achieve access to space for peaceful purposes.

In addition, the United Nations General Assembly should also accelerate its efforts to maintain space as a domain free of weapons. A caucus of state parties to the OST this fall in NY during the General Assembly should enable a first discussion of the above proposed elements.

Having discussed space policies and the possible future danger of an arms race in space the group came to the conclusion that in this very criti-

cal moment urgent action is needed. Pugwash can and should contribute to this by informing the public and the parliaments about the danger of space weaponization. Again, the group thinks that no state has the right to put arms into space. Space belongs to all mankind and should only be used for peaceful and scientific purposes, international cooperation and the prevention of conflicts. A costly arms race in space can be avoided if decisive steps by the international community are starting now.

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### REPORT OF WORKING GROUP 3

## CBW and WMD Terrorism

*Robin Coupland and Judith Reppy, Co-convenors*  
*Clayton Nall, Rapporteur*

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Working Group 3 discussed the strengthening of chemical and biological arms control treaties, as well as chemical, biological, and nuclear terrorism. The group decided that the best way to discuss these topics in the sessions allotted was to hold five largely separate discussions on the following issues:

- Strengthening the Chemical Weapons Convention (CWC)
- Strengthening the Biological and Toxin Weapons Convention (BTWC)
- Preventing chemical terrorism
- Preventing biological terrorism
- Preventing nuclear terrorism.

### Strengthening the Chemical Weapons Convention

The discussion began with a presentation on the implementation problems under the Chemical Weapons

Convention (CWC), which just had its fifth anniversary. Currently, 174 states have signed the treaty, and 145 have ratified it, testifying to the popularity of complete chemical disarmament. The treaty is a watershed in disarmament verification, especially in terms of its on-site inspection provisions administered by the Organization for the Prohibition of Chemical Weapons (OPCW). However, States Parties must solve a range of implementation challenges if the treaty is to function effectively at prohibiting chemical weapons.

One working group presentation identified three far-reaching implementation problems that have arisen since the treaty's entry into force: noncompliance of certain states with the treaty's verification provisions, the predicted failure of certain states to meet an ambitious April 2007



*Pan Zhenqiang, M.S. Swaminathan, Chen Jifeng.*

deadline to destroy their CW stockpiles, and atrophy of various treaty provisions because individual States Parties have not used them.

Several states have not complied fully with the CWC's provisions. The United States, for example, was cited as ratifying the CWC with significant conditions. This sets a poor example and precedent that other states may follow or exploit politically. Many states have yet to create a National Authority for domestic implementation of the treaty. Such noncompliance undermines the treaty.

It was noted that neglect of certain provisions has weakened the treaty regime. Challenge inspections have not occurred, yet were to have provided teeth to the CWC's verification regime. They serve as a contractual obligation that requires states to operate inside the treaty's institutions to pursue evidence of accused programs. Similarly, the General Purpose Criterion (GPC), a catchall for control of agents not scheduled under the convention, has not been applied vig-

orously in treaty interpretation.

The GPC was central to one point of concern raised about research on so-called non-lethal weapons (NLWs), including sedatives, retching agents, and psychoactive substances. While the treaty does allow for use of riot-control agents in non-combat and law-enforcement situations, the US appears to give itself the benefit of the doubt when interpreting the treaty, potentially allowing for the use of such agents in operations other than war. Some group members were aghast at such developments, saying they undermine treaties and that the "non-lethal" label is scientifically unsound in any case. Others were more open to NLWs, noting their potential practicality in peacekeeping and other military operations where armed individuals could be hiding in crowded areas or using hostages as human shields.

A range of proposed remedies arose from this discussion. While no particular proposal received a stamp of approval from the group, partici-

pants repeated three major points. First, the treaty's near-term responsibility is to ensure destruction of declared stockpiles, and to make every effort to do as much as possible before 2007, especially in Russia. Second, participants said that emphasis should be shifted from routine inspections, many of which could be carried out with automatic monitoring equipment such as that employed by UNSCOM. It was observed that this would free resources for challenge inspections and more direct challenges to treaty violators. Third, on a range of issues participants encouraged States Parties to adopt a more scrupulous interpretation of treaty provisions ranging from the General Purpose Criterion to the loophole provided for "riot control agents."

It was observed that at least one positive development has emerged from the CWC: the chemical industry's support for the treaty regime. This support persists, and appears critical to the success of any treaty where dual-use dilemmas may emerge.

### **Strengthening the Biological and Toxin Weapons Convention (BTWC)**

Discussion on strengthening the BTWC focused not only on the need for such a regime, but also on new biotechnology developments that, if left unfettered, could imperil the BTWC altogether. As with the CWC, less-than-scrupulous interpretation of treaty loopholes by States Parties was cited as a problem that could be a "treaty breaker."

This discussion seemed based on the assumption that little progress will occur when the Fifth BTWC

Review Conference resumes in November. The United States' rejection of the Draft Protocol and its attempt to terminate the Ad Hoc Group's mandate have left a leadership vacuum in Geneva. Given this, few new measures are expected besides limited biosafety and biocriminality measures of the type backed by the US and the UK. It was argued that these proposals, which are limited in scope, will be a useful basis for moving forward, but do not constitute an adequate protocol in themselves.

The group focused a great deal on emerging concerns. Among these was the threat from new biochemical techniques that could create a host of new weaponizable toxins. Using combinatorial techniques, industry is now screening 3 million chemicals per year; 50,000 of which are found to have highly toxic properties. Such techniques also yield "non-lethal" agents that could be weaponized. Unfortunately, the technology's potential use for toxin synthesis presents another major challenge to both CWC and BTWC verification. Another group member raised concerns about recombinant DNA experiments, citing a research study in which a recombinant mouse poxvirus designed to serve as a delivery vehicle for contraceptive gene therapy for rodent control was inadvertently converted into a fatal pathogen. Abuse of genomics research is also a concern.

In light of the potential misuse of this new technology, it was proposed that these activities be regulated under existing treaties. Under the CWC, the OPCW could focus inspec-

tions on the discrete organic chemical (DOC) plants that employ biotechnology to produce toxic chemicals. A BTWC monitoring protocol could also take the risks of new developments into account.

Confronted with these thorny issues, participants noted that certain false dichotomies muddle efforts to bring substances under treaty control. One is the "lethal weapon" versus "non-lethal weapon" dichotomy. A group member noted that no chemical agent could be called non-lethal, since lethality is ultimately a function of the dose administered. Others questioned this dichotomy on the grounds that non-lethal substances not only would be indistinguishable from lethal agents in real time, but also would almost certainly be employed in tandem with lethal weapons, a clear violation of humanitarian principles. Another problematic dichotomy is the provision in the treaty distinguishing between offensive and defensive purposes for possessing biological agents. Under the treaty, States Parties are able to conduct activities that are indistinguishable from offensive research and development but for the stated intent. US biodefense activities are particularly troubling in this regard.

Group members suggested a few steps to get BTWC verification back on track. One proposed measure was to use the British Green Paper on BTWC verification, which summarizes a number of politically viable options, as a basis for moving forward. The Ad Hoc Group remains a suitable forum for discussing a protocol. Even more critically, supporters of a strong BTWC protocol must

elicit support of industries that would be affected, especially by winning support of such groups as the Pharmaceutical Researchers and Manufacturers of America. Such support may require compromises, but it was offered that useful provisions, including green-light challenge inspections and disease outbreak investigations, might be accepted by industry. Inconsistencies in inspection requirements would still have to be worked out—sectors from brewing to pharmaceuticals to education would likely be affected by BTWC inspections.

A widespread feeling prevailed that little progress will take place without increased US involvement. Many group members dismissed the idea of attempting an Ottawa-type process in lieu of US leadership.

## Chemical and Biological Terrorism

The group was uncomfortable with the word "terrorism," believing that it requires careful definition. Group members did acknowledge that "terrorism" does usually encompass a manifestation of politically or ideologically driven violence. It was generally also used as a term of reference for the use of weapons against a population outside of a recognized combat situation. Rather than debating definitions, the group deliberated on the motivations for chemical and biological weapons use and the effects of such weapons.

Shying from the term "terrorism," an analytical framework of armed violence was introduced as the basis for discussion. This framework was meant to serve as a model to identify

the chain of events that would contribute to a chemical or biological attack, or, for that matter, any violent act and measure its effects. Four key determinants are at play in this framework:

- The potential of the weapon to cause the desired effect
- The number of potential users armed
- The vulnerability of the victim(s)
- The psychological potential for violence.

Each of these determinants is to some degree a function of the others. Two simple concepts make this framework useful. First, if any of these factors is measured at zero, there will be no violent effect. Secondly, the psychological potential for violence is shaped by an individual's perception of the other three determinants. This framework was presented as a useful way, for example, to assess the sending of anthrax letters in the US last fall. Participants took this model as a point of departure to address the likelihood of use and the likely effects of biological or chemical weapons.

The question of the effects of CBW use, and their resulting attractiveness to non-state actors, was discussed. Participants agreed that chemical and biological weapons have a spectrum of effects, most of which could not be termed "mass destruction." Even the term "mass destruction," it was said, creates problems. How does one compare the effects of deliberately released smallpox, which could kill millions, and the more intense local effect of a nuclear explosion? These are but two

manifestations of unconventional weapons use. The group questioned the value of labeling weapons types according to the damage caused.

Nor can effects simply be measured in terms of physical damage. Terror thrives on ignorance and sensationalism, both of which were served in heaping portions following September 11. Thus, an effect of anthrax letters was not only the people killed and the buildings quarantined, but also the widespread fear that any letter among billions could contain anthrax spores. Another noted consequence of the media feeding frenzy over the anthrax scare was an erosion of the norm against BW use.

Working group members agreed that several "bioterror" scenarios are cause for grave concern. For example, it was accepted that the deliberate release of smallpox or any other highly contagious and fatal disease would be a crime against humanity potentially leading to hundreds of thousands, if not millions of deaths. The deliberate release of a vaccine-resistant contagion is also worrying. At the same time, participants noted that no use of BW would be able to destroy human civilization, although it is feasible that some pathogens could cause 90 percent fatality rates, leading to a crisis unprecedented in human history.

Non-state use of chemical weapons prompted less discussion. While they would cause significant localized damage, they were not treated as a "megaterrorism" threat, to quote one participant. Participants said that CW remained a threat, particularly because they can be targeted more easily than biological agents, and

their effects will not differ as significantly from one victim to another. Also, some chemical agents, such as chlorine and cyanide, are more manageable and more accessible than BW.

Some proposals to address the terror threat did come out of the working group. One was for states to prepare for attacks by strengthening public health and educating public in order to mitigate psychological effects of terror attacks. This would entail expanded epidemiological research and monitoring as well. Another measure is for states to sign on to treaties establishing stiff penalties for biological weapons possession and use and maintaining tight control over pathogens. Participants also agreed on a treaty requiring states to establish stiff criminal penalties for possession and use of illicit biological agents.

## **Nuclear Terrorism**

Nuclear terrorism presents a range of unique problems that the group determined would be worth longer discussion. Nuclear terrorism encompasses the range of threats involving nuclear materials. Roughly in order of increase threat level, these are:

- Radioactive dispersion devices
- Attacks on nuclear power installations
- Acquisition or use of nuclear materials suitable for use in functioning nuclear explosive devices
- Acquisition or use of intact nuclear weapons.

The problem with the current response, especially from the United States, to this four-fold threat is that it is not the product of an effort to



consider or compare the full range of nuclear terrorist threats. Participants argued that we must decide which threats will be a priority.

For example, the first threat, radioactive dispersal devices (RDDs), is more psychological than physical. The second, sabotage of nuclear power installations, is not a hypothetical threat, given cases of sabotage in the former Soviet Union. In one instance, a nuclear facility was subject to blackmail, in another, a plant security system was faced a planned computer virus attack. This threat is most acute where reactors are in urban areas. Russian blueprints for a maritime mobile power reactor based on highly enriched uranium (HEU) naval reactors are also problematic. The safety of facilities in Pakistan and India also prompted concern.

The third category, theft of fissile material, was also raised as a real concern, given its usefulness in fashioning a working nuclear device. In fact, it is a key choke point in nuclear weapons production. HEU can be easily incorporated into a crude gun-type nuclear device. However, programs to downblend HEU to a sub-weapons-grade level are moving slowly.

Fourth and finally, acquisition of functional nuclear weapons is a grave concern. Thousands of tactical nuclear weapons are in storage and not well protected, especially in Russia. Yet these weapons, which pose the greatest proliferation threat, are not subject to any legally binding transparency or verification mechanism that could ensure their security.

### *Recommendations for comprehensive action against nuclear terrorism*

The first two threats listed—radiological attacks and nuclear sabotage—merit attention, but could be addressed primarily by immediate safety measures and a public information campaign. In the short-term, screening of personnel could begin immediately at the world's nuclear facilities. In the intermediate term, fissile material controls should be enacted, as should controls on other radiological materials. One such proposal suggested that an international agency could be assigned to control of radioactive materials, especially in the nuclear fuel cycle.

Tactical nuclear weapons (TNWs) are vulnerable to theft. One participant said that more cooperative threat reduction funds, both from the US Nunn-Lugar program and foreign governments, should go to TNW dismantling. In fact, the US and Russia should adhere to their 1991 and 1992 agreements to take such weapons out of deployment.

The Nunn-Lugar programs received universal acclaim for their role in addressing the nuclear terrorism threat in the former Soviet Union and as a model for international initiatives against the global nuclear terrorism threat. The group lauded the US political commitment at the G8 to move forward with funding for CTR for at least another decade. However, this commitment to funding is marred by tricky accounting where funds already committed to CTR are being counted as “new commitments” to nonproliferation over the

next ten years. The moneys under the G8 commitment could also occur through debt reduction linked to Russian nonproliferation support. Participants noted that the EU also deserved strong criticism for its failure to fund CTR efforts in the former Soviet Union. It was strongly urged that more money should go to accelerating HEU downblending.

On the international legal level, a draft convention against nuclear terrorism has been tabled by Russia. Other conventions apply to nuclear safety, each of which could be a part of the comprehensive plan of action.

### **Openness in Science**

To conclude discussion, participants questioned whether the technical feasibility of chemical, nuclear, or biological attacks should be explained in public fora. Participants agreed that responsible and realistic communication with the public is crucial before and after predictable unconventional weapons events. When properly informed, people will be less likely to panic over small threats. And if such an event happens to be severe, then the public still benefits from access to scientific knowledge by knowing how to respond.

The group generally concluded that the full spectrum of threats from nuclear, chemical, and biological weapons demands a domestic commitment from governments and a shared international response.

REPORT OF WORKING GROUP 4

**International Governance and Security**

*Ochieng Adala and Lynn Eden, Co-Convenors  
John Avery, Rapporteur*

Working Group 4 focused on three issues: (1) The phenomenon of terrorism; (2) Resources and conflict; and (3) Strengthening multilateral security cooperation.

**The phenomenon of terrorism**

The group agreed that the tragic events of September 11, 2001, had a profound effect on the international scene, as well as on the psyche and foreign policy of the United States. It was pointed out that as a result of attacks, many people lost their sense of security and stability. There was a wave of suicides, and use of antidepressant drugs. Irrational non-specific fear produced symptoms of paranoia and anxiety. There were also realistic fears that a global civil war might be starting .

The response of the Bush Administration was also worrying. There was an initial worldwide outpouring of sympathy for the US and for the families of the innocent victims of the attacks, but this sympathy was soon combined with alarm when President Bush claimed the right to unilaterally initiate war against potential enemies and when civil liberties began to be eroded by antiterrorist measures.

In discussing the phenomenon of terrorism, we found it hard to agree on a definition. One of the participants proposed that by definition, terrorism has to be committed by a non-state actor, that the act must be indiscriminate, the victims innocent,

and the purpose politically motivated. However the majority of the group members felt that limiting the definition of terrorism to non-state actors ignored similarities and causal relationships linking state terror to non-state terror. For example, in the conflict between Israel and Palestine, there is a circular causal relationship between the use of helicopters and tanks against unarmed civilians by Israel and the suicide bombings by Palestinians. Most of us felt that states can also act as terrorists, when they maintain their power by fear rather than by democratic principles, when they violate human rights, or kill large numbers of their own citizens, when they invade foreign countries, or when they produce

massive destruction by strategic bombing. States normally have a monopoly on the use of force, but under normal circumstances this use of force is constrained by the safeguards of law and the principles of human rights. When states act outside the law, it was felt, they act as terrorists.

We agreed that in combating terrorism, it is extremely important to examine the reasons why people become terrorists, and to eliminate those causes. One cannot get rid of terrorism by killing or jailing individual terrorists, since others will spring up in their places. Our only chance is to understand and to correct the root causes of the phenomenon, remembering, of course, that no motivation can possibly excuse violent acts directed at innocent people. It was pointed out that the September 11 attacks against the United States were apparently motivated partly by anger and frustration over what was



*Ochieng Adala, Alexander Animalu, Umaru Shehu.*

perceived to be US bias in favour of Israel, and partly by anger caused by US troops stationed in Saudi Arabia.

Terrorism often arises as the result of unbearable situations, which cannot be corrected in any other way. To suppress terrorism, we have to strike at the base, at the unbearable situation that fuels the fanaticism. Religion is often an excuse, where poverty, ignorance, injustice, dictatorship and hopelessness are the real reasons.

Because of the enormous increase in global communication, the world is now a fishbowl. The lifestyle of the rich is exhibited in a frustrating way to the poor, who have no chance to emulate it. The have-nots of the world have nothing to hang onto except their ethnic identity, because material goods are not available to them. Terrorism is the poor man's weapon - a way of waging an unsymmetrical struggle against a superior power.

Finally, we noted that in spite of its powerful psychological impact, terrorism is statistically a minor problem compared with many others. Globally, the numbers of deaths involved are extremely small compared with the mortality from AIDS or starvation. We must not allow the issue of terrorism to distract our attention from the other very serious problems that the world is facing.

### **Resources and conflict**

Conflict is often found where communities compete for a source of wealth. Thus, the accelerating demand for water, oil, timber and mineral resources may be important

sources of conflict in the 21st century. Both population growth and the increased use of automobiles will greatly increase the demand for resources.

Among the "loot-seeking wars" which were mentioned in our discussion were conflicts in Angola, Sri Lanka, Liberia, Congo, Indonesia, East Timor, Fiji, Colombia, Chechnya, Zimbabwe and Uzbekistan. In many cases, indigenous people have been intimidated and driven out of their traditional lands, for example by the use of fire, so that the resources of these lands may be seized.

A discussion paper presented to our group focused especially on the conflicts over oil which threaten to develop during the next few decades. A report was published by the US National Energy Policy Group on May 17, 2001. In this report (known as the "Cheney report" after its principal author, Vice President Dick Cheney) it is estimated that by 2020, the United States will have to increase its imports of foreign oil by 60%. Most of this oil is only available in regions, which are either politically unstable or else unsympathetic with the United States. The discussion paper linked the Bush Administration's increased military spending and wish to project military power into these regions with its desire to insure future availability of oil for the US.

The group noted that during the colonial era, military power was often used by industrial nations to obtain natural resources, under the cover of improving the lot of people in the less developed countries.

Colonization started to end with the founding of the United Nations, but now we are facing a new avalanche of massive power, outside international law, and outside control.

Oil is important for the United States, but it is also important for the rest of the world. Pugwash should raise its voice against the use of unchecked unilateral military power to monopolize resources. We should use international law, and especially the International Criminal Court, as the medium for guaranteeing justice. No country is above the law.

On a more positive note, our group thought that resources can in some cases be a source of cooperation rather than of conflict. For example, it is predicted that the population of the Nile Basin will triple during the next century. In order to support this increased population, cooperation in the field of water resources will be needed. Mutual planning of water use could lead to other forms of cooperation within the region.

### **Strengthening multilateral security cooperation**

Our working group discussed a paper which emphasized that the goal of all those who desire a peaceful world must be to substitute the rule of law for the rule of force in the domain of international security. The paper noted that this goal is the same as that embodied in the United Nations Charter, but that as we survey the current international scene, we seem to be veering away from it.

Our multilateral institutions have been weakened by the Bush Admin-

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istration's reluctance to accept the constraints of international law and international treaties. Examples of this include withdrawal from the ABM Treaty and initiation of a national missile defence program; withdrawal from the Rome Treaty establishing the International Criminal Court; postponing action on the Biological Weapons Convention Protocol; rejecting the Comprehensive Nuclear Test Ban Treaty, and the proposal for developing a new class of nuclear weapons.

The unilateralism of the current US Administration is only thinly disguised by its eagerness in seeking coalitions on an issue-by-issue basis, for example in dealing with terrorism or in combating international drug traffic. The discussion paper proposed that other nations, who wish to see our multilateral institutions strengthened rather than weakened, might act by refusing to join such coalitions unless the US participated in building norms that cumulatively would constitute an international rule of law. Several examples were given:

Turkey, Jordan, the Gulf States, and Saudi Arabia might make participation in a coalition against Saddam Hussein's government in Iraq conditional on the authority of the Security Council. In the absence of a Security Council mandate for action against Iraq, they could refuse to allow the US to use their land bases or air space. This example touches the broader question of "unilateral preemptive self-defence", which is prohibited under the UN Charter.

A second example given in the

discussion paper was participation in anti-terror programs. This could be made conditional on withdrawal of US objections to the International Criminal Court and US participation in other multilateral institutions. The jurisdiction of the ICC might even be extended to cover crimes of terror.

Finally, the discussion paper stressed the important role of NGO's in working to replace the rule of force by the rule of law. These organizations have shown their effectiveness in the past, for example in environmental and human rights issues. Their help is now needed to prevent the erosion of our multinational institutions and to support the authority of the United Nations.

In discussing this paper, our group added that Pugwash, as an NGO, must do its part in strengthening both the United Nations and the International Criminal Court. The efforts of Pugwash could be coordinated with those of other NGO's. Pugwash could be made more open, and it could make efforts to influence public opinion.

Much of the discussion of the paper was related to the current concentration of power in the hands of the US. One of the group members remarked that empires are not necessarily a bad thing, and that the United States would be his choice for the country best suited to have an empire. The majority of the group, however, thought that unilateral international power is inconsistent with the principle of equality of nations and of peoples. The group also felt that within the United States,

the country's traditionally egalitarian principles are now at risk. The danger of the fight against terrorism is that it entails invasion of privacy, restraints on free movements of people and ideas, and control of communications (phone-tapping, e-mail supervision, press censorship) that may in the end compromise democracy. The more the US becomes an empire, we felt, the less it will be a democracy.

The planned attack on Iraq was thought to be potentially catastrophic because of the vision which motivates it. It was noted the "power corrupts, and absolute power corrupts absolutely". However, our group felt that the United States is many things, and that there are many voices within the US which disagree with the unilateralism of the present Administration. We should appeal to these voices of dissent, and encourage them.

Regarding the threat of a US invasion of Iraq, and a consequent threatened destabilization of the Middle East and Southeast Asia, it was suggested that it might be useful for Pugwash to send a delegation to Iraq to discuss the situation informally with Iraqi scientists. During the Cold War, such informal channels of discussion proved useful, and this might be the case again. However, it is possible that Pugwash scientists would be prohibited from talking directly to scientists employed by the Iraqi government, since this was the experience of a recent delegation sent to Iraq by International Physicians for the Prevention of Nuclear War.

Looking towards the more distant

future, we discussed ways in which the United Nations might be improved and made more effective. A future United Nations might have a legislature, which would build up a system of international laws, guided by the principle of subsidiarity. These laws, acting on individuals rather than on states, could be enforced by an expanded version of the International Criminal Court. The notion of state security might be replaced by concept of security for peoples. An Assembly of Peoples, with delegates directly elected by popular vote, could be added to the General Assembly. Thus a bicameral system could be established, analogous to the Senate and the House of Representatives.

We also noted that there is a need for reforming international monetary organizations, such as the World Bank, and the International Monetary Fund. These institutions are, in fact, a part of the United Nations, and their influence ought to be used to help the poorer countries, but this has sometimes not been the case. Debt relief for the less-developed countries is urgently needed.

Finally, we concluded that ethical considerations and altruism, combined with respect for human rights and the environment, are urgently needed in our increasingly technological modern world. We need to achieve ethical and political maturity to match our scientific progress.

regulations, and social arrangements so elaborate that they will suffocate economic growth.

It was argued that Article 1 (1) of the Universal Declaration of Human Rights: "All human beings are born free and *equal* in dignity and human rights" implies a lever towards reducing socio-economic inequalities. This Article ought to be reflected not merely in institutions and their accessibility to all, nor just in principles of due process, but also in *outcomes*. The degrees of substantial inequality that exist can be seen as a violation of Article 1.

Technology and knowledge are needed to fight poverty. However, technology has been important historically in creating inequity. The challenge is to harness it as an instrument for equity. Developing countries must have the capability to adapt technology to their needs, and the first world must share with them the fruits of technology. Yet global forces – especially relating to trade – may increase inequity. There is no level playing field between mass production technologies and microenterprises. Intellectual property rights (IPR) can make matters worse – think only of health in Africa. Equity must be inclusive, and must include equity with respect to IPR. Technology should also be used to empower women – and there are many successful examples of this.

It was argued that external public debt is increasing poverty, sometimes dramatically. Unless we reverse this tendency, we will end up broadening so-called 'Islamic terrorism' to include 'African' and 'Latin-American terrorism'. A public debt

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## REPORT OF WORKING GROUP 5

### Globalization and Technology

*Miles Kahler and Marie Muller, Co-Convenors*  
*John Finney, Rapporteur*

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The group discussed papers under three heads: equity in the global economy, information technology haves and have-nots, and biotechnology and development. Although with such a broad agenda, extensive in-depth discussion was unrealistic, issues were identified for possible more detailed studies. These are itemised in the summary.

#### Equity in the global economy

Six papers were discussed in the first session. These addressed intrinsic problems of capitalism, equity and human rights, foreign debt, education in Afghanistan, knowledge and

poverty elimination, and relocation of international agencies.

Possible threats to the long-term stability of global capitalism were proposed. The first is chronic insufficient economic demand, further eroded by technological change. Secondly, large material and energy throughputs overload the planet's ecological systems. Finally, a relentless tendency towards greater complexity and pace is reflected in capitalism's technologies, institutions and social relations. Under the constraints of global capitalism, the paper argued that we can sustain the biosphere only by developing institutions,



*Brindan Byrne, Harle Montgomery, Richard Somerville.*

Pugwash Study Group could tackle the relationship between increasing poverty and debt.

A small step was suggested that might significantly reduce economic and social inequity: relocate international agencies to countries relevant to their mission. For example, the Organisation of American States could move to South America, or the World Health Organisation to sub-Saharan Africa.

Since the power of political and economic groups partly explains the present inequity, can this situation be changed only by countervailing power? Or is an internal value change possible – an internal acceptance that the international situation should be refined? Are there things Pugwash can do to introduce other concepts into the existing system so the world evolves in a more equitable direction? Are there actions that can

be taken to perturb the frequently observed graphs quantifying ‘cumulative advantage’ – for example those showing the majority of the world’s food/health/resources are in the possession of the minority? If we understood the dynamics of this apparently universal set of curves, we might be able to bias them in favour of reducing inequity.

### **Information Technology Haves and Have-nots**

One of the main reasons for past failures to alleviate poverty may be our failure to focus on technology as a major driver of socio-economic transformation, in particular information technology. It may break down barriers to knowledge and participation, and consequently play a significant role in development and the alleviation of poverty.

The digital divide between devel-

oped and developing countries was graphically illustrated. This gap is not only large, but also increasing for some developing countries. The Internet might be seen as an intellectual technology. It can give everyone access to writing and to knowledge, and to intellectual tools.

A case study of India was presented, detailing the current state of its IT infrastructure and regulatory environment. Some successful, innovative experiments illustrated how enhanced IT access could improve local economics through access to market prices. Enormous innovation can be locally driven – bottom-up changes can result in imaginative ways of using – and tinkering with – the network to meet local need.

Problems in developing the infrastructure were seen as not economic *per se* – rather they relate to the politics of adjusting market arrangements to take advantage of the technology. With proper policies using market led growth and appropriate subsidies, it was argued that the infrastructure can be developed effectively.

The linkage of IT use to development was queried. How much research is there on the impact of IT on societies and individuals in the developing world? The lack of such studies was acknowledged, though gut economic instinct suggested that in the long term the benefit is likely to be enormous. However, even when the infrastructure is there, success in use can be a hit-or-miss affair. The social substrate on which the technology is introduced is important. To be successful, IT development has to take into account local needs and ideas. Experience has shown that

when the Internet is available rurally, people learn to use it in ways previously not thought of. The information accessed is converted into what is useful to local people. Western ideas and western quality control may not be appropriate. Private initiative and appropriate technology are. In India, development of IT locally has empowered women, and their status has indeed risen as a consequence of increased IT access.

Some argued that the effective use of IT tools requires literacy. As less than half the world is literate, it was argued that illiteracy needs to be conquered before IT is considered a priority. Good teachers are needed to teach writing and its use as a tool. However, experience shows that children easily learn to use the net – first for amusement, then for information. But what about the variable quality of information on the web, and its use for propaganda? It was counter-argued that quality control is needed – just as in any educational procedure. Teachers are important in selecting information, and in educating children in the use of the net.

It was further pointed out that as the African situation is so desperate, we have no choice but to use the resource despite these problems – the teacher shortage and quality are so stretched that ‘traditional’ teaching is likely to be similarly defective anyway. We have to be able to deliver formal education with a severe teacher shortage: using IT-based distance learning, a handful of good teachers can reach and teach many students. This is true at tertiary as well as lower levels.

Computers as a means of education delivery were discussed. However, as there is no convincing data to demonstrate the value of computers in extending the abilities of the teacher, studies need to be undertaken. Producing material for computer-assisted learning is resource intensive. Yet good material is essential. It would be a severe mistake to transport without modification courses developed in, for example, the US – the material must relate to the situation in which it is being used, and hence must be developed locally.

Where is the infrastructure to keep computers going? Using IT students as interns to service the infrastructure was suggested. Moreover, it is important to simplify both the hardware and the software. The ‘computer’ developed in Bangalore recognised the hardware problem, and using open source software – as is increasingly done in commerce and industry in the developed world – is not only less resource intensive, but also facilitates local development.

Suggested ways forward to help poorer societies become more knowledge-based included a co-ordinated, global effort by institutions such as the World Bank, UNDP, UNESCO and other NGOs. Regulatory policies should encourage, not suppress, innovation and experimentation.

In summary, policy, income, literacy, and education were seen as the major barriers to effective exploitation of IT in development. Different members of the group gave different emphases to these. But none of them were seen to be insurmountable.

## Biotechnology and Development

### *Biomedical Research and the developing world.*

Biomedical R&D and related patent protection is driven by ‘high-income clients’ and their diseases. There is an ample supply of scientists with the ability and desire to work on diseases prevalent in developing countries. What is often absent is the finance for such R&D. Even when appropriate drugs exist, patent protection makes their use in poorer communities unaffordable.

Suggested ways to tackle this problem included making patent protection (or extension) conditional on pursuing work on diseases of little interest to the developed world. Or is straight public subsidy a better way? Or can we find – together with workers in the pharmaceutical industry – imaginative mechanisms that liberate the industry from its current competitive constraints so that such research can proceed effectively? A Pugwash workshop bringing together those in industry with other stakeholders may be a way to begin to look for a solution.

### *Genetic modification in third world agriculture.*

It was argued that it is economic interests that are promoting biotechnology as a ‘magic bullet’ that will revolutionise third world agriculture. Yet studies have demonstrated *lower* yields of genetically modified crops, no reduction in the use of pesticides, increased pest losses, reduced variability, development of pesticide resistance and effects on nitrogen-fixing flora. Small farmers are being

pushed out, yet there is evidence to suggest a major role for small farmers, who are often repositories of indigenous knowledge. Evidence in indigenous farming systems of an inverse relation between size and productivity implies we should invest in the small farm approach. To benefit the rural poor, agricultural research and development should operate 'bottom-up', using and building on resources already available.

The outcome of the Mexico City May 2002 Workshop on 'The Impact of Agricultural Biotechnology on Environmental and Food Security' was summarised. In addition to the six principles identified at the workshop to guide agricultural biotechnology research and policy making, on which Pugwash was recommended to organise future meetings, a number of further issues were raised. To address the ethical, economic, social, and environmental dilemmas that have emerged from the development, use, and release of GMOs, the broad spectrum of applications of transgenic organisms must be discussed, rather than just focusing on those technologies related to agriculture. These again could give rise to future themes for workshops.

Two questions were asked at the beginning of the discussion. First, can GM feed 9-10 billion people by 2050? Secondly, will it benefit the poor? If the answer to either question is no, then GM techniques should not be a priority. Ability to even use the technology is not necessarily available in poorer countries. A case in point is that of Argentina, which has large GM plantings. However, the recent economic problems are pre-

venting farmers being able to buy the needed fertilisers. A consequent drop in production of some 40% has been estimated.

Both small farmers and public institutions are hamstrung by IPR. Consequently, they have to do deals with private companies, and then the agenda changes. The patent system allows firms to monopolise *tools* for new development. This is a choice society makes to give a temporary advantage to a monopoly. But in its present application, it has gone too far – it no longer promotes innovation but stifles it. A Pugwash Workshop might look at ways of restructuring the patent system to retain some protection for the inventor, but without stifling further development.

*Location of research infrastructure.*

The pros and cons of siting appropriate research institutions in the developing world, where the need is both recognised and immediately relevant, were discussed. The International Rice Research Institute in Bangladesh has resulted in an eight-fold increase in production. In medicine, some questioned why there are so few tropical medicine research facilities in the tropics. Again in Bangladesh, an institute set up for cholera research later developed wider roles in public health, nutrition, and disease prevention. Perhaps research on malaria and HIV should be centred in Africa, fostering additional research infrastructure.

Some caution was expressed about this idea. For example, is it sensible to site an institute working

on cholera in a place where there is no clean water? The history of CGIAR (Consultative Group for International Agricultural Research) was brought up as a cautionary tale. Even though the funding apparently came with no strings attached, the outcome was not as hoped – with suggestions that there *were* strings which resulted in the importation of inappropriate ideas. There was also a view that institutions in the developing world should not be limited to those that deal only with 'local' problems. Science in the developing world must aim to be comprehensive. As it is not practical to send significant numbers of young people to work at the International Centre for Theoretical Physics in Trieste, why not set up an Institute of Mathematics in Nigeria? We talk about asking what Africans want, but generally only in the context of immediate issues such as health, poverty, and hunger. Pugwash should address this issue of sustainable science for developing countries.



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**REPORT OF WORKING GROUP 6**
**Climate Change, Energy and the Environment**

*Lisa Shaffer and Tatsujiro Suzuki, Co-convenors*  
*Bob van der Zwaan, Rapporteur*

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**Climate change**

Climate changes have occurred in the past naturally, for various reasons. However, currently *mankind* is modifying the Earth's environment, in various ways, notably because we are changing the climate. Largely as a result of the large-scale combustion of fossil fuels, the atmosphere is at present polluted with particulates, and the balance of the radiation on Earth is being further altered through the emission of anthropogenic greenhouse gases. Among the latter, the most important are carbon dioxide and methane. Global warming and the associated effects of regional and local climate change are expected as a result. In 2001, the International Panel on Climate Change (IPCC) confirmed that "There is new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities". After a decade of intensified scientific research during the 1990s, there is now no longer doubt about earlier observations that mankind is changing the climate on Earth.

In particular, the magnitude and rate of change of global mean surface temperature over the past few decades is shown to be outside the range of anything deduced from paleo-climate records for the last 1000 years. A global warming has been taken place over the past one hundred years of about 0.7 °C, and

most projections for 2100 give an increase of global mean surface temperature between about 2 to 4°C. The last decade has been the warmest decade, on average, on record; 1998 has been the warmest year and 2001 the second warmest year ever recorded. Increases in atmospheric greenhouse gas concentrations not only increase mean global surface temperature, but, perhaps more importantly, involve regional and local climate effects, such as increased drought, precipitation, floods, and storms.

**Energy supply and economic prosperity**

A reliable and affordable supply of energy is critical to maintaining and expanding economic prosperity where such prosperity already exists and to creating it where it does not. But at the same time, the core of the challenge of expanding and sustaining economic prosperity is the challenge of limiting, at affordable cost, the environmental impacts of an expanding energy supply. The worth of today's largely fossil-based world energy system is some 10 trillion dollars at replacement cost. Also because of the equipment turnover time amounting to around a few decades, the current energy supply system cannot be rapidly replaced with non-carbon emitting alternatives, even if they were economically more attractive than conventional fossil-based tech-

nologies. Hence, the challenge of transforming the current energy supply system is considerable. This does not imply, however, that the challenge of transforming this energy system into an environmentally friendly one is insurmountable.

A recommendable strategy to address the global warming problem would be not to let carbon dioxide concentrations in the atmosphere increase to more than a stabilization level of about twice as high as the pre-industrial level of 280 ppmv. While the climate change impacts of such an objective could be considerable, to which mankind will need to adapt, there is then at least a good chance that the situation would be manageable. The chance of our ability to manage the impacts would diminish sharply if the concentrations were to rise toward a tripling or quadrupling of carbon concentrations that would be associated with a continuation of business-as-usual. Since we are already well on our way to reaching a doubling, mankind will in any case need to adapt to the climate changes this doubled carbon dioxide concentration will involve. Geotechnical engineering the atmosphere to reduce the effects of greenhouse-gas increases in the atmosphere on climatic variables seems undesirable, but might at some point in the future be needed. Removing from the atmosphere the emissions that have previously been added, for example through afforestation or through enlarging other biological sinks, can contribute to only moderate extent to solving the climate change challenge mankind is currently facing. In addition to these measures, reducing greenhouse

gas emissions below levels that would be implied by a “business-as-usual” scenario is therefore imperative.

### **Reducing carbon dioxide emissions**

The determinants of anthropogenic carbon dioxide emissions – the most important greenhouse gas – are population, Gross Domestic Product (GDP) per person, energy use per unit of GDP, and carbon emissions per unit of energy. The available leverage of in principle each of them should be used to reduce carbon dioxide emissions. International support for education, development and family planning are effective measures to slow down population growth and should therefore receive high attention, also since population control simultaneously involves addressing a spectrum of other problems. However desirable a re-orientation of human wants in terms of material consumption might be, it is unlikely that any political decision-making body will anywhere soon adopt this approach. Industries and individual consumers should be motivated to choose among the available energy options those that are least energy consuming, and to realize savings in an as broad as possible range of energy uses. Equally, incentives should be provided to make low- and non-carbon choices from the menu of energy-supply options available at any given time.

### **Energy resources and research**

The menu from which choices can be made between energy technologies that are both environmentally friendly and economically affordable can be enlarged. To achieve an

improved range of energy production options, fundamental research, applied research, development, demonstration and deployment should be imminently accelerated, starting today. International cooperation in energy research is paramount, firstly in order to economize on scarcely available funding. Stimulating collaboration in energy technology development between industrialized countries, countries in transition and developing countries can also be instrumental in the exchange of expertise in technology development and experience in the use of new energy technologies.

At the moment, no single energy resource or technology constitutes a panacea to solve the climate change challenge. Therefore, all available options to address this challenge should be employed and kept open. This involves both increasing energy efficiencies and savings, and keeping a non-carbon energy spectrum as diversified as possible. Among the latter are notably the use of decarbonized fossil fuels (through carbon capture and sequestration), the use of renewables (such as hydropower, wind, solar and biomass energy), and the use of nuclear energy. Also in view of ascertaining energy supply security, maintaining the use of a combination of these options is advisable, since with a diversified energy system nations are better able to hedge against potential energy supply shortages. Meanwhile, the advantages of distributed energy/electricity systems can be exploited to a fuller extent than in the currently largely centralized energy production infrastructure.

Increased fundamental research

and R&D into all energy alternatives can mitigate the drawbacks that each of them involves, and can render their favorable properties in terms of global warming accessible. A global framework of commitments should be realized to constraining greenhouse gases in the long run. Many policy options are open to this end, one of which seems to be particularly attractive. All present energy technologies possess detrimental environmental and health externalities, so that there are at present no winners or losers among the energy options available. By internalizing these externalities, that is, by considering them as real costs that are reflected in energy prices, a fair level playing field of competition can be created. Such internalization of external environmental effects should become the basis for energy decision-making, and should be realized according to an internationally determined set of agreements.

### **Climate change uncertainties**

While the phenomenon of human-induced global warming and the overall effects of associated climate change, such as an increase in global sea levels, have been scientifically well established, many aspects of climate change remain subject to uncertainties. The extent to which, when precisely, and in what parts of the world its effects will become predominant is still difficult to predict scientifically in all its possible dimensions. However, these uncertainties are no reason for inaction. On the contrary, irrespective of these uncertainties, action should be undertaken so as to hedge humanity against some small proba-

bility, but highly adverse, climatic effects, such as a deviation of large ocean currents. Especially the possibility that certain climate effects can be incremental, non-linear, interactive or self-enhancing should make us weary of the risks that could be at stake.

The IPCC seems the appropriate body to analyze climate change uncertainties, as well as summarize them and convey them to a large public. It should continue to inform national governments and individuals that the energy-climate challenge must, and can, be met. Scientific knowledge about why doing so is necessary is abundant, and proposals on how to proceed to address this challenge abound. The costs of the required action are most likely small in comparison to the environmental and economic damages averted, as well as small compared to the investments made globally in maintaining national military forces.

### **International cooperation and individual responsibility**

Today, the poor countries contribute little to the causes of the problem of climate change, while they are likely to suffer most of its consequences, partly because of the stronger dependence of people in the developing world on natural ecosystems, and because they are less able to adapt to the adverse impacts of climate change. Especially in many developing countries the vulnerability to the various effects of climate change is likely to be high. Like with questions of global nuclear disarmament, international cooperation – notably between developing and industrialized countries – is the crux for

addressing the many facets of the solutions to problems involved with climate change. International cooperation is in particular essential for establishing global accountability and commitments to reduce carbon emissions. It is also necessary for making energy policy decisions on the basis of the *true* cost of energy production, including the detrimental effects that may be caused to the environment or to human health as a result of energy production.

Establishing individual responsibility in energy and resource use will also be paramount to solving the climate change problem. Public education and dissemination, notably by scientists, plays a fundamental role in increasing the public understanding that climate change is a problem, which ought to be addressed as of today. Enhancing public awareness of the potential threats to humankind involved with global warming can help creating the political conviction that action is required now.

International cooperation, both in energy research and in establishing global greenhouse gas reduction commitments, as well as the promotion of establishing individual responsibility, should be central at the forthcoming Johannesburg Summit. Given the relevance of the global warming problem, and given Pugwash's history in bringing together scientists from different disciplines and backgrounds, convincing policy makers of undertaking action vis-à-vis urgent global threats, and stimulating the realization of international treaties that address these threats, Working Group 6 on "climate change, energy and the environment" recommends

that Pugwash should enhance its activities in the climate and energy field, notably through the organization of workshops on this subjects matter, and by including among its Council members experts that are knowledgeable in both the natural scientific and social scientific (e.g. economic) aspects of this multifaceted challenge.

### **Concise Summary**

Whereas climate changes have occurred in the past naturally, there is today overwhelming evidence that mankind is modifying the Earth's environment and is provoking an increase of the average global atmospheric temperature and the associated detrimental effects of regional and local climate change.

In order to minimize the risks induced by substantial climate change, carbon dioxide concentrations should be stabilized, preferably during the 21st century and at a level not exceeding twice the pre-industrial level.

Adaptation to the consequences of climate change will almost certainly be necessary; geotechnical engineering to counteract the radiative effects of increased levels of greenhouse gases in the atmosphere may at some point be needed; and removal of carbon dioxide from the atmosphere through the employment of large-scale biological sinks (e.g. by afforestation) can only to a limited extent contribute to mitigating climate change.

Thus, reducing anthropogenic greenhouse gas emissions substantially below levels that would be implied by a "business-as-usual"

scenario is imperative; this can – and should – be realized through a reduction in population growth, decreasing levels of energy use per unit of Gross Domestic Product, and decreasing levels of carbon emissions per unit of energy use.

Reduction in energy demand is essential for addressing the global warming challenge, and measures regarding the end-use of energy, in e.g. transport, building and construction, should be pursued aggressively.

Since no panacea energy resource exists, all non-carbon emitting energy resources should for the moment remain – and become – part of an energy mix as diversified as possible – also in order to ensure energy security for mankind during the 21st century – at least to allow further mitigating some of the intricacies that available options possess; among these energy resources are decarbonized fossil fuels, renewables and nuclear energy; all of these should be subjected to increased levels of research, development, demonstration and deployment.

As with questions of global nuclear disarmament, international cooperation, notably between developing and industrialized countries, is the crux for addressing the many facets of the solutions to problems involved with climate change; among these are establishing global accountability and commitments to reduce carbon emissions and making energy policy decisions on the basis of the *true* cost of energy production; also establishing individual responsibility in energy and resource use will be paramount to solving the climate change problem.

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*The La Jolla cliffs.*

## 8th Pugwash Workshop on the Middle East

Alexandria, Egypt, 31 May–2 June 2002

### Report

by Helena Hörnebrandt

*The 8th Pugwash workshop on the Middle East convened at the Swedish Institute in Alexandria and was co-hosted by the Egyptian Pugwash Group. Attending were 30 participants from seven countries, including Palestine, Israel, Egypt, Jordan, USA, Italy and Sweden. Pugwash is grateful to the Swedish Institute and to the governments of Egypt and Sweden for their support.*

*The workshop was originally scheduled for April and was postponed due to continuing violence in Israel/Palestine and the difficulty of traveling. Unfortunately, this meeting was marked as well by the inability of some invited Palestinians to obtain exit permits from Israeli authorities, and from the decision of other Palestinians not to leave Palestine during these most difficult times. It was also the case that several invited Israelis chose not to attend because of security concerns due to demonstrations and violence in the Arab world directed at Israel.*

The workshop discussed the following issues:

- Breaking the Stalemate: Israel-Palestinian Relations;

- Resuming the Peace Process: The Proposed International Peace Conference;
- Lessons of September 11 for Arab-Israeli-US Relations;
- Ramifications of Extending the War on Terrorism: Prospects of a US Military Attack on Iraq, the Role of Iran and other Scenarios;
- Future Scenarios of Middle East Peace and Security Frameworks;
- Future Modes of Israeli-Arab Cooperation.

### Current Situation

The first part of the Workshop focused on the current situation of the region, with participants expressing grave concerns on the development of the conflict. In order to resolve the conflict, a few participants argued the necessity of concentrating on the root of the matter; i.e., so far the focus has been one-sided, as it has been focusing on the suicidal bombers rather than the fact that Palestine is under occupation. Two questions flow from this: can Palestine conduct elections when it is under occupation, and does Israel need to end the occupation and respect Palestinian nationalist aspirations before peace negotiations can start?

Other participants felt that Israel is under siege from Palestinian bombers. These circumstances have

led the Israeli government to take necessary security measures which in turn hinders any peace negotiations.

Three ways to advance the peace process were laid out: (1) to pick up from where previous talks ended; (2) through an interim agreement; and (3) through unilateral steps. The first approach has little chance of success, and few participants had faith in the second approach. Accordingly, it was felt that the third approach would best create a basis for positive negotiations. The support of and engagement by the international community could compensate for the weaker position of Palestine.

Peace negotiations must focus on Palestine as an independent state, with demographic and personal security for Israel. While this could mean building walls and fences to secure Israelis, this would not be an optimal solution and should be seen strictly as a security option and not a political solution.

### Processes and Opinion

Others proposed going beyond unilateral steps and directly involving the United Nations or other actors. Those in the midst of conflict will always protect their own interests first, thus it is imperative to use external and internal pressures. There was also discussion of the role of the US,



*Francesco Calogero and Amnon Pazy in La Jolla.*

with some expressing dismay that the US government has a limited understanding of Middle East dynamics. Others felt that US involvement can never be more than limited, that the parties themselves must resolve the issues.

Workshop participants agreed that public opinion is very important, and that opinions and perceptions must change dramatically for peace to be possible. The current war is a conflict over both territory and identity. Personal fears need to be reduced and the two societies need to find a common language. How can we start working together?

## Peace Conferences

Peace conferences are often triggered by leadership problems, initiated in situations where the leaders do not know what to do. So, what purpose should a conference serve: to reach common understandings or simply to exchange ideas? Can conferences at times be counterproductive to stated goals? In situations of severe conflict, a poorly arranged and handled conference can end up worsening the relationship between the parties. One participant emphasized that Israelis and Palestinians need to clar-

ify the who, what, when, and why of a peace conference before it undertaking it.

It was felt by some that nothing concrete could come out of a conference between Israel and Palestine due to the current violence and the gulf between them. Others felt that, even if nothing tangible is gained from a such a conference, the process would nonetheless legitimize Palestine as a negotiation partner. Even negotiations that contribute to an understanding of outstanding issues could help get the peace process back on track.

Mention was also made of the beneficial role that is played by external organizations like the United Nations and International Red Cross, and the need for strengthening their involvement during times of violence.

## Economic Cooperation

There was broad agreement that both social and economic cooperation, whether in health, education, or business, can beneficially assist the peace process. Such cooperation can stimulate economic growth and attract foreign investment while creating improved social and environmental conditions.

Others felt that a comprehensive peace must be in place before joint social or economic projects can be discussed. Furthermore, how is it possible to even discuss cooperation when one side is under occupation? Moreover, such cooperation is both time consuming and expensive under the current political situation. It is one thing to discuss joint projects on infrastructure, yet this same infrastructure is being destroyed by military actions. Where hope does

not exist, it must be restored before joint projects become possible.

Two important elements to remember are the asymmetry of power and the asymmetry of gain between the parties undertaking cooperative efforts. If you can identify objective elements that both parties can agree to, there is a greater chance for the process to work in a positive direction towards peace. Cooperation may not resolve the political issue, but it might be an element that ultimately contributes towards a political resolution.

## Impact of September 11

While the terrorist attacks of 11 September 2001 were justly condemned around the world, many people still have difficulty conceptually understanding these capacities for terrorism. Not only has this made it difficult for some to understand the impact September 11 had on the United States and other countries, it has brought about major changes in how America sees itself and the rest of the world. It has also brought to the fore very simplistic ways of defining complex concepts of evil and good.

While Islam is often directly linked to terrorism in the media, it should be borne in mind that most Muslims see Osama bin-Laden as having exploited Islam for his own purposes. It is also true that other 'fundamentalists,' whether Christian or Jewish, have also undertaken acts of terrorism for their own 'causes.'

What is important is to focus on the aims and bases of support of terrorist organisations? Terrorism is difficult to define, it has different manifestations all over the world. We need

to look at what stimulates terrorist actions and terrorist groups, while also making clear that it is never permissible to kill civilians, no matter what the political, social, or religious cause.

## The Future

There was consensus among the participants, despite the difficulties in holding the meeting and in having all those invited able to attend, that such meetings should continue.

It was suggested that a joint steering group, consisting of Israelis and Palestinians, be established to explore practical and regional forms of cooperation as well as to prepare relevant topics for future meetings. Close cooperation with Jordan and Egypt was also emphasized. Participants expressed their appreciation to the Swedish Institute in Alexandria and the Swedish government for their support for this and possibly future meetings.

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## Participants

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## 17th Workshop of the Pugwash Study Group on the Implementation of the Chemical and Biological Weapons Conventions: *The Impending First CWC Review*

Oegstgeest, The Netherlands, 15-16 June 2002

### Report

By Pamela Mills, Harvard Sussex  
Program Hague Researcher

*This was the seventeenth of the current Pugwash workshop series on chemical and biological weapons (CBW), held in collaboration with the Harvard Sussex Program on CBW Armament and Arms Limitation (HSP). Like the eight preceding workshops of the series held in the Netherlands, it was hosted by the Netherlands Pugwash Group. The Dutch Ministry of Foreign Affairs and the Dutch Ministry of Defense, as well as Blücher GmbH, a German chemical protection company, provided financial assistance for the meeting. The meetings were held at the Congresshotel Oud Poelgeest in Oegstgeest, The Netherlands.*

*Participating by invitation were 35 people from 13 countries (Australia, Belgium, Cuba, France, Germany, Italy, Mexico, The Netherlands, Poland, Russia, Sweden, United Kingdom, and the United States), all of them doing so in their private capacities. The present report is the sole responsibility of its author, who was asked by the meeting to prepare a report in consultation with the Steering Committee. It does not necessarily reflect a consensus of the workshop as a whole, or of the Study Group.*

The workshop focused on the First Review Conference of the 1997 Chemical Weapons Convention (CWC), which is scheduled to begin in less than a year's time on 28 April 2003. Under the Convention, a special session of the Conference of the States Parties (known as a Review Conference) must be convened prior to the expiry of the sixth year after entry into force, which was 29 April 1997. A review process to prepare for the Review Conference was launched by the Technical Secretariat of the Organization for the Prohibition of Chemical Weapons (OPCW) in January 2002. Much of the review is being conducted and coordinated by an Open-Ended Working Group on Preparations for the First Review Conference (WGRC) established by the OPCW Executive Council in September 2001. The objective of the first review conference is to review the operation of the CWC and any developments in science and technology that may impact CWC implementation. The review process currently underway will help the OPCW to achieve this goal. To this end, both the states parties and the Secretariat are preparing papers for the WGRC to examine, as is the Scientific Advisory Board (SAB), in

coordination with the International Union of Pure and Applied Chemistry (IUPAC).

After reports on the general status of the CBW treaties, workshop participants devoted discussion to a number of issues/topics impacting upon the review: universality and emerging challenges, including terrorism, impact of relevant developments in science and technology, ensuring non-proliferation, verification in general, national implementation, assistance and protection and international cooperation, effectiveness of the OPCW structure, the contribution of non-governmental organizations (NGOs), and the general effectiveness of the review. These categories corresponded roughly with clusters of issues important to the review established by the WGRC at its first meeting in November 2001. Also considered by the Study Group was the important work of counteracting biospecific terrorism and future work of the Study Group itself.

### Reports on International CBW Activities and Initiatives

#### *BWC: Progress in Implementation*

With respect to the Biological and Toxin Weapons Convention (BWC), the last six months were marked by the failure of the states parties to

adopt any measures to strengthen the BWC regime. The Study Group was informed that the rejection of a draft verification protocol for the BWC was a missed opportunity that will have lasting consequences for biological weapons disarmament efforts.

In March 2001, the chairman of the Ad Hoc Group, which was mandated to negotiate a protocol, presented a draft composite text to the states parties. The text was more than 95 per cent agreed language and contained all the key elements of an effective verification regime for biological weapons. However, at the twenty-fourth session of the Ad Hoc Group in July 2001, one state party, the United States, repudiated the approach taken by the draft protocol, stating concerns of its effectiveness in “catching cheaters” and the impact such verification would have on the pharmaceutical and biotechnology industries. Despite international attention after the events of September 11<sup>th</sup> and the anthrax attacks in the United States, the U.S. position on the protocol did not change. In November 2001, when the fifth review conference of the BWC first convened, there was a lack of political will to conclude a protocol in the absence of U.S. support and no agreement was possible on other measures, such as the establishment of interim supportive institutions. The United States used the forum of the fifth review conference to “name names” of those countries it thought had biological weapons programs, or weapons capabilities, in violation of the BWC. The consultation procedures under Article V of the Convention were designed to handle

such allegations. The fifth review conference was forced to adjourn, and will reconvene on 11 November 2002. Meanwhile, the states parties were encouraged to make proposals on ways to strengthen the BWC short of a protocol.

The United Kingdom released a “Green Paper” containing proposals on how to strengthen the BWC in April 2002. It suggests mechanisms for investigations of non-compliance, assistance in the event or threat of use, and national criminal legislation to implement the Convention, as well as a scientific advisory panel to assess develops in science and technology that impact on the Convention, an expanded system of confidence-building measures (CBMs), standards for the physical protection of pathogens, increased disease surveillance, a code of conduct for academic and professional bodies, and the universal criminalization of CBW offences.

The U.S. concerns over the weakness of the draft protocol and its burden on industry were largely unfounded as the protocol’s aim was not to “catch” cheaters but rather to demonstrate compliance, build confidence among states parties, and deter potential violators of the BWC. U.S. industry would have been subject to a maximum of seven inspections per year of declared facilities; the FDA does thousands. Inspections of industry under the CWC verification regime have proven that confidential information and information relevant to national security can be adequately protected.

States parties with concerns over the effectiveness of the BWC, with or

without a protocol, were encouraged to utilize the consultation procedures and the system of CBMs already provided for. Also, there was a need for better preparation on the part of the states parties, who could use the fifth review conference in November as a forum in which to reaffirm the international norms against biological weapons. If there is no consensus, the states parties should be prepared to take any motion to a vote, rather than allow one or more states parties to block action. States parties in support of a strengthened BWC, and who did support the draft protocol, should make a renewed commitment to a positive outcome for the November 2002 review conference.

The Study Group also heard about the efforts of other organizations to take up where the Ad Hoc Group was forced to leave off in December 2001. The International Committee of the Red Cross (ICRC) was one such organization very concerned about the failure of the BWC states parties to adopt a verification protocol. As biotechnology advances, the ability to address such innovation within the current BWC regime diminishes greatly. As the guardians of international humanitarian law, the ICRC felt a responsibility to prevent the erosion of moral and ethical norms against biological weapons and to work therefore to strengthen international efforts in support of the BWC. To this end, the ICRC was working on a declaration on “biotechnology, weapons, and humanity”. It hoped to convene a meeting of government representatives to discuss this subject and decide on action prior to the

November 2002 resumption of the fifth review conference of the BWC. Another program in the process of being established is a biological weapons monitoring group, which is a group of responsible NGOs that are looking to step in where governments have failed and work toward the implementation of a verification mechanism for the BWC.

Lessons to be had from the experience of BWC review conferences, for the first CWC review conference, include the need to focus on key issues and engage in extensive planning and preparation; the outcome of the Conference must be agreed.

The Study Group was, however, warned against drawing too many parallels between the fifth review conference of the BWC and the first CWC review conference, as they are different instruments, designed with different intentions and in different international environments. The CWC review conference would seek to adjust an already existing and functioning verification regime, while the BWC review conference was asked to adopt one. The Study Group also explored the role of verification in inspiring greater confidence in a treaty regime. Verification should decrease the confidence of violators that they can work in secret, thus deterring violations of the convention in the first place. Any BWC protocol must therefore, first and foremost, serve as a deterrent.

#### *NATO Longterm Scientific Study (LTSS)*

The Study Group received a presentation on the results of a 3-year NATO study on chemical and biological

defense. This study looked at a number of issue areas: evaluation of the hazards and NATO's ability to respond, effect levels, detection, physical protection, medical countermeasures, contamination control, training, and CB terrorism (which was added to the study only after September 11<sup>th</sup>).

The study highlights the threat posed by the increased potential for new, possibly more virulent, biological agents as a result of developments in genomics and proteomics. There is also a potential threat from hidden stocks of biological weapons or agents in states both party and not party to the BWC. Both of these aspects create unknowns with regard to the effect of and response to a chemical attack. A wider range of detection methods should be developed, including generic detection, which would allow the detection of many agents with a single procedure or mechanism. There was also a need for multivalent or generic vaccines that counteract a variety of biological agents instead of a vaccine targeted to one agent or virus. Radical new approaches to therapy must be developed in order to respond to genomic or proteomic agents. On the question of contamination, the question is "how dirty is clean enough?"—new decontamination techniques will be explored. Prior to September 11<sup>th</sup>, chemical and biological terrorism was not considered a military problem in the context of NATO; however with Article V (collective response) enacted, NATO must take the "war against terror" and the potential use by terrorists of chemical and/or biological weapons into

account. In the study, it was concluded that a "web of deterrence" is of utmost importance, because, particularly with biological weapons, the development of reliable defense technology is unlikely.

The results of the NATO LTSS are a NATO unclassified document and will be released officially in 2003. Participants in the LTSS plan to evaluate progress and research biannually.

#### *Progress in Implementing the CWC*

On 29 April 2002, the OPCW marked the fifth anniversary of the CWC. Looking back over five years, the CWC has both met with great success and encountered serious difficulties. The OPCW has overseen the destruction of 10 percent of the declared stockpile of chemical agents, and 24 percent of the declared stockpile of munitions and containers. Both India and the United States have met the deadline to destroy 20 percent of their Category 1 chemical weapons. Russia and another state party of withheld identity have both submitted requests for the extension of their destruction deadlines. All states parties in possession of Category 2 and 3 chemical weapons have met the deadline to destroy 100 percent of their stockpiles, which coincided with the fifth anniversary. All states parties that declared chemical weapons production facilities met the deadline to destroy 40 percent of their production capacity. Difficulties previously encountered during the conduct of inspections at certain Schedule 2 facilities have been resolved bilaterally.

In both the United States and Russia destruction activities are





*UNSCOM Inspecting CW in Iraq. United Nations Photo 158837*

increasing their pace and many facilities are scheduled to come on-line in the forthcoming year, including those at Aberdeen and Umatilla in the United States and Gornyy in Russia. These developments will necessitate a larger budget for verification activities, such as continuous monitoring of chemical weapons destruction facilities (CWDFs). The number of CWDFs being monitored is expected to increase from one to five in the course of 2003. Furthermore, the Technical Secretariat is looking to re-examine, as part of the review process, inspection methodologies under Articles IV, V, and VI. The midterm plan for 2004-2006 foresees as many as 12 fully operation CWDFs by 2006, which will then necessitate even larger amounts of time spent on continuous and on-site monitoring inspections and even larger budget increases. Changes may also be imminent for the industry inspection regime under Article VI, including lower frequencies of inspection for Schedule 1 and 2 facilities.

The emphasis will instead shift to Schedule 3 and DOC facilities and/or plant sites; this trend is already reflected in the draft 2003 budget. However, there will be a need to establish a new mechanism for the selection of sites/facilities for inspection, keeping in mind the type of facility and geographic distribution.

Progress has been achieved in the resolution of unresolved issues related to Article VI, such as boundaries of production and captive use, aggregate national data, low concentrations of Schedule 2A and 2A\* chemicals, and the selection of other chemical weapons production facilities (OCPFS, i.e. DOC/PSF) for inspection. However there is a worrying lack of progress concerning the issue of transfers of Schedule 3 chemicals to states not party to the Convention, and whether or not to impose a trade ban; it is thought that the states parties will only be able to agree to some measure short of a total ban. The Technical Secretariat of the OPCW has been doing

research into the under-declaration or non-declaration of declarable industrial facilities; using open-source public information, 44 such facilities were identified. The states parties involved have been contacted and were appreciative of the Secretariat's assistance.

Programming in the area of international cooperation and assistance had been severely affected by the cash deficit, but results have been achieved nonetheless. In 2002, two meetings were held for regional National Authorities, in Slovakia and Brazil. Also in Brazil, there was an international meeting on assistance and protection. The annual National Authority Day meeting is scheduled to take place in the fall, as are basic and advanced training courses for National Authority personnel. The Technical Secretariat is planning a major exercise on the delivery of assistance, to take place in Croatia in November. The third annual Associate Programme will begin in July 2002, this time with the support of a chemical company in Italy, in addition to the University of Surrey, United Kingdom, and chemical companies in Belgium, France, and the Netherlands.

Although no states have become party to the CWC in 2002, the Technical Secretariat continues to pursue universality, through a regional approach and bilaterally. In addition, there was a need to reevaluate the public outreach strategy of the OPCW.

Since January 2001, the OPCW has been experiencing a severe cash flow problem, which has reduced program delivery (including inspec-

tions) by as much as 50 percent. The funding of programming has been prioritized based on the CWC mandate, with the monitoring of the destruction of chemical weapons taking precedence. There has been a marked reduction in the inspection of chemical weapons storage facilities (CWSFs) and in industry inspections; in 2002, there will be only between 45 and 50 industry inspections rather than the 132 originally planned. The financial crisis first arose most directly from discrepancies in the income budgeted and that received in reimbursements for the costs of Article IV and V inspections. The reasons for this are varied, including late or non-payment by the states parties concerned and late invoicing by the Secretariat. New mechanisms are being explored to more accurately estimate the amount of income this area generates in any given year and for the payment of these funds, i.e. advance payments instead of reimbursements. As inspection activities in this area are expected to increase with the upsurge in destruction activities, action must be taken as soon as possible. The argument can be made that verification is being held hostage by the untimely payment of arrears and that perhaps it is time to question the possessor pays principle. Since verification provides confidence for all in the regime, should not all states parties fund these activities?

In addition to the financial crisis, there is a political crisis facing the OPCW in the form of a lack of Director-General. The first Director-General was voted out by a special session of the Conference of the States Parties in April 2002, citing a

loss of confidence. It is hoped that a new Director-General will be appointed prior to the seventh session of the Conference of the States Parties in October 2002 and that both the Secretariat and the states parties can soon put the financial and political problems behind them and focus on the critical issues, such as preparations for the first review conference

### *HSP Draft Convention on CBW Criminalisation*

As in previous workshops, the Study Group was provided an update on the progress achieved by HSP in promoting its draft convention on CBW Criminalisation, which aims to establish universal jurisdiction for crimes involving violations of the prohibitions contained in both the CWC and the BWC. States will have an obligation to either extradite or prosecute offenders no matter their nationality or where the crime was committed. This convention is a necessity given that only a minority of states are in full compliance with the legislative provisions of the CWC (Article VII) and the BWC (Article IV), and legislation, regulation, and penalties vary widely. Furthermore, the statutes of the new International Criminal Court do not provide jurisdiction over chemical and biological crimes. The two possible routes for the draft convention to take to become international law are the sixth committee of the United Nations or a separate diplomatic committee. Either action would immeasurably aid efforts to maintain the moral norm against chemical and biological weapons.

The draft convention text has

already been discussed by the public international law working group of the EU, which has submitted it to the EU governments for consideration. The draft convention also merited mention in the April 2002 UK Green Paper on measures to strengthen the BWC. One important aspect of such a convention is that it will also criminalize the production, development, or use of chemical or biological weapons by states not party to the CWC or BWC, or their nationals, as well as by non-state actors. It will also cover riot control agents and other so-called non-lethal weapons, if they were used for prohibited purposes (i.e. warfare rather than domestic riot control).

Concerns were raised about the combining of chemical and biological crimes in one treaty and the lack of involvement by the OPCW in this project. The HSP draft does, however, aid efforts to harmonize international criminal law.

## **The Impending First CWC Review**

### *Universality and Emerging Challenges*

One of the major challenges for the CWC at the beginning of the twenty-first century is to reaffirm a commitment to its core mandate: to take all and any measures to eliminate all chemical weapons worldwide. Because today's international environment differs significantly from what it was when the CWC was negotiated (10 years ago) and first implemented (5 years ago), the OPCW (states parties and Technical Secretariat) must ask themselves what today's threats are and what

resources are available. For example, as the threat of state use of chemical weapons decreases, the number of threats from non-state actors is increasing; the goal in 1993 was disarmament, the goal for 2002 may be considered non-proliferation.

Another example, is the obligation of the OPCW to respond to international terrorism and work towards the response to and prevention of acts of terrorism using chemical weapons. To this end, the OPCW Executive Council has established an open-ended working group on the role of the OPCW in international anti-terrorism efforts. Although terrorism is not explicitly mentioned in the CWC, many of its provisions—Article IV, V, VI, VII, X, etc—have direct relevance to efforts to combat terrorism. One measure that the Council has taken so far in this respect is to adopt a decision on national implementation measures, stressing the need for every state party to criminalize chemical weapons offences in order to rid the world of “safe havens” for any potential violators of the Convention.

Universal adherence to the treaty, or universality, is one mechanism for helping to eliminate any safe havens for would-be violators of the Convention. Universality will also greatly aid efforts to ensure the non-proliferation of both chemical weapons and toxic chemicals and precursors. The OPCW, however, must be careful not to overemphasize the role of universality at the expense of key parts of the CWC mandate, such as the verification of destruction. There are a total of 49 states not party to the Convention, according to OPCW

calculations, including 29 signatory states. The states that remain outside of the OPCW can be found in four main regions—Caribbean, South Pacific, Middle East, and Africa—and their reasons for not joining fall into a number of broad categories: unawareness of the treaty, infrastructural or economic deficiencies, a lack of the capacity to implement the Convention, government instability, or security concerns. Those states with the latter, found mainly in the Middle East, will not join until they perceive that the Convention is being implemented to its fullest and most complete extent, including full assurance of compliance by all states parties.

For those states outside of the Middle East, the OPCW can and should engage in programming and activities designed to encourage membership, including regional seminars and bilateral assistance meetings. The members of the Executive Council could be involved in a focused way to encourage universality, perhaps by working with states not party in their own region or with whom they have special relationships. One example is the recent EU practice of carrying out demarches in the capitals of states not party in support of CWC adherence. The Council could also help by adopting stricter controls on the transfer of Schedule 3 chemicals to states not party. Regional National Authorities as well as NGOs, activists, and academics within the states not party can also be encouraged to get involved in the universal efforts.

### *Impact of Relevant Developments in Science and Technology*

The dominant issue when it comes to developments in science and technology are the great advances being made in biotechnology; science will not stand still and neither should the CWC. The Convention, under the general purpose criterion (GPC), defines a chemical weapon as any chemical intended to cause harm, thereby not limiting the application of the CWC provisions to Scheduled chemicals. This definition, which includes substances such as bioregulators, calmatives, maloderants, and other so-called non-lethal weapons, must be reaffirmed by the states parties during the review conference. Otherwise, there is a danger of an explosion of non-lethal weapon development by state actors—they could be viewed as an alternative to lethal weapons and may assuage public outcry over death tolls in conflict. It was also noted that if terrorists were to employ toxic chemicals they would most likely not use any found on the Schedules.

The CWC GPC also applies to toxins, and in the wake of the failure of states parties to adopt measures to strengthen the BWC, the CWC states parties should reaffirm the overlap between the two regimes and more assiduously apply the CWC provisions to toxins. Currently, only three toxins can be found on the CWC Schedules: hydrogen cyanide, ricin, and saxitoxin.

IUPAC and the OPCW SAB are preparing an analysis of scientific and technological developments. The results of the study will be released after an IUPAC workshop in Norway

in July 2002.

For the OPCW, scientific developments may lead to more declarations, more inspections, and more expertise, meaning more activity and larger budgets. The states parties must be prepared to accept such a situation as inevitable.

### *Ensuring Non-Proliferation*

Article VI of the CWC is dedicated to the non-proliferation of toxic chemicals and their precursors that could be used to manufacture chemical weapons. The mechanism it establishes to achieve this is the industry verification regime. Facilities that produce and/or consume Schedule 1, Schedule 2, or Schedule 3 chemicals are all subject to declaration and inspection procedures. There is an additional category of OCPFs (OCPFs), which must be declared and inspected. These facilities produce discrete organic chemicals (DOCs), and it is the concern that the facility itself could be diverted for prohibited purposes that justifies declarations and inspections. There are more DOC plant sites than Schedule 1, 2 and 3 facilities put together—more than 4,000 have been declared so far. The selection of DOC plant sites for inspection is an issue that merits serious attention. As does the over-inspection or non-inspection of Schedule 1, 2 and 3 facilities.

The trade in Scheduled chemicals is in need of more effective monitoring, and an effort is being made to correlate import and export data submitted by the chemical industry to National Authorities and reported to the OPCW. The states parties are also exploring issues related to the

enforcement of the transfer bans on Schedule 1 and 2 chemicals and what restrictions to impose on the transfer of Schedule 3 chemicals, short of a ban.

As part of efforts to combat terrorism, the security of CWSFs and any other locations where chemical stockpiles are stored and/or present is being evaluated. Also, to ensure non-proliferation, the industry regime might at some point have to be expanded beyond the Schedules, beyond DOCs even, to capture all possible dual-use chemicals, processes, and equipment. Although, some participants felt that the addition of chemicals to the Schedules was counterproductive and/or that amending the Schedules is still a politically unthinkable action, and that the OPCW should rather expend resources on inspecting those facilities already declared.

### *Verification in General*

The first topic taken up by the Study Group under this agenda item was an update on the issue of site access during industry inspections in the United States. According to the report, where there were previously problems, solutions have been found and the inspection of U.S. industry is proceeding smoothly. The main issue was access to the “plant”—location where activities involving Scheduled chemicals were taking place—versus access to the “plant site”—wider area in which the Scheduled chemicals were present. OPCW inspectors were granted full access to the plant, but were only permitted to inspect the perimeter of the plant site. Bilateral consultation resulted in inspectors

being allowed to walk through the plant site, thereby avoiding any “ambiguities” in the final inspection report.

It was determined that the issue of plant or plant site delineation is one for the facility agreement, and therefore should not hamper on-site activities. It was also noted that document control has increased significantly since September 11<sup>th</sup> and that currently no documents are allowed to leave the inspected site.

It was noted during subsequent discussion that under the Convention, inspectors should be granted unimpeded access to the entire plant site and that a facility agreement is not necessary. The sort of managed access practiced by U.S. industry is not permitted; the Convention only provides for managed access to protect national security is the context of a challenge inspection. It is important to note that in order to achieve a level playing field within the industry regime; all states parties must be treated similarly.

The Study Group next considered the issue of boundaries of production within the context of declarations under Article VI. Related issues include the declaration of intermediates and the production of low concentrations of Schedule 2 chemicals within DOC plant sites. It was pointed out that nearly all of the chemicals on the Schedules are intermediates and not end products.

There are many other serious issues under consideration and in need of attention with regard to the OPCW verification regime, both for chemical weapons related sites and

industrial facilities. The verification concept must be defended from erosion. The key principles in this concept are that verification is designed to demonstrate compliance with the provisions of the CWC and verification must be carried out in the least intrusive manner and through cooperative means. Verification begins and ends with the independence of the Technical Secretariat, and thus of inspectors, to carry out their mandate. While there have been no gross violations of the CWC to date, and the verification regime is functioning, it is also impeded by numerous roadblocks erected by the states parties—managed access, lack of transparency, reinterpretation of the Convention, underbudgeting, reservations, etc. These restrictions have resulted in less than optimum performance and may gradually erode the confidence placed by the states parties in the CWC.

A large piece of the verification puzzle is the ability to the OPCW Executive Council to take the decisions necessary to enable the verification regime to fully function, such as the approval of detailed plans for the verification of destruction of chemical weapons and CWPFs, for the conversion of CWPFs, and facility agreements, as well as decisions on the unresolved industry issues: low concentrations, aggregate national data, boundaries of production and captive use, transfers of Schedule 3 chemicals, etc. The Executive Council, rather than making quick decisions, has a tendency to defer decision from session to session, often for as much as a year or more. At the root of the problem is an emphasis on consen-

sus-decisionmaking, which is not mandated by the Convention and which effectively holds decisions hostage to the whims of one or a few states parties. As well, over the last couple years, the Council has been plagued by a dominance of administrative and procedural issues over substantive topics. In order to ensure effective verification, the Council must function more efficiently and effectively, which requires better focus, more preparation, and greater political will and participation.

In addition to Articles IV, V, and VI (the chemical weapons-related and industry verification provisions), the OPCW must turn its attention to the implementation of Article IX of the CWC: challenge inspections. The fact that no state party has called for a challenge inspection to be conducted anywhere in the first five years of the OPCW's existence is seen by some as proof of the CWC's effectiveness and believe that the role of a challenge inspection is deterrence, while others see the non-implementation of Article IX as a deficiency that must be corrected as soon as possible. They view challenge inspections as important CBMs that should become routine practice. If a state party does have concerns about the compliance of another state party, it has an obligation to pursue such allegations through either the consultation and clarification procedures provided for in the Convention or via a challenge inspection. The fact that this has not occurred and the role challenge inspections should play in CWC implementation must be addressed during the review process.

The Convention is viable, but

only if those responsible for its implementation—the states parties and the Technical Secretariat—take their obligations seriously. Change is sorely needed.

### *National Implementation*

Universality is not just about numbers, but is also about application. It is not enough for the CWC to be adopted universally, it must be implemented universally as well.

Article VII of the Convention requires states parties to take the necessary measures to implement the CWC at the national level, including implementing legislation that criminalizes the CWC prohibitions. The verification regime will only fully function with the collaboration of all the states parties, and the states parties must be empowered to collaborate. To date, only a minority of states parties (63) have enacted implementing legislation, and the forms and provisions of such legislation vary widely. Although international law can, for some legal systems, automatically become the law of the land, regulatory legislation is still necessary to ensure proper implementation. Work must be done towards the enactment and the harmonization of domestic legislation among all 145 states parties.

One area in which the divergence in legislative measures is most pronounced is in the definition of what constitutes a chemical weapon—some states parties limit it to the Schedules while others rightly use the GPC. Under the Convention, states parties are obligated to do the latter, but there is much debate over how to implement the GPC, which by its

very nature is broad and all inclusive leading to greater resources for monitoring, analysis, and declaration. The states parties and their National Authorities must work diligently to prevent the misuse of all toxic chemicals.

On the issue of the GPC and national implementation in general, the OPCW should show leadership and promote awareness among the states parties. This it has done to some extent already, most recently via two questionnaires sent to states parties requesting information about their national implementation measures, both in regard to the import and export of toxic chemicals and penal legislation.

In other areas of national implementation, the OPCW has made great progress: the training of National Authorities, the exchange of information, capacity building, support for the work of National Authorities, and encouraging communication between National Authorities regionally and internationally. Another OPCW program, the ethics project, is in its preliminary stage. This project seeks to engage academia and research centers within the scientific field for the purpose of ethical education; reaffirming the global norm against the unethical activities involving chemical weapons. The ethics project will work to increase awareness of the CWC within the chemical sciences and educate students and scientists about the deleterious applications of their work. Scientists must be made to realize that any activities involving chemical weapons are not only unethical but also illegal. Industry

must also be made more aware of the CWC and industry's role in the implementation of the global chemical weapons ban.

In addition to discussion of the topics addressed above, the Study Group received a paper on Russia's national implementation measures, including details about the request to extend its destruction deadline to 2012. Russia views national implementation of the Convention as an international project, particularly with respect to the destruction program, which can not be completed without international financial assistance.

.....  
***An OPCW program, the ethics project, is in its preliminary stage.***  
***This project seeks to engage academia and research centers within the scientific field for the purpose of ethical education.***  
.....

Although much is being done already, there is more that could be done by both the Technical Secretariat and the states parties in the area of national implementation. A greater commitment of political and economic resources is needed from the states parties to ensure the reliability and viability of national implementation.

***The Contributions of NGOs***

In response to a letter sent from a group of NGOs to the Director-General—an initiative that began at the Study Group workshop in June

2001—NGOs have been informed that they are welcome to attend the Review Conference under the usual rules of procedure and that they are additionally invited to submit papers to the WGRC. There is the added possibility of NGOs briefing the WGRC directly or being provided with an informal session or forum during the Review Conference at which to speak. A general acknowledgement of the value of NGO participation has been voiced within the WGRC, but NGOs must push for more formal involvement; one way to do this is by answering the WGRC's invitation for papers, the sooner the better.

The one NGO currently most involved in the review process is IUPAC, which is preparing its study of scientific and technological developments relevant to the CWC. An effort is being made to involve National Authorities and particularly their technical advisors in this process, in order to provide the states parties a channel for participation. It is important that the IUPAC study remain pertinent and relevant to the review process and not make wide-ranging recommendations that cannot be translated into near-term action.

Industry should also be encouraged to take a more active role in the review process and participate in the review conference.

***Assuring an Effective Outcome***

There is a real potential crisis in that the states parties do not yet seem engaged or interested in the review process. This will hopefully change when national papers are finalized

and submitted. The states parties find themselves preoccupied with the question of appointing a new Director-General of the Technical Secretariat. There is also a need to determine what the end product of the review conference will be: a final declaration, a set of decisions, a report? The outcome has not yet been decided.

Preparation and participation will be the keys to a successful review. There must be consensus on an agreed clear vision of what the review should accomplish. The circle of active participants must be extended wider than the 9-10 delegations that are most active in the work of the OPCW. The CWC and the OPCW are about upholding an international norm; therefore, the review process must be inclusive and involve all stakeholders: the states parties, the Technical Secretariat, NGOs, academia, industry, etc. To this end, transparency and public participation are key not only to the review process but also to the longterm success of the OPCW.

### *Counteracting Biospecific Terrorism*

The issue of how to protect people and animals from chemical and biological weapons, particularly if such weapons are used by terrorists, is an important topic of discussion in a post-September 11<sup>th</sup> world. The two facets of this problem are deterring the use of chemical and biological weapons and establishing the proper mechanisms for passive defense: protection, detection, and decontamination. As one example, the Study Group heard a report of a practical exercise conducted to determine

whether people are safer inside of sealed or ventilated rooms during a chemical attack. The conclusion was surprising and contradictory to much of the information released in recent months. People are safer in a room with some ventilation than in a room that is “completely” sealed—a complete seal is almost impossible to achieve and ventilation will help to dissipate any agent that did gain access to the room.

The Study Group was also presented with an analytical framework of armed violence. The determinants of the effect armed violence has on a population include: the potential of the weapon to cause the effect, the number of potential armed users, the vulnerability of the victim, and the potential for a situation to come to violence in the first place. In order to respond to armed violence, protect populations, and save lives, answers must be sought to these questions, as well as the questions of the context and intent of weapons use and how to prevent or limit the effects of a particular weapon or weapons.

With this framework in mind, there is much that the international community can do to reduce the potential for and the impact of the use of intentional disease as a weapon. Number one is the conclusion of a verification protocol for the BWC and universal adherence to both the Convention and the protocol, as well as criminalisation at both the national and international levels of biological weapons offences. Better disease surveillance and control of known pathogens in combination with better preparation within the health services will significantly

advance global response capabilities. All of this is only possible, however, if there is an effort to increase awareness within the scientific community of the hazards of both chemical and biological weapons and the international treaties designed to control and eliminate them.

### **Future Work of the Study Group**

With over 45 years of work to its credit, Pugwash has made great strides in the linking of science with world affairs, particularly in the area of disarmament. However, in the twenty-first century there may be a need to reevaluate role and strategy of Pugwash. In the last few decades, civil society and the public at large has taken on a greater role in large areas of public policy and international politics. Until now, Pugwash has had little interaction with these groups. Perhaps it is time for Pugwash to enter into coalitions with civil society, and to become more advocacy oriented? Pugwash also must explore ways to reach out to and involve the next generation of scientists and policymakers. One example is the nascent BW monitoring group. Should Pugwash join them?

The Study Group hopes to hold its eighteenth workshop in Geneva during 9-10 November 2002, just prior to the resumption of the fifth review conference of the BWC on 11 November. This workshop will focus on the fifth review conference and on efforts to ensure the establishment of a verification mechanism for the BWC.

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## Participants

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## Working Papers

**Gordon M. Burck:** Contribution to Discussion on Boundaries of Production

**Richard H. Burgess:** A Short Note on Site Access During Industry Inspections

**Pamela Mills:** The Icing on the Cake: CWC Universality

**Pamela Mills:** The First Review Process of the Chemical Weapons Convention, an Update

**Ian R. Kenyon:** The Chemical Weapons Convention and OPCW: The challenges of the 21<sup>st</sup> century (to be published in *The CBW Conventions Bulletin*, no. 56, June 2002)—[Background Document]

**Julian Perry Robinson:** The Threat of Chemical and Biological Weapons (text of presentation at the 3<sup>rd</sup> Swiss Student Pugwash National Conference, Geneva, 10 May 2002, corrected and annotated 12.05.02)—[Background Document]

**Alexandre Kaliadin:** National Implementation Measures of the CWC: The case of the Russian Federation—Background Paper [Background Document]

**Julian Perry Robinson:** Should the First CWC Review Address State-Party Non-compliance with the National Implementation Provisions?

**Walter Krutzsch and Pamela Mills:** Verification in General

**Matthew Meselson:** "Bioterror, What Can Be Done?", May 2000, in *A Draft Convention to Prohibit Biological and Chemical Weapons under International Criminal Law*, Matthew Meselson and Julian Robinson, Harvard Sussex Program on CBW Armament and Arms Limitation—[Background Document]

**Graham Pearson:** Maximising the Effectiveness of the First CWC Review Conference [slide presentation]

**Graham Pearson:** BTWC Developments since June 2001 (slide presentation)

**Jan Medema:** Technologies That Make a Difference in CB Defence

**Jean Pascal Zanders, John Hart and Frida Kuhlau:** "Chemical and Biological Weapons Developments and Arms Control", *SIPRI Yearbook 2002*

**Robin Coupland:** An Analytical Framework of Armed Violence/Measures to Reduce the Chances of People Suffering the Effects of Intentional Disease

ITALIAN PUGWASH GROUP

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## Pugwash Workshop: *Impending Challenges to Strategic Stability: Constraining the Nuclear Threat*

Moscow, Russia, 8-10 July 2002

### Report

by John B. Rhinelanders

*This workshop on strategic stability and nuclear threats, held 8-10 July 2002 in Moscow, covered subjects far different from those during the Cold War. A strong theme was the potential or present instability in East Asia and particularly South Asia and the Middle East. The US-Russian relationship was discussed in the immediate aftermath of the Moscow Summit in May, where the successor to the SALT-START strategic nuclear weapons treaties was signed, and the termination in June of the Anti-Ballistic Missile (ABM) Treaty upon the US withdrawal. The fact that the workshop covered but did not dwell on these US-Russian matters (or even the changing political relationship between the two) is evidence that concerns about strategic stability and nuclear weapons are largely focused elsewhere. Thus, the seventeen participants from outside Russia, who were joined by a large and knowledgeable Russian contingent, covered a broad range of subjects. They also enjoyed a never-ending variety of events scheduled by the energetic Alexander Nikitin and hosted by the Russian Pugwash Group, and benefited from informative sessions at the Russian Foreign Ministry, the Ministry of Atomic Energy and the Kurchatov Institute.*

### US-Russian Strategic Relations

Notwithstanding the signing of the Declaration on New Strategic Relations at the May summit between Presidents Bush and Putin, the nature of this evolving relationship is unclear even as Russia moves politically toward the West and focuses on its economic development. The Strategic Offensive Reductions Treaty itself is a flawed document, but will keep Russia in rough parity with the US on deployed strategic nuclear weapons through 2012, particularly since the ban on MIRV'd ICBMs in START II will never enter into force. Hope was expressed at the workshop that some of the ambiguities in the new treaty, including how to count the deployed weapons covered by the Treaty and the verification regime, might be resolved over the new term and that ratification would be prompt. Neither has happened as the year 2002 draws to a close. Left unresolved by a ceiling of 1700-2200 deployed warheads are central questions starting with the continuing role of nuclear weapons, the dismantlement of the excess warheads and conversion of the fissile materials. Little optimism was voiced that these carryover issues from the Cold War buildups would be addressed anytime soon.

The demise of the ABM Treaty was noted more by sadness than as raising Russian security concerns.

Participants seemed to take their cue from President Putin's conclusion that in the near-term (10 to 15 years), US ballistic missile defense programs would not adversely effect Russia's deterrent capability. The general sense was that the primary impact of the US BMD programs would be elsewhere, particularly East Asia.

The US-Russian Cooperative Threat Reduction program, now in its tenth year, has been successful, but needs to be accelerated and expanded. Participants were fortunate to hear a pioneering proposal to apply the learning and experience in Russia to the physical protection of nuclear weapons and facilities in other countries, particularly India and Pakistan, in this era of heightened concern with terrorism and nuclear proliferation. But neither India nor Pakistan is a party to the Non-Proliferation Treaty (NPT), nor is either a member of the Nuclear Suppliers Group. The legal and policy issues are new and acute, and even the readiness of India or Pakistan to accept outside suggestions or assistance is uncertain. Further, no single approach is likely to work and cooperation may occur first on non-nuclear-weapon materials. Nevertheless, this new initiative could be of real importance and non-governmental groups, including Pugwash, could have important roles. Unfortunately, no one from India or Pakistan was present to respond in Moscow.

Nuclear proliferation has already occurred in South Asia and raises acute and continuing challenges. The two other geographic regions discussed were East Asia and the Middle East. The former appeared to many to be less pressing, assuming China's modernization remains unprovocative, disputes over Taiwan do not flair up dangerously, and North Korea remains contained. Concerns were expressed about Pyongyang's intent and the future of the Agreed Framework, but in July 2002 when the workshop was held the Korean peninsula was still quiet [editor's note: this situation markedly deteriorated in November 2002 when North Korea announced it was resuming pursuit of a nuclear weapons capability.]

The Middle East, particularly including Iraq and Iran, were the center of intense discussions. No one differed with the conclusion stated by several that if Iraq crossed the nuclear-weapon threshold, Iran would as well. Iran is clearly on a path that brings it closer to nuclear-weapon capability, but the public evidence of its policy is ambiguous. While several participants stressed the US desire that Russia curtail or end its nuclear relationship with Iran, one suggested that the US should no longer oppose Russian policy if Russia committed to the take back the spent fuel from any reactors it builds in Iran. Other participants noted the ambiguity in past and present Iranian acts, but believe Russian assistance, particularly the construction of a single reactor at Bushehr, is appropriate. Those supporting the differing US and Russian policies all seemed to agree that Iran's future decisions would be guided, in part, by developments in Iraq. No one suggested that Iran would necessarily remain a non-nuclear weapon state



*Workshop Participants Visiting Kurchatov Institute.*

even if Iraq's programs were credibly stopped.

The discussion of Iraq's nuclear ambitions raised the most diverse views. One participant bluntly stated his understanding of US policy—Iraq was on course to develop nuclear weapons, sanctions were ineffective, and military action therefore necessary. (At the same time, he indicated a military response was not considered appropriate for dealing with either Iran or North Korea.) Regime change might come from an internal coup, but the US view was that a pre-emptive strike was necessary in the alternative. He described the differing motivations within the Bush administration, and thought they would never be resolved. He noted the disagreement among experts on the consequences of military action, particularly a US occupation of Iraq.

The Russian and Chinese positions were presented as dependent on the UN Security Council actions and giving Iraq a final chance. One participant thought a coup within Iraq unlikely and raised questions about the impact of war on the Iraqi civil population, the general geographic area, and public opinion in Europe. Israel's three-decade nuclear capability, even if devoted to its defense, was recognized as a huge unsettling factor

particularly in the absence of peace negotiations between Israel and the Palestinians. Returning to the general theme of the workshop, one participant suggested that the search for stability in the Middle East may in fact lead to instability.

Other themes expressed at the workshop on related matters included:

- the NPT regime seemed relatively stable for most states, notwithstanding the differing applicable standards to certain parties and among the three non-parties, Israel, India and Pakistan, and the suspect performance of several parties;
- Russian nuclear weapons had no role in areas of regional conflict and should be removed; and
- the building a new US-Russian relationship will take a great deal of time and must be based on a real understanding of each other's security needs and concerns.

In brief, the workshop explored a number of difficult, if not intractable, problems in a fast-changing world where anti-terrorism and nuclear non-proliferation are priorities. It was clear from the discussions that while agreement on ends may be achieved, the means to achieve them are likely to remain divisive.

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## Pugwash Workshop: Terrorism and Weapons of Mass Destruction

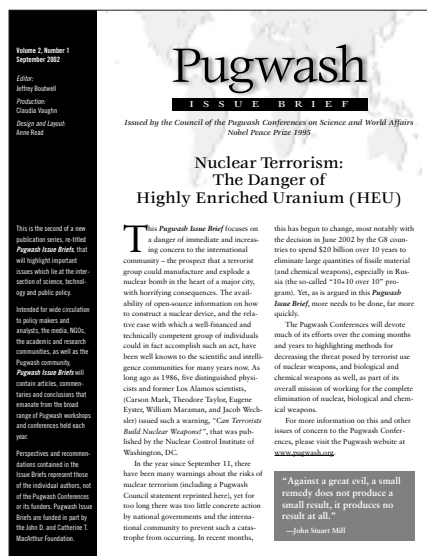
Como, Italy, 26-28 September 2002

### Report

by Götz Neuneck

The first in a planned series of Pugwash workshops on Terrorism and Weapons of Mass Destruction was held in Como, Italy from 26–28 September 2002. There were 25 participants from 11 countries, all attending in their private capacity. The workshop was made possible through the generous support of the Municipality of Como, and Pugwash is grateful to the Municipality and the Landau Network Centro Volta for their efforts in organizing the meeting. The following report is the sole responsibility of the rapporteur and does not necessarily reflect the views of other participants or the workshop as a whole.

The opening session focused on technical aspects of “terrorism with weapons of mass destruction,” primarily nuclear. Participants reviewed the wide range of destructive effects of nuclear weapons, including death, injury and the physical destruction of infrastructure through blast and heat, as well as widespread contamination by radioactive fallout (including long-term genetic effects). A nuclear device like the type used in Hiroshima (13 kilotons), detonated in a big city, could



kill up to a hundred thousand unprotected civilians and devastate an area of several square kilometers, with tremendous longer-term physical, economic, social and political consequences. Even the detonation of a one-kiloton nuclear device in a densely populated area is likely to create an overwhelming challenge for catastrophe-management response services.

Concerning the design of nuclear weapons, much scientific information is publicly available. The most significant technical barrier to constructing such devices is the acquisition of fissile material, either highly-enriched uranium (>20% U-235) or plutonium-239. It is generally agreed in the scientific community that fabricating a gun-type HEU-device is difficult but feasible, whereas the implosion-

type plutonium device is far more technically demanding. The HEU device could be constructed in several weeks or months by groups having access to sufficient quantities of HEU (on the order of 100 kilos), though without being able to test the device, its precise yield would remain unknown. [See the *Pugwash Issue Brief*, “Nuclear Terrorism: The Danger of Highly Enriched Uranium (HEU)” by Jeffrey Boutwell, Francesco Calogero and Jack Harris (available at [www.pugwash.org](http://www.pugwash.org))].

Despite progress by the US and Russia to secure and eliminate much excess HEU in Russia, there remains far too much ‘loose’ fissile material. Given sufficient resources and political will, excess HEU could be eliminated far more quickly than the current 20-year projection. One participant warned that politicians will grasp the scale of the problem only when it is too late, when “a nuclear explosion is triggered by a terrorist organization.” Scientists have a responsibility to draw the attention of all governments, not just the US and Russian, to the problem, and to propose ways of overcoming political and commercial obstacles to the speedy implementation of eliminating HEU all over the world. The explosion by terrorists of an HEU-device is a threat to all peoples and nations.

As noted in the *Pugwash Issue Brief*: “a team of terrorists with sufficient knowledge of physics, explosives and machining could, having gathered information in open and easily available sources, construct a crude nuclear bomb that would have a high probability of exploding with a high nuclear yield.” (p.3) Nevertheless, nuclear aspirants must still (a) develop a design for its nuclear device or obtain it from a nuclear weapon state; (b) produce the nuclear material for the device or obtain it from external sources; (c) shape the nuclear and non-nuclear parts into a nuclear device; and (d) verify the reliability of all of these elements.

The requirements for the performance and delivery of a military weapon versus a terrorist device are, of course, quite different. A terrorist device will entail less technical sophistication in terms of yield, safety and reliability. For terrorists, any explosion within the lower kiloton range would represent an unprecedented achievement. Even a plutonium device that failed to achieve a sustained, critical reaction would represent a radiological weapon with severe consequences. Terrorists also have the option of seeking to steal or buy a “tactical nuclear weapon” from the large stockpiles of TNW remaining in Russia. Many older TNWs are not secured with modern electronic permissive action links (PALs), thus making it easier for nuclear terrorists to detonate such a warhead should they obtain one (see Report on the Pugwash Workshop on Tactical Nuclear Weapons, Sigtuna, Sweden, May 2002, in the *Pugwash Newsletter*, Vol. 39 (1), June 2002).

There exist worldwide many sources of weapons-grade nuclear material. There are in military stockpiles some 1300-2100 metric tons of HEU and 200-270 metric tons of separated plutonium, with an additional 200 metric tons in civilian stockpiles. More than 20 metric tons of HEU are located at research reactors in 39 countries, and HEU also serves as fuel for reactors of nuclear-propelled submarines.

The risk of such material being smuggled, stolen or purchased illegally most definitely exists, even if it is difficult to quantify. Some cases of illicit activity have been thwarted, most involving material that originated from nuclear facilities in Russia or the former Soviet Union. Given the difficulties of ensuring the security of fissile materials in storage, or controlling borders and interdicting attempts at smuggling, the only viable option is to eliminate this material altogether. The **second session** was devoted to the prevention of terrorism with WMD, especially the control of critical material in the former Soviet Union and elsewhere. An analysis of the US-Russian “Cooperative Threat Reduction” (CTR) program showed that arms control, not security issues, are driving the reductions. Ten years of dismantlement has yielded impressive results: 6,000 nuclear warheads, 900 launchers and 800 silos have been eliminated thus far, but the legacy of the Cold War is still huge: too many warheads, missiles and silos remain active. After September 11, expenditures for fissile material security were doubled by the Bush Administration to \$320 million for 2002. Nevertheless, too many secu-

rity gaps remain: chemical weapons stockpiles are still vulnerable to air attacks, border control is not yet implemented, and the oversight of weapons scientists will be essential for the next 10 years. Continuing problems are lack of funds for high-priority projects, extremely thin support from politicians, poorly coordinated strategies and an intransigent bureaucracy.

The IAEA is preparing a concrete action plan to improve security against terrorism, comprising “physical protection of nuclear material and facilities, detection of malicious activities involving nuclear and radioactive materials, the security of radioactive resources, the assessment of safety and security related vulnerabilities at nuclear facilities and the enhancement of program coordination and information management, etc.” The G-8 Global Partnership Program “10+10 over 10 years” is an important step to invest more for threat reduction, but there are doubts that the G-8 program will be well coordinated and fully funded. It was suggested that Pugwash could strengthen such efforts by establishing a road map of priorities. Certainly the Europeans should do more to support the nuclear cities initiative and the ISTC and TACIS programs. There are also continuing issues of Russian transparency regarding CTR. The **third session** dealt with military means to prevent terrorism with WMD, and began with a discussion of Bush administration calls for launching a preventive war against Saddam Hussein’s Iraq. For the US government, Saddam Hussein repre-

sents a clear and imminent danger; Iraq has substantial biological and chemical weapon capabilities and missiles and, left unfettered, the nuclear option for Iraq would only be a question of time. Regime change is therefore the only option.

For many participants, attacking Iraq cannot be justified by Article 51 of the UN Charter [*editor's note*: this was prior to adoption of UN Security Council Resolution 1441 on November 8, 2002], and that a more realistic assessment of Saddam's WMD capabilities is needed. There is much opinion that the Iraqi forces are now weaker than they were ten years ago and that Saddam Hussein might deploy and possibly use biological and chemical weapons only if driven to a hopeless situation.

Participants discussed the pros and cons, and possible scenarios and outcomes, of a military intervention. Most participants did not feel that a war against Iraq should be seen in the context of the war on terrorism, but rather by the beliefs of a small group of US officials that Saddam Hussein must be dealt with 'once and for all'. To achieve this, a full scale invasion and costly urban warfare will likely be needed. And, while the Bush administration may hope for a post-Saddam "democratic Iraq", it is unclear how this is to be accomplished. There are concerns over political unrest and violence in Jordan and throughout the Islamic world, not to mention between Palestinians and Israelis. Finally, even though a regime change in Iraq is likely to be welcomed by most of the international community, hostility and terrorism toward the West is

likely to increase significantly.

On the other hand, the US military might just win such a war in fairly short order, given the tactical operational capabilities of US forces and the degraded state of Iraqi weapons and troops. Yet the important question remains: why Iraq and why now? More than a few think that a war mentality since September 11, 2001 is being used by some hardliners as a pretext to achieve other foreign policy goals, such as US influence and control of oil supplies in the Middle East.

Regarding WMD, the irony is that Saddam would likely be more prone to use such weapons when attacked. Chemical weapons, especially, could be used as weapons of mass disruption to complicate and raise the costs of an invasion. The same holds true for setting the oil fields on fire and putting large numbers of Iraqi civilians at risk in defending the country. It remains unclear how the Iraqi people and military forces will react to an attack, what the ramifications will be for civil war in Iraq involving the Kurds in the north and the Shiites in the South, and how difficult any post-war occupation might be.

For many, what is more important than regime change in Iraq are good faith efforts to resolve the Israeli-Palestinian conflict and the wider Middle East confrontation; resolution of the Israeli-Palestinian conflict would undercut much of Saddam's appeal and that of terrorist groups like al-Qaeda.

Regarding the possible return of UN weapons inspectors [*editor's note*: UN inspectors returned to Iraq

on November 18, 2002], there were concerns that Iraqi compliance might not be enough to dissuade the Bush administration from military action. The proposed coercive inspections also create new questions: Can Hussein differentiate between forces supporting the inspections and an occupation force? And who ultimately decides on the use of force: Chief Weapons Inspector Hans Blix, the UN Security Council or the US government?

For some, the Iraq issue must be seen in the light of the new "National Security Strategy" of the US, published in September 2002, which states that the US would not hesitate to act alone and "pre-emptively" to thwart dangers from rogue/hostile countries or terrorist groups armed with, or seeking, nuclear, biological or chemical weapons. The strategy also calls for the Pentagon to be able to defeat two aggressors at the same time, "while preserving the option for one massive counteroffensive to occupy an aggressor's capital and replace its regime". (Donald Rumsfeld, "Transforming the Military," in *Foreign Affairs*, May/June 2002, pp. 20-46, p. 24). While "regime change" is defined as a new mission for the military, the question remains as to who decides which country is ripe for a forceful regime change and what kind of a new world order would be created? In light of this, one participant argued that "the biggest trouble spot today is the United States."

Concern was also expressed over the proclivity for unilateralism in US foreign policy. These objections were expressed mainly in regards to the credibility and sustainability of international law as expressed by the UN



charter, the Non-Proliferation Treaty (NPT) and other arms control regimes, such as the ABM Treaty, the CTBT and the Biological Weapons Convention. The 13 practical steps to implement Article VI of the Non-Proliferation Treaty, unanimously adopted in the Final Declaration at the 2000 Review Conference, are still awaiting implementation. One participant especially pointed to the fact that the US is not in compliance with

the BWC and the CWC and that additionally, the USA is not funding the CTBT verification efforts. Pugwash should bring such facts to the attention of politicians, the media, and the public.

Generally, multilateral institutions and agreements are being marginalized by the Bush administration, and could set dangerous precedents for other countries. This could especially be true in the area of nuclear

weapons testing. Accordingly, Pugwash should base its thinking and action on seeking to strengthen international norms and regimes. The absence of superpower rivalry provides unique opportunities to create new international frameworks and norms of behavior, and Pugwash should continue to bring its expertise to bear in these areas.

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**Working Papers**

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Is it possible for terrorists to produce highly enriched uranium? And can it be traced and detected in the hands of terrorists?, by **Gunnar Arbmán** and **Anders Ringbom** (**Sweden**)

Consequences of an attack on Iraq on the Palestinian-Israeli conflict, by **Gabriel Baramki** (**Palestine**)

The IAEA's plan of action for protection against nuclear terrorism, by **Tariq Rauf** (**IAEA**)

The decision process of war on Iraq: The wrong way and the right way, by **John B. Rhineland** (**USA**)

Terrorists and Crude Nuclear Devices (II), by **Morten Bremer Maerli** (**Norway**)

Implications of US Military Action against Iraq: An Egyptian Perspective, by **Mohamed Kadry Said** (**Egypt**)

Invading Iraq: The Political and Military Risks, by **Michael Donovan** (**USA**)

Legal Foundations, Mechanisms and Measures for the Fight against WMD Terrorism, by **Alexander Nikitin** (**Russia**)

Chemical Terrorism, by **Pierre Canonne** (**France**)

Force, Order, and the Implications of War with Iraq, by **Steven Miller** (**USA**)

**BACKGROUND DOCUMENTS**

Nuclear Terrorism: The Danger of Highly Enriched Uranium (HEU), *Pugwash Issue Brief*, by Jeffrey Boutwell, Francesco Calogero and Jack Harris, Vol. 2, no. 1, September 2002

"Securing Nuclear Weapons and Materials: Seven Steps for Immediate Action," by Matthew Bunn, John P. Holdren, Anthony Wier, *Project on Managing the Atom*, Belfer Center for Science and International Affairs, John F. Kennedy School of Government, May 2002

**BOOKS OF NOTE**

**The Heart of War:  
On Power, Conflict and Obligation  
in the Twenty-First Century**

*by Gwyn Prins*

Routledge Books, 2002

## Pugwash Workshop on South Asian Security

1-3 November 2002, Geneva, Switzerland

### Report

by Jeffrey Boutwell

*This workshop was co-hosted by the Pugwash Conferences and the Geneva International Peace Research Institute (GIPRI) and involved 32 participants from seven countries meeting over two and a half days to discuss major points of tension between India and Pakistan and ways of building confidence between the two and finding a resolution of the Kashmir dispute. Both Pugwash and GIPRI gratefully acknowledge financial support from the Swiss government.*

### Conventional Confrontation and the Risk of Nuclear Escalation

A central focus of the workshop was the risk that future military confrontations along the Indian-Pakistan border, and the Line of Control in Jammu-Kashmir, might lead to the use of nuclear weapons.

Discussion began with a few participants voicing the opinion that the risk of large-scale conflict between the two countries remains remote, and that belligerent postures in Delhi and Islamabad are rooted primarily in domestic politics. In this light, neither country at present has much of an incentive to change current policies which perpetuate the stalemate

between them. Even if conventional war did break out, according to this view, a military stalemate would be the most likely outcome. In addition, nuclear use by miscalculation or by accident is unlikely, and nuclear preemptive strikes are not a likely option. What is needed is for both sides to lower the inflammatory rhetoric.

Others disagreed strongly with this thinking, arguing that nuclear use by accident, miscalculation, or unauthorized use is very much possible. This view held that both countries have been on the brink so often that risk-taking has become ingrained in policy-making; the (unfortunate

and dangerous) consequence being that both India and Pakistan feel large risks can be taken because these won't lead to all out conflict.

In terms of the major issues fueling the conflict between them, cross-border terrorism is for India the key issue; it simply must stop. One Indian characterized India as a status quo power confronting a revisionist power that uses and manipulates terrorism for its own ends. The dilemma for New Delhi is how to respond: military mobilization, punitive actions, diplomacy? The point was made forcefully by one participant that Pakistan seems to feel that its nuclear weapons have given it a free



hand to pursue low intensity warfare without fear of conventional retaliation. India can not countenance staying in the box, and will have to respond, perhaps with preemptive options.

A Pakistani response is that India is manipulating the meaning of terrorism when it talks of Pakistan using its nuclear shield to promote terrorism, and that India greatly over-simplifies the problem of controlling terrorism (as India should know from its own domestic terrorism). Given instability in Pakistan, the Pakistani government will need political cover (talks on Kashmir, economic relations) as a quid pro quo for cracking down on cross-border and domestic terrorism. Another participant asserted that Pakistan's national security policy has changed substantially in the post 9/11 environment, and India should recognize and acknowledge these changes. Moreover, Pakistan has accepted its military imbalance with India and won't try and engage in an arms race in every area.

[Although not discussed at length during the workshop, press reports shortly before the meeting that North Korea had admitted to violating the 1994 Agreed Framework by building up a stockpile of highly enriched uranium, and that Pakistan had aided these efforts in return for North Korean ballistic missiles, could only further complicate the situation.]

### **The Nuclear Dynamic**

Discussion followed on perceptions of the role of nuclear weapons in South Asia. For some in India, there is the assumption that nuclear weapons greatly reduce the possibility of

major conflict and will facilitate an ultimate settlement between India and Pakistan. Others clearly feel the opposite, that perceptions of a 'nuclear stalemate' greatly enhance the risk of conventional conflicts (e.g., Kargil). Whatever Pakistani assumptions might be, however, about the role of India's nuclear weapons, the opinion was voiced that Pakistan should not take 'no (first) nuclear use' by India for granted.

The same dichotomy of opinion is found, not surprisingly, in Pakistan, with some believing that nuclear weapons in South Asia are self-detering, with little risk that a conventional conflict will lead to the use of nuclear weapons. Others believe that, while Pakistani views on nuclear weapons have matured since the early 1990s, with a greater realization of the consequences of their use, there is still a tendency to underestimate the dangers of 'going nuclear.' Credit was given to Pugwash for helping to educate Pakistan's strategic community on the dangers of nuclear weapons, but more such efforts are needed, especially in terms of public awareness of the dangers of nuclear war.

One participant stressed that it is important to lay bare what the India-Pakistan strategic dialogue is all about. A nuclear confrontation in South Asia would have horrific consequences for the subcontinent, as well as strategic implications for the outside world, and various major powers will exert themselves accordingly. Optimistic predictions that conventional conflict would not go nuclear could be undermined by several factors. One such is the difficulty both sides might face of sustaining

major conventional operations for any length of time (one analyst has maintained that the Indian army has logistic capabilities for only 2-3 weeks of sustained conventional conflict), thus increasing the pressures for nuclear weapons use. More ominous is the role of non-state actors in provoking India and Pakistan; terrorist attacks in South Asia have become more provocative following 9/11, and this is the wild card that is most potentially destabilizing.

Some participants felt that the militaries in the two countries recognize that the confrontation is a no-win situation, and that it is the politicians who are responding to and/or exploiting domestic political pressures in sustaining the conflict. This is especially true in terms of the actions of non-state actors being exploited for political purposes. Yet, assumptions about the low probability of major conflict could themselves become self-deluding dangers. And, more generally, there are the economic and political costs of maintaining the military confrontation, both in terms of money spent and investment lost in a region seen as unusable.

One participant suggested that both the following propositions are true: that there is a low probability of actual conflict, yet extreme international concern that such a conflict could occur. It is this concern, especially over nuclear war and over the ability of the two countries to control their nuclear weapons and fissile material, that will keep the US and the international community centrally involved in South Asian affairs. For different reasons, it was also

argued that both India and Pakistan at times manipulate this nuclear concern to keep US and the world involved in South Asia.

Others do not share this confidence in the military being able to control the situation. Things can go wrong, and short timelines for decision making compound the problem. Senior leaders in both countries have intimated a willingness to use nuclear weapons if need be, and there are the worrisome developments of more extreme elements in both governments. It was also noted that scientists should play a stronger role, but don't, in policymaking in both countries, in part because of secrecy laws that greatly constrain those scientists who worked on nuclear and other programs.

Even if the risk of nuclear war is low; US concerns about nuclear war stem from the imbalance in conventional forces and Indo-Pakistani misperceptions about each other's red lines. For example, the Kargil stand-off was one thing, but conflict across their joint border would be significantly different, in terms of the Indian army threatening major Pakistani cities or lines of communication, or where Indian air force superiority could inadvertently or deliberately lead to pre-emption of nuclear assets, leading to Pakistani threats to use nuclear weapons.

There is an inherent fallacy in thinking that deterrence is a stable condition, that India and Pakistan have somehow reached a deterrent plateau; deterrence is a dynamic condition that is subject to change. Moreover, deterrence is weakening as nuclear weapons lose their terror

value for elites and publics in both countries (others disagreed about this, feeling that elites in both countries are well aware of what nuclear war would mean, and are self-deterred accordingly).

If there was one silver lining to the crisis that began with attack on the Indian parliament in December 2001 and led to troop mobilization in early 2002, it is the increased interest on both sides (and in the international community) to find ways of resolving the long-standing Indian-Pakistani confrontation, and the need now to seize this opportunity.

### Defusing the Nuclear Confrontation

Any discussion of ways to reduce the likelihood of nuclear weapon use in South Asia must begin with dispelling misconceptions about nuclear weapons and nuclear strategy. Given short flight times between the two countries (8-12 minutes for known missile systems), radars and satellites will provide precious little 'early warning'. Precisely because there would be essentially no time for political decision-makers to order retaliatory attacks in the case of genuine attack, one participant feared that each or both countries might feel impelled to pre-delegate launch authority to commanders in the field in order not to lose their nuclear forces to preemptive attack. Such a posture, of course, would produce its own instability, in that nuclear forces could be launched mistakenly, in response to false alarms (e.g., geese on the radar), miscalculation (a mistaken belief that actual events, such as mobilization at nuclear bases or



*Jasjit Singh and Ana María Cetto at the 52nd Pugwash Conference.*

other actions, are preludes to imminent nuclear attack), or misperception (a mistaken belief, even in the absence of any evidence, that the other side *should be and is* preparing a nuclear attack).

Other participants dismissed these concerns, arguing that each country has in place strict command and control procedures for authorizing the use of nuclear weapons.

Whatever the reality, at a minimum both India and Pakistan should adhere to their current moratorium on nuclear testing, but the greater need is to go beyond this to explore ways of limiting nuclear weapons on both sides in ways that can strengthen stability and reduce pressures for preemption. In doing so, it will be important to note the different utility (perceived and real) that nuclear weapons have for India and Pakistan, and these need to be taken into account when discussing strategies for reducing and eliminating nuclear weapons in South Asia.

There followed a general discussion of pre-emption: its effectiveness or lack thereof, the possible destabilizing effects of even discussing it, and the action-reaction cycle of increasing forces to prevent risk of preemption.

Among the confidence-building measures discussed for reducing the threat posed by nuclear weapons were:

- agreements not to develop and deploy tactical nuclear weapons;
- pre-notification of missile test launches and military exercises;
- improvements to the crisis hotline between India and Pakistan (making it a dedicated, hardened and continuous communications link);
- maintaining a de-alerted posture (separation of warheads from delivery systems)
- improving security and safeguards of nuclear weapons and nuclear facilities, to prevent terrorist or unauthorized seizure.
- no increase of forces in Silcik;
- naval CBMs (incidents at sea);
- military to military discussions (even on social and regimental issues);
- discussions between Indian and Pakistani nuclear scientists on such issues as accidents of weapons in transit, or reactors, to help governments devise response plans;
- planning of nuclear risk reduction centers as discussed in the Lahore principles.

Other proposals included having the US and Russia share their expertise on reducing the risk of nuclear accidents (even if it means recognizing the nuclear status of India and Pakistan). There was of course sup-

port for India and Pakistan joining the Comprehensive Test Ban Treaty and the Fissile Material Cut-Off regimes, though both are highly unlikely until substantial progress is made on the Kashmir and terrorism issues. In the area of conventional forces, suggestions were made for no forward deployment of military forces, for restraints on the deployment of landmines along the international border or line of control, and for actual removal of landmines along the border given that landmine maps do exist.

### **Resuming Dialogue: Kashmir and Terrorism**

All participants agreed that the major obstacle at present is a lack of confidence that the other side is genuinely interested in moving forward to a resolution of outstanding issues. Given the mistrust generated by the Agra Summit in July 2002, there was general sentiment that the two sides should return to the 1999 Lahore principles.

There was also some hope that the Kashmir elections in October 2002 may have opened up a 'political space' for renewed efforts to seriously discuss solutions to Jammu and Kashmir. The Kashmiris themselves have become more central to resolving the issue of J&K, both in terms of their sacrifice (more Kashmiris have died in internal conflict than Indians and Pakistanis in their three wars) and credibility gained from their recent election. A combination of these recent free, fair and inclusive elections with a growing climate against violence (many Kashmiris have "plague on both your houses"

attitude towards India and Pakistan at the moment) and decreased legitimacy of militancy (i.e., those who claim to commit violence in the name of Kashmiris) has opened up new possibilities. The new government of Chief Minister Mufti Mohammad Sayeed appears open to dialogue with all. The international community needs to support and strengthen this process, and all parties need to suspend any support for violence of whatever form (Pakistan in terms of cross-border terrorism, India in terms of special operations forces accused of human rights violations).

Kashmiri support for devolution of authority needs to be carried forward, along with demilitarization of the conflict and reconstruction of the society and economy. It will be important not to permit Indian or Pakistani versions of the end game block Kashmiri exploration of possible solutions. What is important for Kashmir is an exit strategy for all three parties that is perceived as honorable and which can be implemented. The work of the Kashmir Study Group was mentioned in this regard, proposing Kashmiri independence with limited sovereignty.

Other elements cited were the importance of adhering to democracy and non-violence; the non-permanence of the LOC as an international boundary (borders should be soft and porous); common municipal functions (infrastructure, tourism) built into maximum autonomy for Kashmir; Indian and Pakistani military protection of the borders; and giving Kashmir a semi-international presence (observer status in international bodies).

Specific mention was made of

international monitoring of the LOC to demonstrate Pakistani good faith in stopping cross-border terrorism, recognizing there are indigenous religious extremists in K&J that are independent of Pakistani control. Reinforcement of UNMOGIP would be natural, but India will see this as UN intrusion into the Kashmir dispute (one Indian countered that India is not averse to international facilitation on J&K, but to international mediation). Mention was made of involving SAARC in monitoring the border, while British Foreign Secretary Jack Straw has proposed an international helicopter-borne monitoring force. Others were less sanguine about the effectiveness of such monitoring, when incursions across the LOC are rapid and easy?

### The Way Forward

Participants focused on how the group can take advantage of points of leverage in proposing next steps. Much emphasis was put on fully implementing the various components of the 1999 Lahore Declaration, wider discussion of CBMs, especially nuclear, and exploring resolution of the Kashmir/terrorism issues. One participant noted that measures such as CBMs are fine in themselves, but what is needed is a vision of future goals that will motivate people to reaching a final goal and ending 50 years of conflict.

Regarding the Lahore Declaration, various elements that were agreed to have not been fully implemented. Even in times of tension, such measures as: bilateral consultations on security concepts and nuclear doctrines; unilateral measures to reduce

risks of accidental or unauthorized use; and upgrading of the communication hotline to reduce misunderstanding/misinterpretation of events would go far in solidifying a basis for further progress. Other steps mentioned in this regard included restoring the High Commissioners in Delhi and Islamabad, resumption of trade and air/ground links, and reducing inflammatory rhetoric.

In terms of CBMs, a wide array of military and non-military CBMs already exist, and a paper outlining a strategic restraint regime (nuclear and conventional CBMs) tabled by Pakistan deserves discussion. There could also be joint patrols and monitoring of the Line of Control and evaluation of whether Pakistan is restraining cross-border terrorism.

The issue of joint patrols of the LOC was floated in July 2002, and Pakistan responded with UNOMIP; such patrols would have automatically brought a ceasefire into place, and this would also have strengthened higher level politico-military contacts that could strengthen crisis management. Also recommended was reinstating the ceasefire in Kashmir and permitting Kashmiris to go to Pakistan for talks.

A Helsinki analogy might be appropriate for the India-Pakistan confrontation, with three baskets of issues that could be discussed: Kashmir/terrorism; nuclear/military; and trade/social interaction.

Looking at the longer term, participants stressed emphasizing the benefits of peace to both countries. One example given was the total collapse of the Pakistani educational system (higher education is only

available to two percent of the of population) and its desperate need for resources, which could come in part from academic exchanges with India. Regarding trade and economic activity, economic actors need to be brought into the discussion to explicate the benefits of peace, recognizing that greater bilateral trade, while in the interest of both India and Pakistan, will still be affected by tensions (as are tourism, transportation, communications, etc.). A good example is the potential for a natural gas pipeline through Pakistan to India, and the fact that alternatives through Bangladesh are being explored instead. Nonetheless, economic CBMs and regional infrastructure projects could help create constituencies for improved relations.

In any event, track II dialogue should not be constrained by governments, and international engagement by NGOs, foreign leaders, journalists, and others are important in shaping attitudes and policy in the two countries.

One participant thought that, although political will for improving bilateral relations is currently lacking, especially in Delhi, there are grounds for optimism about progress over the next six months, especially with US facilitating. Of course, all bets are off should there be an invasion of Iraq.

A next meeting was scheduled for May 2003 in Geneva, with agreement that concrete agenda items and papers would be prepared and distributed well in advance so participants can fully explore possible areas of agreement.

## Participants

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**Working Papers**


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South Asian Stability—A Pakistan Perspective, by Jehangir Karamat (Pakistan)

Some Draft Remarks on the Conference Agenda, by Abdul Sattar (Pakistan)

The Law of Diminishing Threats (*Revised*), by Asad Durrani (Pakistan)

India-Pakistan Relations and South Asian Security, by Pran Chopra (India)

Impact of Religious Extremism on Security of South Asia, by L. Ramdas (India) [Background Document]

Some Cooperative Initiatives for India-Pakistan Dialogue and Risk Reduction, by Ravinder Pal Singh (India)

Nuclear Weapons in South Asia: Risks and their Reduction, by R. Rajaraman (India)

The Pakistan Elections and After, by Maharajakrishna Rasgotra (India) [Background Document]

India and Pakistan (An appeal for monitoring LOC) (*Revised*), by A.H. Nayyar and M. Martellini [Background Document]

India's Strategic Game: A Paradigm Shift?, by Waheguru Pal Singh Sidhu (India) [Background Document]

Confidence Building Measures in South Asia, by Satish Nambiar

"Signposts for Peace in South Asia", by L. Ramdas, *The Hindu*, Thursday, July 18, 2002 [Background Document]

South Asian Security—An Indian Perspective, by Maharajakrishna Rasgotra (India)

Indo-Pak Talks: Ten Questions, by C. Raja Mohan, Strategic Affairs Editor, *The Hindu*, New Delhi

Kashmir—A Way Forward, *Kashmir Study Group*, 2000 [Background Document]

## 18th Workshop of the Pugwash Study Group on the Implementation of the Chemical and Biological Weapons Conventions: *The Resumption of the Fifth BWC Review Conference 2002 and Beyond*

Geneva, Switzerland, 9–10 November 2002

### Report

by Fiona Tregonning

*This was the ninth of the current Pugwash workshop series on chemical and biological warfare (CBW) to be held in Geneva. It was jointly convened by the Harvard Sussex Program on CBW Armament and Arms Limitation (HSP) and the Swiss Pugwash Group. The meetings were held on the premises of the Graduate Institute of International Studies, University of Geneva.*

*Fifty-six people attended the workshop, by invitation and in their personal capacities, from 19 countries (Australia, Belgium, Egypt, France, Germany, Hungary, India, Iran, Israel, Italy, Japan, New Zealand, Pakistan, Russia, South Africa, Sweden, Switzerland, the United Kingdom and the United States of America). This report of the workshop is the sole responsibility of its author, who was asked by the meeting to prepare a report in consultation with the Steering Committee. It does not necessarily reflect a consensus of the workshop as a whole, or of the Study Group.*

The focus of the workshop was, once again, the Fifth Biological

Weapons Convention (BWC) Review Conference, due to resume after a year's adjournment on Monday 11 November 2002, the day following the closing of the workshop.

The meeting opened with a welcome by the new Secretary General of the Pugwash Conferences, Professor Paolo Cotta-Ramusino of Italy, and the observation that this was the fiftieth international meeting of the PSG-ICC and its predecessor CBW study groups, the initial focus of the study group in 1964 being on matters relating to Biological Weapons (BW).

In addition to the various reports on developments outside the BWC during the previous year, the main items for discussion by the workshop under the rubric of the Resumption of the Fifth BWC Review Conference 2002 included: developments since the adjournment of the Review Conference in December 2001; key issues for the resumed session, namely a final declaration and future meetings of the States Parties; taking stock of the situation, including the role of civil society; and topics that might be addressed at future meetings of the States Parties. Participants also addressed themselves to the future work of the Pugwash Study Group on the implementation of the CBW Conventions.

### CWC: Progress in Implementation

A report was given on developments since June 2002 within the Organisation for the Prohibition of Chemical Weapons (OPCW). Issues covered included: the appointment of a new Director-General; the seventh session of the Conference of the States Parties to the CWC; internal Secretariat problems; the forthcoming First Review Conference; progress in CW destruction; verification activities; and implementation of the CWC.

The first item noted was the appointment of a new Director-General of the OPCW, Rogelio Pflifter of Argentina, by a Special Session of the Conference of the States Parties in late July. It was observed that the period preceding his appointment, including the termination of the previous Director-General's term of office, had been a painful one for the Organisation and a number of member states. It had also been a unique situation for an international organisation. Since then, relations between member states and the Technical Secretariat were reported to have markedly improved—this has been aided by the Director-General having been active both in The Hague and in his travels

to States Parties. For the first time in many years, the OPCW, represented by the Director-General, attended the First Committee in New York, which he addressed, the Director-General also being due to address the full General Assembly in November. Staff morale within the Organisation was also reported to be improving with this new phase in the OPCW's history.

Second, the seventh session of the Conference of the States Parties in October was reported to have been more productive and effective than any others save the first session in May 1997. The Conference took a number of decisions, the most important of which was an increase in the OPCW's budget for 2003 by almost 10 per cent. The Director-General was also authorised to withhold the distribution of the prospective cash surplus for 2001. However, the financial decisions taken by the Conference along these lines were *ad hoc* in nature, rather than addressing fundamental structural issues. It was noted that the OPCW had also received several voluntary contributions, including a US\$2 million contribution from the United States. In short, the current financial situation was considered to be improving, enabling the OPCW to conduct a full programme of activities.

Several political decisions relating to the Russian Federation were taken at the Conference: the Conference finalised a lengthy and painful process of consideration and approval of Russian conversion requests—24 chemical weapon production facilities (CWPFs) had been declared by Russia, of which six were to be destroyed and 18 were the subject of

conversion requests. While some States Parties were of the opinion that conversion of CWPFs under the CWC was for exceptional situations only and therefore should not be granted for two-thirds of the Russian CWPFs, in the end Russia had received approval to convert. The other major decision taken was in respect of the Russian request for an extension of intermediate and final deadlines for destruction of Category 1 CW stockpiles. Last summer the Russian Federation had produced a revised destruction programme that would see a five year extension of the final destruction deadline. The Conference agreed "in principle" to an extension of the first two intermediate deadlines, the details of which were to be established by the Executive Council in December—the remaining deadlines will be considered at the next session of the Conference in October 2003. The result, however, is that the Russian Federation is now not in technical non-compliance with the CWC.

Third, the participants' attention was drawn to internal problems within the Secretariat. While these existed within the Secretariat, they had been created together with member states through the Staff Rules and budgetary decisions. Resolving these problems will take some time, but attention is now being focussed on them.

Increasing attention is being given to the first CWC Review Conference, which will take place in The Hague in late April and early May 2003. The Working Group for preparations for the Review Conference is now moving to more substantive discussions and papers and proposals from

member states are beginning to arrive, including three papers from the United States. The hope was expressed that this will lead to a political declaration and more specific decisions by the Review Conference, but that the Review Conference would not try to resolve technical issues. Finally, a possible need for changes to the rules of attendance of NGOs at the Review Conference was said to be being considered—participants at the workshop expressed their desire to contribute constructively to the Review process and to attend.

The CW destruction process was reported to be lagging. It is hoped that the Gorny facility in the Russian Federation, built with German assistance, will be online early in 2003 so that Russia can meet the first deadline for destruction of one per cent of Category 1 CW stockpiles. While the United States has made no requests for assistance with its destruction programme, there have been indications that it too might experience delays.

Verification activities, on the other hand, were reported to be progressing smoothly and issues from earlier inspections were being addressed. Discussion has been taking place on overall verification activities in relation to the most efficient use of resources, 70 per cent of which are spent on continuous monitoring of destruction. Another issue being discussed is the distribution of Article VI inspections.

In terms of implementation of, and compliance with, the CWC, it was noted that many member states could not report that they had national implementing legislation or



*Mohammed ElBaradei and Hans Blix*

National Authorities, while those which had implementing legislation might not necessarily have sufficiently comprehensive legislation.

Participants raised the issue of the recent Moscow hostage crisis and the role of the OPCW. It was stated that the OPCW had watched the situation unfold, particularly after the news of the use of gas, and had made contact with the Russian authorities fairly early on. There had been reports that one State Party had been about to officially request clarification in respect of the Moscow events in the Executive Council, but this did not occur. The official Russian position is that what happened had nothing to do with the CWC and no State Party was known to be taking an official position that there had been any violation of the CWC in respect of the Russian actions. Three issues pertinent to the CWC were considered to have been raised by the Moscow hostage crisis: (i) the applicability of the CWC to internal conflicts; (ii)

new categories of chemical substances for law enforcement purposes, not being riot control agents; and (iii) whether the Review Conference would address either of these issues. The first was considered by one participant not to apply to the Moscow crisis, as it was a law enforcement situation, not an internal conflict; the second point was thought to be valid; and at this stage there was no proposal to address the issues related to the Moscow hostage crisis at the Review Conference.

Finally, participants queried whether Iraq had made any indication of acceding to the CWC, Iraq having, for the first time, attended the seventh session of the Conference this year as an observer.

## UNMOVIC

The workshop then turned its attention to issues related to UNMOVIC and inspections in Iraq, the situation in respect of Iraq having recently changed with the adoption on 8

November of UN Security Council Resolution 1441 (2002).

In response to questions about measures to ensure the safety of the UN inspectors and their possible extraction if their work was obstructed, it was reported that security had been addressed by Dr Blix with General Al Sa'adi of Iraq, and that there was an obligation on Iraq to ensure the inspectors' safety. In the past, UNSCOM had had extraction plans, and it was assumed that these would remain in place for UNMOVIC. As regards security of UNMOVIC teams, the understanding was that while no inspections would be coercive, there would be UN guards and UNMOVIC would have bases outside Baghdad. While the unpredictability of Iraq was acknowledged, it was considered that Iraq probably would accept Resolution 1441 within the timeframe set.

Participants noted the gap in time since there had been inspectors in Iraq, commenting on the sharp learning curve experienced by UNSCOM during previous inspections and noting a need for a continuity of expertise and knowledge in inspectors. UNMOVIC has attempted to gain UNSCOM's knowledge through two years of studying the UNSCOM archives and database. In addition, six training courses for inspectors have been conducted and some 30 per cent of UNMOVIC were previously with UNSCOM—while, in general, the inner core of Chief Inspectors will not be there, some will be present as monitors. There is a question as to how Dr Blix will interpret Resolution 1441 regarding the requirement to ensure that inspection

teams are composed of “the most qualified and experienced experts available”—this may provide the opportunity for other ex-UNSCOM personnel to be involved.

Noting that Iraq had previously said that it did not possess any WMD, and now is required to make final declarations within 30 days (if it accepts the Resolution), it was observed that there was no intention of providing Iraq with any ‘exit’ or face-saving strategy. There is a requirement in the Resolution for total disclosure of weapons programmes, not simply weapons. Importance was placed by the workshop on the unanimity of the Security Council Resolution this time—this was thought to convey the message to Iraq that it would not be able to exploit any differences of opinion in the Security Council.

### CBW Criminalization

Two reports were given to the workshop on progress in CBW criminalization, one focussing on national measures, the other on international measures.

The first focussed on criminalization of the inchoate CBW crimes, the preliminary steps of acquiring CB materials, production and planning to use them. The problems of distinguishing between criminal and non-criminal acts of possessing CB agents were noted, the conclusion being that a licensing system for access to chemical and biological agents was required. This would create a rebuttable presumption of non-criminality.

Observing the difficulties of achieving international criminalization, the presentation emphasised the

progress that could be made through tough national penal measures. It was noted that most states have general prohibitions on homicide, on the operation of criminal networks and money laundering, which should be sufficiently broad to deal with CBW related crimes. Areas thought to need attention were the wrongful diversion of chemical agents and legally requiring laboratories to implement adequate biosecurity standards, with penalties for failure. In addition, attention should focus on the ability to carry out legal prosecutions (Article VII of the CWC and Article IV of the BWC) and the strengthening of co-operation in respect of trans-national crime. It was also considered that carrying out some forms of CB research should be criminalized and that the legal authorisation and capability of the police to detect and surveil wrongful activities must be ensured. In terms of surveillance, the conclusion was that an international convention was not required, instead the capabilities of international organisations such as the World Customs Organisation, Interpol and Europol could be drawn on. In essence, national criminalization was presented as a broad set of measures for regulating CBW activities, not simply targeting non-state actors but also acting as a brake on state activities.

In terms of how to move forward on criminalization, it was noted that the expert group meetings contemplated by the Tóth proposal (described below) would consider national measures for implementation and biosecurity, both aspects of criminalization. A possible workshop, to be held in Geneva in antici-

pation of the meetings of the group of experts, was being considered as an aid to structure the debate and move criminalization forward. In response to the presentation, one suggestion was that security of pathogens might be more effectively addressed through adjustments to existing requirements to protect public health and the environment, rather than as part of national implementation measures for the BWC and CWC.

Second, an update was provided to the workshop on the HSP Draft Convention to Prohibit Biological and Chemical Weapons Under International Criminal Law. Since the last meeting, it was reported that the Swiss representation at the first session of the Fifth BWC Review Conference had spoken of the need for international criminalization. There had been discussion of the HSP proposal, introduced by the Netherlands, at the public international law working group of the Council of the European Union. On 31 January, the proposal had been referred for consideration by national governments. In addition, a new Convention on Criminalization of CBW, referring to the HSP proposal, was the seventh of 11 steps outlined in the April 2002 UK Green Paper on measures to strengthen the BWC. The presentation highlighted the difference between national and universal criminal jurisdiction, with the benefits of universal jurisdiction emphasised.

Opinions were divided as to the level of support for universal jurisdiction within the international community, observations being made that the new International Criminal Court operates on the principle of comple-

mentary, rather than universal, jurisdiction. On the other hand, it was noted that there are seven international Conventions establishing universal jurisdiction, with one new Convention (on Terrorist Bombings) pending, all of which are supported by the United States. It was reported that some states were interested in pursuing the issue in the Sixth Committee, however, there are some problems with that, including whether a topic which has been viewed as falling into the First Committee's ambit would be able to be shifted to the Sixth Committee.

### **The Fifth BWC Review Conference (Part I)**

It was reported that, last year, the Fifth Review Conference had been conceived of as a forum to which a report would have been made on the work of the Ad Hoc Group, which had been negotiating a Protocol to strengthen the effectiveness and improve the implementation of the BWC. The failure of the Ad Hoc Group in July 2001, however, meant that States Parties were in an uncertain position when the Fifth Review Conference convened in November. The Review Conference opened with a General Debate in which States Parties had made statements which included disappointment about the Ad Hoc Group negotiations and concerns about compliance with the BWC. Three main issues emerged as requiring resolution in order for the Conference to reach a consensus Final Declaration:

- 1) The status and future of the Ad Hoc Group;
- 2) How to deal with accusations

regarding compliance with the BWC; and

- 3) If there was to be no Protocol, where to go from here and how to follow up on what had been done.

Two weeks were spent in the Committee of the Whole, then proceeding to the Drafting Committee to prepare a draft Final Declaration developed from those of previous Review Conferences. However, late on the final day of the Review Conference, the United States produced a controversial new proposal calling for termination of the Ad Hoc Group and its mandate. Given the stage of the Review Conference, the President proposed, and it was agreed, to suspend the Conference for a year until November 2002.

At the time of the 18<sup>th</sup> Pugwash workshop, the Fifth Review Conference was scheduled to run for a period of two weeks, starting with a plenary meeting on 11 November. While much work had been done over the last 12 months, the outcome of the Fifth Review Conference was considered still to be very unclear.

### **The Resumption of the Fifth BWC Review Conference 2002 and Beyond**

#### *Developments since the adjournment in December 2001*

The workshop heard an outline of the work conducted by the President of the Fifth Review Conference, Amb. Tibor Tóth, since December 2001 and his proposal for the reconvened session. On the morning of Monday 11 November, a draft decision would be put before the Conference focussing on one item: follow-up. This was described as a

mid-term strategy programme, mixing both process and substance. The Tóth proposal is for five issues to be the subject of three annual meetings of States Parties, each of one week's duration, to be held between 2003 and 2005:

- 1) adoption of national measures to implement the prohibitions in the BWC, including the enactment of penal legislation (for discussion in 2003);
- 2) national mechanisms regarding the security and oversight of pathogenic micro-organisms and toxins (for discussion in 2003);
- 3) enhancing international capabilities with respect to cases of alleged use of BW or suspicious disease outbreaks (for discussion in 2004);
- 4) national and international efforts and mechanisms for surveillance, detection, diagnosis and combating infectious diseases in humans, animals and plants (for discussion in 2004); and
- 5) codes of conduct for scientists (for discussion in 2005).

It is proposed that each of the annual sessions will be preceded by a two-week meeting of experts.

The background to the Tóth proposal was the three failures in July, August and December 2001; failure to agree on a Protocol, failure of the Ad Hoc Group to report to the Fifth Review Conference and the suspension of the Review Conference. In December last year, the situation was tenuous, with a request for the termination of the Ad Hoc Group. Since then, there have been three rounds of consultations by the President of the Fifth Review Conference and much quiet diplomacy. While in spring and

summer this year, the consultations appeared to favour the Tóth proposal, in September the position seemed hopeless, with the United States indicating that it did not want there to be any ‘real’ Review Conference.

Analysing the proposal, the presenter outlined five legitimate concerns that had been raised by States Parties. The first concern relates to the absence of a Final Declaration. In terms of the situation in December 2001, while over 90 per cent of a Final Declaration could have been consolidated from work at the Review Conference, there were a number of outstanding issues, on any one of which the Final Declaration could have foundered. Those issues included: the description of what happened in respect of the Ad Hoc Group; whether or not the Ad Hoc Group should continue its work; compliance with the BWC; and export control regimes. By 7 December 2001, it was clear that it would be impossible to resolve the issues relating to the Ad Hoc Group and compliance. The absence of a Final Declaration was considered to be a substantial loss and an indication that the position at the Fifth Review Conference was negatively different to that at previous Review Conferences. The resulting dilemma is whether the Conference should try to produce an outcome which is a mix of procedure and substance. However, it was emphasised that the Tóth proposal is not a ‘better than nothing’ approach.

The second concern is that the Tóth proposal is a ‘selective’ approach; that is, because the proposal identifies items to be discussed

in the years until 2006, this by definition narrows the scope of application of the BWC. However, there are three precedents for a focussed approach: the 1986 decision on CBM declarations; the 1991 tasking of VEREX to examine possible verification measures; and the 1994 establishment by the Special Conference of the Ad Hoc Group. The Tóth proposal is seen as a mid-term strategy with an annual programme of work.

.....  
***Even if the Tóth proposal is accepted, it may be nothing but an empty shell. The Tóth proposal could mean only three weeks a year of meetings on the five issues contained in the proposal.***  
 .....

The third criticism, one that had been voiced primarily by non-aligned states, is that there is a lack of co-operation and multilateralism in the proposal. While it was acknowledged that there could be more co-operation in the package, it was emphasised that the situation has to be viewed in context. At least two items provide concrete spin-offs which historically are within Article X provisions, items which have been in both the draft Protocol and previous Final Declarations. The efforts at balancing co-operation and compliance in the Tóth proposal were highlighted, although it was also noted that there was little emphasis on compliance measures and thus the balance appears different to some States Parties. The fact that the co-operation items in the

Tóth proposal are fewer than those in the draft Protocol was acknowledged.

Fourth, there are concerns about the lack of legally binding mechanisms in terms of compliance. The reference point for the Tóth proposal was said to be the IAEA regime between 1957 and 1968, before the NPT was in place. The question is whether, in the absence of an agreement by States Parties on compliance measures, the Tóth proposal is an acceptable compromise as a mid-term strategy. In analysing the need for legally binding mechanisms, comparisons were drawn with the CW and nuclear regimes, looking at the layers of safety provided by activities during the many years prior to entry into force of the CWC and the NPT.

The fifth and final concern is that, even if the Tóth proposal is accepted, it may be nothing but an empty shell. The Tóth proposal could mean only three weeks a year of meetings on the five issues contained in the proposal —by 2006, it is conceivable that all focus would be gone and previous progress will be lost. However, it was suggested that the annual two-week meetings of the experts could be preceded by other efforts, including seminars or papers, not necessarily done on an official basis.

The workshop also received a paper setting out options and uncertainties relating to the resumption of the Review Conference in the context of developments since December 2001. Tracking the statements and actions of both the United States and other States Parties to the BWC, the conclusion was that the United States’ position had not shifted since December 2001 but that other States Parties

had reiterated their wish for a resumed Fifth Review Conference leading to a programme of further work. Five options for a resumed Review Conference were outlined: agreement on a Final Declaration, either by consensus or a vote; agreement on a procedural report containing agreed language from the 2001 Draft Final Declaration; agreement on a short statement concluding the Review Conference and attaching a paper on follow-up; agreement on a further adjournment of the Review Conference; and ending the adjourned Review Conference without agreement. The conclusion was that the situation demanded efforts focussing on agreement on a Final Declaration. The BWC Review Conferences have already developed, through Final Declarations, extended understandings which had begun to strengthen the regime; serious damage to this cumulative process was thought likely if the Fifth Review Conference failed to build upon this. Arguments for and against the Review Conference departing from tradition and taking a vote were also addressed, the position ultimately taken being that, while voting is best avoided, if it is necessary to rescue the Review Conference from the intransigence of one state, it should be adopted.

Subsequent discussion raised the idea that the US position might be fairly encouraging in terms of follow-up measures and might have developed somewhat in the last two months prior to the Review Conference. Compliance with the BWC was identified as a central concern of the United States, with debate focussing on whether anything since the Pro-

ocol, including the UK Green Paper, had dealt with the issue of compliance adequately. Other concerns expressed by the workshop included ensuring that discussion at the Review Conference meetings in future years was not limited to simply procedural matters. In more substantive terms, it was thought that, since the United States was unlikely to support measures agreed by a vote not going in its favour, the Review Conference might not be able to pursue measures requiring substantial financial resources to implement them. At a more general level, participants also discussed the nature and value of multilateralism and whether any outcome of the Review Conference was necessarily better than no outcome. A follow-up process would, however, at least keep the issues on the agenda and preserve national and international BW links. The impact of a hypothetical US withdrawal from the BWC was also discussed with respect to the impact on those States Parties who had deposited instruments of ratification with the United States, the conclusion being that this would not spell disaster; the UNDDA could probably take note of the ratifications and future States Parties could deposit instruments in London or Moscow.

#### *The key issues for the resumption*

*a) Final declaration.* A paper was presented to the workshop on the importance of a Final Declaration, underlining that, by the afternoon of 7 December 2001, the Final Declaration was said to be 95 per cent complete. The benefits of a Final Declaration, including the reaffirmation of norms, agreed extended understand-

ings and a clear red-light to possessor states, were contrasted with the consequences and message sent if there is no Final Declaration. In short, it was stated that the Review Conference needs to be seen to have progressed and that States Parties should act, using the vote mechanism if necessary. In discussion on this matter, one point raised in the workshop was that the content of previous final declarations would not, and should not, just disappear, meaning that there is not necessarily a need to simply reaffirm previous final declarations.

*b) Future meetings.* The workshop received a presentation on a realistic inter-Review-Conference Strategy, which outlined five strategies available to States Parties to strengthen the BWC and identified states as either 'reformist' or 'minimalist' in their approaches to the BWC. Analysing the strategies, it was concluded that agreement of a Protocol to the BWC could not be taken forward at the present time. The reformist agenda of establishing legally binding mechanisms was also thought to have come to an end for the time being, with no group of States Parties prepared to carry it forward. The third strategy of *ad hoc* and special measures, involving agreements outside the BWC, was thought unlikely to be able to generate agreement to raise one problem above all others by the States Parties as a whole. However, smaller groups of like-minded States Parties could address such an issue by mutual agreement. Fourth, external frameworks and measures outside the Treaty regime, such as concerted action within the European Union



(EU) and export control regimes, were thought to offer some possibilities. However, there are dangers associated with this - measures outside the BWC might not be seen as strengthening the Convention itself, and such measures are unlikely to be truly multilateral and involve all States Parties - there will therefore not be an even implementation of obligations. Finally, the fifth strategy is to pursue politically-binding agreements and obligations. While this approach has proved useful in the past, the disadvantages include the quality of the measure itself (i.e. the lack of a legal obligation) and its nature as a fall-back mechanism.

In sum, only the external measures and politically binding measures were thought to offer a feasible strategy to strengthen the BWC before 2006. Any measures taken, however, need to be linked back to the BWC in order to demonstrate the strengthening of the regime. The necessity of meetings between 2002 and the Sixth Review Conference in 2006 was again highlighted, with the observation that such inter-Review Conference meetings were not uncommon in other regimes.

Following the presentation, the workshop discussed the need for care in relation to activities outside the BWC regime, in that they can create disconnects from the Convention. Some activities that it was thought should be contemplated in respect of reinforcing the BWC regime included: member states using their good offices to push for ratifications to the BWC in the aim of universality; member states abandoning their existing reservations to the 1925 Geneva Proto-

col; and the importance of continuing CBMs and declarations. The concern was also raised that States Parties' expanding programmes on biodefence, while initially innocent, may lead to operational planning.

A paper was also presented on follow-up to the Fifth Review Conference. For there to be considered to be at least a minimum result from the Review Conference, it was considered that there would need to be a Final Declaration and follow-up meetings, making mandatory the most important CBMs, such as biodefence programmes and vaccine producers, agreement on the extended CBMs from November 2001 and some form of permanent UN office or official to handle these items. Other areas that it was thought needed to be addressed further included: the possibility of a framework Convention banning bioterrorism, linking proposed legislation on the criminalising of CBW, the Convention on the physical protection of dangerous pathogens etc; involvement in discussion of the biotechnology and pharmaceutical industry; increasing States Parties' confidence in terms of biodefence programmes; initiating discussion on an international licence/certificate for scientists; and scientific discussion of US and other proposals, such as the UK Green Paper. It was noted that the Swedish Pugwash group would be prepared to promote meetings taking an initiative in one or several of these areas.

Considerable subsequent discussion amongst workshop participants focussed on CBMs, with a challenge being raised as to the value of CBMs and perceptions that they are neither

accurate nor complete. In particular, the argument was made that the role of CBMs should be re-evaluated now that there will be no BWC Protocol, one concern being that they are only politically binding. In response, it was suggested that if all the EU states submitted CBMs, as called for in the EU list of concrete measures, and if the Andean Community did likewise, having identified the importance of CBMs, this would move CBMs from being a piecemeal measure to something of more value - allied to this was the suggestion of having an individual responsible for collating and arranging for translations of CBMs. Others observed the domestic utility of CBMs, for example in the United States, by keeping all relevant activities, including any which might be questionable, ventilated through national information channels between those working on biodefence and those implementing the BWC within the US administration. CBMs were acknowledged, by their very nature, to be unable to address all the suspicions of foreign states, because all of the information provided comes from the State Party. However, they remain of value through providing potential explanations for possible suspicions before they are expressed and through the fact that they go on record.

Given the failure of the Protocol negotiations, CBMs were thought by some to be more important than they were previously and that States Parties should be encouraged to implement and enhance them. States could emulate Canada in unilaterally adopting extended CBMs or post their CBMs on the internet, as Australia has done.

One point made was that a sharp distinction should not be drawn between what is done inside and outside the Convention, noting that Canada's actions in respect of the extended CBMs would not be thought to be outside what had been agreed by States Parties. For example, there is no reason why individual States Parties should not help each other to extend their CBMs or to co-operate in terms of national implementation; these actions would not be "outside" the BWC.

### **Taking stock, including the role of civil society**

Reiterating the value of taking stock in terms of assigning priorities for the future, the workshop heard a presentation emphasising state actors as the major engine in the biotechnology field. States, rather than non-state actors, were thought to be most likely to set the course of the future because of their ability to reinterpret and change norms. Analysing both tyrannies and democracies, tyrannies were thought to be potentially interested in both lethal (for external conflicts) and less than lethal (for internal use) technologies, while democracies were considered more likely to be interested in non-lethal weapons (NLW). Concern was expressed about the unclear legal status of NLW.

The presentation then turned to topics which might require attention in terms of state conduct in the coming years. It was considered that efforts toward universality, and the withdrawal of Geneva Protocol reservations, were necessary, while increased disease surveillance efforts should be left entirely in the hands of the WHO

and national and regional authorities. In respect of the introduction of Codes of Conduct, concerns were raised that, while worth having, they could absorb much time and effort; however, they could help to promote the necessary education about prohibited activities. National criminal legislation was thought of lesser importance in deterring state action, as were national controls on pathogens. The difficulties of oversight of genetic engineering were highlighted, while the importance of revised and extended CBMs was again emphasised.

.....  
***There is no reason why individual States Parties should not help each other to extend their CBMs or to co-operate in terms of national implementation.***  
.....

Assistance in the event, or threat of use, of BW was thought necessary, as was a new Convention to criminalize CBW—such a Convention must apply to state acts and include the use of non-lethal chemical or biological agents prohibited by the CWC and BWC. However, care needs to be taken to ensure that there are no gaps between the definitions of CW and BW in such a Convention and those in the CWC and BWC. A new Convention on physical protection of dangerous pathogens could also be considered of use to limit the shipment of dangerous agents.

The importance of education and understanding of the terms of the Convention was noted. Workshop participants agreed on the necessity

of outreach and education in the CBW arena to combat the lack of understanding, with the suggestion raised as to whether there might not with advantage be a BW equivalent prior to the Sixth Review Conference of the IUPAC workshop held in Bergen in July 2001 on the impact of recent developments in science on the CWC.

Much discussion followed on the value of Codes of Conduct. Some participants considered them mostly ineffective, noting war crimes by Nazi physicians and the activities of the Japanese Unit 731 and concluding that politics often trumped morality. Thus, while of long-term use in education and articulating norms, Codes of Conduct should not be viewed as an end in themselves. Others, while agreeing that they are not necessarily of deterrent effect, observed that a declaration was issued to Japanese doctors involved with Unit 731 that Japan's interests required them to put aside their moral code, thus implying that a Code of Conduct did have some moral strength. One issue is whether it would be possible to have a universal harmonised code, or whether a Code would have to be national and culture-specific. Previous efforts and suggestions in respect of Codes of Conduct were noted by the Group, and it was emphasised that any Code of Conduct should be kept simple and should be generated within the scientific community, rather than dictated from outside. The workshop noted that the Tóth proposal included Codes of Conduct as the item for discussion by States Parties in 2005.

The issue of universality was also dwelt on by the workshop, with

some participants considering that the negotiation of the BW Protocol could have been a distraction from implementation of the BWC and efforts towards universality. While it was conceded that there had not been a formal concerted process by States Parties as a whole towards universality, the efforts of the EU and states such as Australia were noted. A possible drawback from universality was, however, also noted, with observations made that one State Party which had been required to ratify the BWC had contributed to the thwarting of consensus decision-making, as occurred at the 1996 Review Conference; this point caused some debate within the workshop. While the negotiation of the Protocol was not universally viewed as a possible distraction, it was considered that issues such as universality and CBMs, which would have been taken into account by the Protocol, now needed renewed attention.

Clarification was sought as to the current legal effect of reservations to the Geneva Protocol, given that the prohibitions contained within the Geneva Protocol have entered into customary international law. It was considered that the norm reflected state practice and centred on non-use under the Geneva Protocol—removing reservations would thus strengthen the norm. The disparity was noted between the BWC, which prohibits development, production and stockpiling BW, and reservations to the Geneva Protocol which implies a right to use BW in certain circumstances and thus to retain BW stocks. Accordingly, there is a need to withdraw reservations to the Geneva Protocol

to remove the contradictions. It was observed that the Final Declarations of the Third and Fourth BWC Review Conferences had reiterated the importance of removing reservations to the Geneva Protocol.

One point raised in discussion was the importance of making a distinction between how to prevent further deterioration of the BWC Review Conference situation in the next two weeks and how to strengthen the regime in general. In the long term, it was emphasised that, since the end of the Cold War, the traditional arms control community needed to expand its horizons and talk to other communities, including NGOs.

At the workshop heard an analysis of why the United States no longer supported the Protocol, examining the three reasons that the United States had given: that it was inadequate to detect covert proliferation; that it would unacceptably jeopardize commercial proprietary secrets; and that it would endanger the US biodefence program. None of these was considered an adequate explanation. The presentation hypothesised that the US government views global CBW proliferation as inevitable, and highlighted the likelihood that the United States is developing military applications of biotechnology, a slippery slope which, it was considered, others may follow and from which there may be no reversal. The workshop noted a US mentality of unilateralism, rather than multilateralism, and an opposition to legally-binding (rather than politically-binding) instruments. Observations were made that it may not be correct to

talk of a single, coherent, US policy. At this stage, the US programme is probably best characterised as biodefence, rather than containing offensive elements.

A report was then made to the workshop on research conducted, under the Freedom of Information Act, over the last 18 months into the US Joint Non-Lethal Weapons Directorate (JNLWD) programme. JNLWD programmes have, apparently, been underway since 1995. While there has been an increase in media attention on this issue in the United States since the Moscow hostage crisis, proponents of NLW were said to have used the events in Moscow as a rationale for needing better research.

Following this, the concept of a “lethal” weapon was explored. It was stated that the lethality of a weapon is measurable and determined more by its use than its inherent nature, whether conventional or non-conventional. Thus, the argument was presented that using “lethal” and “non-lethal” labels for weapons could sanction the use of NLW. The dangers of NLW in armed conflict were highlighted, including the possible erosion of international humanitarian law and the increase in lethality in warfare. It was considered that a better phrase than NLW would be “new weapons”, as these are required to be subjected to legal scrutiny under Article 36 of Additional Protocol 1 to the 1949 Geneva Conventions.

Substantial discussion then centred on the issue of NLW. One item of interest to participants included the date when US NLW programmes commenced, some stating that it

(referring not so much to CBW weapons as to other forms of NLW) had originated in the early 1990s. As an explanation for why the US withdrew support for a Protocol, the stated existence of US agencies with projects which “raised questions” was noted. A distinction was drawn between international armed conflict and law enforcement situations; it was, however, noted that states often frame armed conflict as law enforcement situations, which can allow human rights abuses. It was observed that the BWC uses the broad language of “hostile purposes”, which would surely mean that any type of weapon, lethal or non-lethal, fell within the scope of the treaty. One concern in respect of non-lethal CBW weapons (for law enforcement purposes) is that they may justify the development of munitions to deliver toxic or infective agents, thus making it difficult to distinguish between legal and illegal military programmes.

Much attention again focussed on the use of gas in the Moscow hostage crisis. Issues raised included: the usefulness of the general purpose criterion and the concept of “intent” in respect of NLW; whether there had been a violation of the CWC; the use of NLW in enhancing the subsequent use of conventional weapons (i.e. the shooting of the hostage-takers) and inviting an escalation of conflict in battle; and, in general, the need for NLW to be put on the international agenda. Attention was drawn to Article II of the CWC, which includes law enforcement under the definition of “purposes not prohibited”, and various prohibitions in the CWC, including the prohibition on engaging

in military preparations to use CW. Pharmacological information was also provided to the workshop regarding the predictability of mortality in cases where someone is aiming for 90-95 per cent incapacitation by a gas.

### *The role of civil society*

The workshop was updated on a new initiative, the BioWeapons Prevention Project (BWPP), created by concerned NGOs in the wake of the premature closure of the BWC Fifth Review Conference in 2001. The organisations involved in the BWPP are the Department of Peace Studies at the University of Bradford, VERTIC, BASIC, FAS, the Graduate Institute of International Studies (PSIS), the Harvard Sussex Program, INES and the Centre on Conflict Resolution in South Africa. The aim is to create a global network of organisations interested in bioweapons prevention. One facet of the project will be the regular publication of a *BioWeapons Monitor*, including reports on government compliance and international and national initiatives and information on BW. The initiative was launched in the Palais des Nations on 11 November.

### **Topics for future meetings of the States Parties**

The workshop then turned to topics for future meetings of the States Parties to the BWC, including: universality and withdrawal of Geneva Protocol Reservations; increased disease surveillance efforts; Codes of Conduct for professional bodies; national criminal legislation; national controls on pathogens; over-

sight of genetic engineering; revised and extended CBMs, assistance in the event of, or threat of use of, BW; a new Convention to criminalize CBW; a new Convention on physical protection of dangerous pathogens; and other subjects.

Having already discussed universality and Codes of Conduct in some detail, the group noted a proposal for a joint initiative by the depositaries of the BWC, the Geneva Protocol and the CWC, with the UNDDA preparing an annual regional tabulation of membership. Attention was also drawn to the FAS Working Group paper on *Recommendations for a Code of Conduct for Biodefence Programs* due to be issued and the need for serious discussion on how biodefence activities should be conducted.

The workshop received a presentation on the WHO’s overall strategy for dealing with BW. In May 2002, the issue of CBW was addressed by the World Health Assembly and the Executive Board, resulting in a resolution (WHA55.16) endorsed by 191 member states and calling for action by member states and activities by the WHO in respect of preparedness for CBW attacks.

It was reported that the WHO already has a strategy within which CBW is addressed, the *Global Health Security: Epidemic Alert and Response*. This is based on a global partnership and the WHO “network of networks” approach. There are three pillars to the strategy: (i) to contain known risks (epidemic diseases); (ii) to respond to the unexpected; and (iii) to improve preparedness. Amongst the measures pursued by the WHO are development of

national action plans for surveillance and early warning systems, strengthening laboratory capacity, the UN Disaster Management Training Programme which has a training module on terrorism, and developing systems for using informal information and intelligence. WHO is working on updating the legal framework, currently contained in the 1969 International Health Regulations and covering only three diseases. The plan is that a revision of the International Health Regulations, containing revised and updated core concepts, will be presented to the WHA in 2004-2005.

The workshop agreed that the WHO should not go outside its humanitarian mandate to venture into verification or security tasks, as this might jeopardise its neutrality. Concerns were also raised as to the preparedness of the other international organisations such as FAO and OIE for deliberate attacks on animals and plants. It was noted that the FAO and OIE do not yet have the mandate from member states that the WHO has.

The ICRC appeal on Biotechnology, Weapons and Humanity, launched in September 2002, was outlined for the group, as were the public health principles that can be implemented to limit deliberately spread diseases, the thesis being that deliberately spread diseases equate to the effects of armed violence. It was emphasised that no single measure would be effective on its own - there is, instead, a need to merge a web of prevention with a web of deterrence. The need for plant and animal disease surveillance was also noted.

On national criminal legislation,

it was noted that VERTIC is conducting a survey, given the lack of a central collection of public information regarding domestic implementation of the BW prohibitions. A questionnaire has been issued to governments on the topic, but so far only 11 responses have been received. In addition to this, VERTIC has been able to collect information through other sources on 65 countries, of which 15 were reported to have fairly comprehensive legislation. VERTIC has also been collecting the texts of legislation, which it hopes to publish as an annex to its report, due out in February 2003. The report will be published in the first edition of the *BioWeapons Monitor*. As a result of this survey, the need was identified for legal assistance in drafting legislation, particularly from regional groups. Separately, the EU was also reported to be exploring this issue.

In discussions on national controls on pathogens, participants observed that the definition of a "pathogen" was difficult and that, given time, it was possible to isolate almost any pathogen save smallpox. The proposal is for health authorities to augment the rules on controlling access to pathogens within a state.

When looking at oversight of Genetic Engineering, the term "GE" was thought too narrow by some participants, who considered that it should include genomic techniques also - another suggestion was "molecular biotechnology". The activities and regulatory legislation underway in the United States were discussed, including those attempting to control access of students of some nationalities to laboratories - concerns were

raised as to how to conduct oversight of GE without infringing human rights. There needs to be a balance between regulation and safety controls on the one hand, and academic and industry freedom to research. One proposal was for an international database of all scientists working in the field of genetic engineering. The different levels of physical security requirements for plant and human pathogens were noted.

On CBMs, the current method of submission and collation of CBMs, and the lack of a database, is inadequate and of limited usefulness to States Parties. Suggestions were for CBMs to be provided on a secure website, or by disk for distribution to States Parties, or for states to put them up on the internet, as Australia had done. However, some State Party governments have made assurances to firms submitting data that the declarations would not be made public. That it is, however, in general possible for declarations to be made public was thought clear from the Ottawa Convention, under which Article 7 transparency reports are submitted electronically to the UNDDA and then published on the internet. The South African proposal for mandatory CBMs was noted, as was the opposition to this by NAM and, given the failure of the Protocol negotiations, the likelihood is that this proposal will not be taken forward at the present time.

In discussions on assistance in the event of, or threat of, BW, it was noted that Article X of the CWC provides for assistance to be provided to states, rather than victims. It was also clarified that the Technical Secretariat in

The Hague is not the body which provides assistance; rather, it is up to member states who have offered assistance, the Technical Secretariat facilitating this and communicating needs. The ICRC was also reported not to be trained or equipped to deal with the use of CBW, though some certain quantities of drugs are available. Some participants expressed concern that nothing similar to Scorpio, which had been available during the first Gulf War, was available today to assist in the event of, or threat of, BW.

One benefit of a Convention to criminalize CBW was thought to be that it makes individuals in governments accountable. In terms of how to take criminalization forward, one suggestion was for the EU to take this to the Sixth Committee. Others thought this should be done outside the Sixth Committee, and without inviting the US to participate, so that it could not be blocked at an early stage. Another possible new Convention discussed was on the physical protection of pathogens. One issue identified was the relationship of this proposal to the Convention on Biological Diversity and the Cartagena Biosafety Protocol.

Finally, a presentation was given on an agenda for the future, in which the presenter highlighted a paradigm shift from weapons elimination to the suppression of proliferation. Actions in support of the existing BWC regime, and those in support of a future legally-binding instrument were explored, as were questions for a future research agenda. One question raised was how to progress without an "OPBW" or

small international organisation with a physical structure to shoulder the burden.

## **The future work of the Study Group**

A number of items were identified by participants that might be addressed in future Study Group meetings. These include: education; the role of civil society; domestic and international law; CBMs; regional and cross-regional measures and co-operation; verification and the BWC; the relationship between the BWC and the

CWC; "Non-Lethal" weapons; lessons from events in Iraq; making use of the Protocol negotiations; and policing and self-policing of the scientific community.

The next meeting of the Study Group is planned for 26-27 April 2003, in the Netherlands. The workshop will directly precede the First Special Session of the Conference of the States Parties to review the operations of the Chemical Weapons Convention (the First Review Conference) to be held over a period of two weeks in The Hague.

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## Working Papers

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### DISCUSSION PAPERS

Is there a danger of radiological warfare?, by **Jozef Goldblat**

Return to Geneva: Uncertainties and Options, by **Graham S. Pearson & Nicholas A. Sims**

On the Brink: Biodefense, Biotechnology, and the Future of Weapons Control, by **Mark Wheelis and Malcolm Dando**

Follow-up after the Fifth Review Conference of the BTWC, by **Roger Roffey**

Escaping from the Shadow of the Future over the BTWC (An agenda for the future), by **Jean Pascal Zanders**

Strengthening the BWC: What is a realistic inter-Review Conference strategy ?, by **Jez Littlewood**

Proposed Guidelines on the Status of Riot Control Agents and other Toxic Chemicals under the Chemical Weapons Convention, by **Abram Chayes, Matthew Meselson, and R. Justin Smith**

Strategy for Bio-criminalization, by **Barry Kellman**

**Graham Pearson** slide presentation:

- The Final Declaration
- Return to Geneva: Uncertainties and Options (with N. Sims)
- Topics for Future Meetings of the BTWC States Parties

### BACKGROUND DOCUMENTS

*Fact Sheet: The Biological Weapons Convention* (issued by the US Department of State, Bureau of Arms Control, May 22, 2002)

SIPRI Fact Sheet, November 2001: *Biotechnology and the Future of the Biological and Toxin Weapons Convention*

“Back to Bioweapons ?”, by Mark Wheelis & Malcolm Dando, *Bulletin of Atomic Scientists*, January/February 2003

A Draft Convention to Prohibit Biological and Chemical Weapons under International Law, by Matthew Meselson (USA) and J P Robinson (UK), from *Treaty Enforcement and International Cooperation in Criminal Matters with Special Reference to the Chemical Weapons Convention*, Rodrigo Yepes-Enriquez and Lisa Tabassi (eds.), The Hague, T.M.C. Asser Press, 2002

“Bioterror: What Can Be Done ?”, by Matthew Meselson, in *Striking Terror: America’s New War*, by Philip C. Wilcox Jr. et al., Robert B. Silvers and Barbara Epstein (eds), *New York Review of Books*

Draft Model Convention on the Prohibition and Prevention of Biological Terrorism, prepared for the Workshop on Biological Terrorism—An International Criminal Law Approach, by Barry Kellman, April 29, 2002

“Legal Aspects of the Geneva Protocol of 1925”, by R.R. Baxter and Thomas Buergenthal, *American Journal of International Law*, vol. 64, 1970, published by The American Society of International Law

Biotechnology, Weapons and Humanity, Summary Report of an informal meeting of government and independent experts, Montreux, Switzerland, 23-24 September 2002

“Preventing the Hostile Use of Biotechnology: The Way Forward Now”, *The CBW Conventions Bulletin*, Issue no. 57, September 2002

UN Security Council Resolution 1441, adopted at Security Council Meeting 4644, 8 November 2002.

*Biological Weapons: Issues and Threats*, P.R. Chari and Arpit Rajain, eds., Institute of Peace & Conflict Studies, New Delhi, October 2002

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### BOOKS OF NOTE

## Resource Wars: The New Landscape of Global Conflict

*by Michael T. Klare*

Metropolitan Books, 2001



## Pugwash Workshop: *No First Use of Nuclear Weapons*

London, England, 15-17 November 2002

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### Report

by Tom Milne

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*The Pugwash workshop, No First Use of Nuclear Weapons, was held in London from 15–17 November 2002 and included 29 participants from 15 countries. The British Pugwash Group also organized a public session at the Royal Society on 14 November that included panel presentations on No First Use issues from Hugh Beach, Steven Miller and Alexander Nikitin. The Pugwash Conferences are grateful to the British Pugwash Trust for their support of the workshop.*

It has long been argued in Pugwash circles among others that until such time as nuclear weapons can be eliminated the purpose of national nuclear forces should be confined to deterring nuclear attack. The formidable political and prudential barriers to *any* use of nuclear weapons are obvious. Yet it remains the case that the governments and national security establishments of some of the nuclear weapon states, not least the USA, maintain and act on the belief that nuclear weapons serve purposes extending beyond deterrence of nuclear attack and that policies of no first use have been explicitly rejected.

Over the years the nuclear

weapon states have discussed, hinted at, and planned for the first use of nuclear weapons for all manner of purposes. Some of these purposes have been bound up with the existence of other nuclear weapons: planning for a pre-emptive nuclear strike in the event that *nuclear* war seemed inevitable, for example, or preventive nuclear war in order to destroy an adversary's incipient or developing nuclear weapons capability. Others have not: in particular nuclear weapons have been used to offset the conventional forces of an adversary at an affordable social and economic cost, and to serve as a weapon of last resort in the face of catastrophic defeat. Use of nuclear weapons has also been threatened as a means of coercion and to deter chemical and biological weapons attack, and notions have been entertained of "demonstration" nuclear strikes as indication of a nation's seriousness of intent in a developing conflict. A somewhat different proposition has been the consideration given to the use of nuclear weapons for ballistic missile defence.

Some of these perceived roles for nuclear weapons may today have less immediacy than in previous times or have perhaps disappeared altogether. The need for the US to provide extended deterrence to Europe is an obvious case in point. Others, how-

ever, are more prominent than ever. In particular, the past decade has seen increasing concerns voiced in the US about chemical and biological weapons, with US negative security assurances—promises that the US has made not to use nuclear weapons against non-nuclear weapon states—undermined by veiled threats of nuclear response to chemical or biological attack. Secretary of State James Baker implicitly threatened tactical nuclear retaliation to Iraqi use of chemical or biological weapons in the Persian Gulf War; Clinton administration officials added to the ambiguity of US policy through a series of statements; and the Bush administration has gone further still, repeatedly stating that the US may be prepared to take preventive military action to disarm adversaries of their weapons of mass destruction capabilities, and in this context openly considering the first use of nuclear weapons to attack, among others, deeply buried targets.

We might, of course, discuss whether such nuclear policies are not promoted as much by an establishment with a vested interest in the maintenance of nuclear weapons as on the basis of objective judgements on defence strategy. But what cannot be doubted is that, for whatever reason, policies of "first use of nuclear weapons if necessary" are embedded



Joseph Rotblat address the 52nd Pugwash Conference.

in military and strategic thought. Before “no first use” could be embraced by the current possessors of nuclear weapons in a meaningful way, that is to say as a national security *strategy*, at least the more powerful among them would have to be persuaded that whatever the benefits they consider to derive from retaining the option of first use of nuclear weapons should, on balance of risk, be foregone.

Were the nuclear weapon states to fully embrace no first use of nuclear weapons then this would constitute a highly significant step towards nuclear disarmament. Whereas the declaration of no first use by the Soviet Union in 1982 saw no alteration to Soviet nuclear weapons deployments, and was given little if any credence by the US and NATO, a multilateral agreement on no first use, if it were to be credible, would entail sweeping and substantial changes to US and Russian nuclear deployments, with each nation needing only to retain a survivable strike-

second deterrent. Lesser changes might need to be made to the nuclear forces of the other nuclear weapon states. Moreover, the whole approach taken by the nuclear weapon states to the goal of a nuclear-weapon-free world would be transformed: the logic becomes that “if no-one has them no-one needs them” and attention can turn from debating the utility of nuclear weapons to the more tractable political, administrative and technical issues facing deep cuts in nuclear arsenals and the eventual creation of a nuclear-weapon-free world regime and control system.

### For and Against No First Use

To reiterate, for the current nuclear weapon states to adopt strategies of no first use of nuclear weapons they need, logically speaking, only to take the view that the risks of retaining policies of “nuclear first use if necessary” outweigh the risks of explicitly foregoing this option. It may still be allowed, for example, that nuclear weapons could have some deterrent

effect against chemical and biological threats, as many would intuitively believe to be the case, while concluding that such deterrence is bought at too high a cost.

This was the basis of the case made for no first use in the 1997 report from the Committee on International Security and Arms Control of the US National Academy of Sciences *The Future of U.S. Nuclear Weapons Policy*. Although written from a US perspective, the report makes a case of more general relevance and formed the basis of the workshop’s opening presentation. Credible policies of no first use on the part of the nuclear weapon states, the Committee argued, would significantly reduce a number of the foremost dangers stemming from the possession of nuclear weapons. In particular, it would make other nations less likely to seek to develop countervailing nuclear, chemical or biological weapons capabilities. The risk of accidental or unauthorized use of nuclear weapons, or of hasty and foolish authorized resort to nuclear weapons in a crisis, would also be reduced as a consequence of associated changes to force posture.

Turning the argument around, to weigh the accompanying risks, the Committee further suggested that the United States, not itself facing any conventional threat, possesses conventional forces adequate to meet all of its existing security commitments as well as to deter or respond to chemical and biological attack. As a matter of practical politics, it is more credible that the US plans to confront non-nuclear threats with conventional force rather than with nuclear wea-

pons, as well as more proportionate to the threat, and by far the preferable option in terms of minimizing the level of violence. Moreover, the existential threat inherent in the possession of nuclear weapons would remain a powerful deterrent to unrestricted war, even in scenarios in which first use of nuclear weapons had been renounced.

The Committee also ventured the belief that the other nuclear weapon states could be persuaded to reach comparable conclusions. This may be plausible given a US lead. Not just on the issue of no first use, but in the case of nuclear disarmament more generally, the other nuclear weapons states would probably follow a US lead. If, however, in addition to the five “official” nuclear weapon states, India, Pakistan and Israel are to be considered, then while a general agreement on no first use would bring a great weight of international pressure to follow suit, it should still be obvious that for Israel and Pakistan, feeling more directly and closely threatened by potential aggression, committing to a strategy of no first use of nuclear weapons might be a difficult decision to take. Pakistan, for example, which incidentally had not openly “gone nuclear” at the time that the Academy study was published, might see itself as confronted with an uncomfortable trade-off between first use deterrence of more powerful Indian forces and the need to strengthen its conventional forces at a cost the nation could ill-afford. Israel is unwilling to make any explicit statement about its presumed nuclear weapons capability for fear of making an already fraught

regional situation worse.

Nuclear deterrence of non-nuclear threats was for a long time a controversial issue within NATO, especially in the early years when the need for social and economic reconstruction in Europe was most acute and Western strategy was based on early and massive resort to nuclear weapons. A conventional wisdom has emerged which finds that the balance eventually struck by NATO

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***Not just on the issue of no first use, but in the case of nuclear disarmament more generally, the other nuclear weapons states would probably follow a US lead.***  
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between conventional and nuclear deterrence has been proven justified (“conventional wisdom” is perhaps not the most apt of phrases!) and indeed the NATO model is often invoked to support policies of nuclear first use applied in other contexts. Yet as is often pointed out, and was reiterated at the workshop, not only does this assume both that the Soviet Union had the desire and capability to invade Western Europe (if not, there were no grounds for deterrence), and that it would not in any case have been deterred by NATO conventional forces and the existential nuclear threat, but it takes no account of the incalculable consequences should the policy have failed, nor of the stimulus that NATO nuclear policy might have provided to the nuclear ambitions of other nations.

A further, subtle argument against no first use allows that the nuclear weapon states should use whatever language and confidence-building measures they can to portray a complete lack of interest in using nuclear weapons in any circumstances (that is, there should be no discussion whatever of first use), but still resists any explicit undertaking of no first use. The reasoning is that such undertakings fail to solve the problem of avoiding nuclear war, in the sense that they can never be dependable, while at the same time risking weakening the one useful role that nuclear weapons may play, which is that of inducing caution in a crisis. Since it is not in dispute that the purpose of no first use is less to seek to constrain the use of weapons in war than to constrain the deployment of weapons in peacetime and to contribute to a disarmament process, at issue here is whether and when an unwillingness to openly and legally commit to no first use would impede wider efforts to devalue and eliminate nuclear weapons.

### **Implementing a No First Use Strategy**

The possibility of first use is, of course, inherent in the possession of *any* weapon and thus it may not be possible to identify a particular point on the de-alerting spectrum at which a nation can be said no longer to possess a first use capability, nor the ability secretly to configure one, while still retaining a credible strike-second option. Nonetheless, a combination of declaratory policy, legal undertakings, changes to weapon deployments, and a general denuclearisation

of war planning, military exercises and training programmes could serve to reduce, to a large extent, the capacity and preparedness of a nation to use nuclear weapons first. Indeed, once a nation accepts the case for a no first use strategy these changes become both possible and desirable in order to promote disarmament, discourage proliferation, and minimize danger of accidents.

Since going nuclear in 1964, China has consistently maintained an unconditional declaratory policy of no first use of nuclear weapons. Despite the lack of transparency surrounding China's nuclear and military programmes, the apparent restraint that China has exercised in its nuclear programme, together with the public positions taken by the government, has over time helped to afford credibility to its proclaimed position. India has announced a similar strategy of no first use, which was considered by many workshop participants as likely to endure even though Indian nuclear doctrine is still evolving. Comparable undertakings of no first use from the US, NATO and others, or at least statements to the effect that they cannot envisage using nuclear weapons first in any foreseeable circumstance, where now they pointedly refuse to offer such a judgement, would no doubt help to devalue the role of nuclear weapons in international affairs and improve prospects for disarmament.

At a certain stage in a disarmament process, however, it was felt that the nuclear weapon states would be likely to want to move beyond declaratory statements to conclude a legally-binding treaty of no first use.

Opinions differ on the likely preconditions for agreement on such a step, but as already suggested a serious commitment to no first use amounts to a commitment to a process of nuclear disarmament and thus is not foreseeable at the current time. As a first step, therefore, it might prove easier to secure agreement from the nuclear weapon states on legally-binding and unconditional negative security assurances. These would replace the existing forms of assurances, which as discussed have been weakened and undermined in recent years, not just by the United States, and might provide an important boost to the ailing non-proliferation regime. A multilateral agreement on "no first use of weapons of mass destruction" was also discussed as a possible approach. Such an agreement could be seen as an advance on the current situation in that it would explicitly exclude the use of nuclear weapons to counter conventional threats, but at the same time it would legitimise the use of nuclear weapons in response to chemical and biological attack, arguably already the most likely route to the use of nuclear weapons today, in view of which most workshop participants judged that the idea should be strongly opposed.

A strategy of no first use, pursued cooperatively among all the nuclear weapon states, should allow significantly smaller nuclear forces, at least on the part of the USA and Russia. There would be no requirement for counterforce capabilities. Weapons designed for tactical or battlefield operations ought also largely to be eliminated, in the wider context of no first use as part of a disarmament

process. Certainly there could be no place in the arsenals for weapons such as those currently being developed for attacking underground targets.

The technical launch readiness of nuclear systems could also be relaxed and delays might be introduced into the decision-making process that would authorize nuclear use. Technical means of de-alerting, which it was felt should be implemented regardless of whether a nation has a strategy of no first use, include disabling missiles or launch systems to add significant time delays to the launch process. These measures make sense whether or not the other side reciprocates, so verification of the de-alerted condition, which may prove difficult in some cases, is not crucial.

A more far-reaching measure of de-alerting would involve separating warheads from delivery systems and possibly placing warheads under civilian control. Nations would thereby revert to practices followed in the early years of the Cold War when warheads were not routinely mated, nor necessarily co-located, with delivery systems. It was the subsequent development of many of the safety features designed into modern warheads and the advent of sophisticated administrative controls on nuclear weapons that made higher alert levels possible. At the extreme, each side would invite the other side or sides to place observers or technical means of verification at sites at which warheads were stored, allowing them to monitor what went in and what went out. Survivability of de-alerted nuclear forces would be a significant concern at all stages, but given the relatively benign interna-

tional relations needed for disarmament to make progress should not present any insurmountable problem.

## No First Use and the Pugwash Agenda

Taking place at a time when the United States is leading preparations for preventive war against Iraq, in order to disarm Iraq of whatever WMD capabilities it might possess and to depose the current regime, one session of the workshop was given over to a general discussion of the world political situation, including its relevance to the subject at hand.

It seems that with each passing day the greater is the disdain shown by the US administration towards the current system of multilateral arms control. Multilateral regimes are dismissed as serving mainly an administrative and accounting function, ineffective in the important cases of recalcitrant states. Indeed the US administration appears to assign little value to *any* of the major international treaties regulating weapons of mass destruction. It seems instead more concerned to ensure that as few constraints as possible are placed on the unprecedented military and diplomatic power at its disposal.

While unquestionably the current system of international arms control has substantial weaknesses, not least the lack of any effective means of enforcement, it was suggested that Pugwash must seek to reassert, in positive and objective terms, the fundamental importance of multilateral approaches to world security and verified treaty-based disarmament. This is, after all, the point of view held by the vast majority of the

world's nations. From this standpoint, and because it is closely linked to the objective of multilateral nuclear disarmament, working towards a multilateral agreement on no first use of nuclear weapons is an important topic for continuing Pugwash attention, made all the more timely by the emphasis on tactical nuclear first use in current US doctrine.

Until such time as the United States might be ready to take the lead in pursuing a multilateral agreement on no first use, which seems certain not to be until the current administration and any successors in kind have passed from power, attention may have to be focussed on no first use agreements in regional and bilateral contexts. Several papers were presented at the workshop, not reflected in this report but available to the interested reader on the Pugwash website, setting out current thinking on policies of no first use of

nuclear weapons in China, Russia, NATO, India, Pakistan, the Middle East and Korea. The papers discuss, among other things, the extent to which current undertakings of no first use by China and India should be expected to be resilient to political change, and possible circumstances in which NATO, Russia, Pakistan and Israel might reconsider their present policies in which the first use of nuclear weapons is not explicitly excluded. Suggestions were made for potential bilateral and regional no first use arrangements and could be pursued at future Pugwash meetings. It was also noted that in 1994 China had formally proposed a draft Treaty on the No First Use of Nuclear Weapons. The draft treaty contained no guidance on implementation and it was suggested that Pugwash might usefully meet to elaborate some technical guidelines.

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## Working Papers

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Bajpai, Kanti, *No First Use in the India-  
Pakistan Context.*

Beach, Hugh, *Implementation of No First  
Use of Nuclear Weapons  
Strategy/Agreements.*

Boutwell, Jeffrey: *The US and No First  
Use: Preemption Trumps Deterrence?*

Fedorov, Yuri, *Russia's Doctrine on the  
Use of Nuclear Weapons.*

Feiveson, H.A., *Implementing No First  
Use: The Question of De-alerting of  
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Freedman, Lawrence, *No First Use.*

Goldblat, Jozef, *NPT and the Security of  
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Hu Side *et al.*, *No First Use and China's  
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Kadry Said, Mohamed, *Security and  
Defense Dilemmas in the Middle East:  
The Nuclear Dimension.*

Levite, Ariel, *Preliminary Reflections on  
No First Use Doctrine for the Middle  
East.*

Lodgaard, Sverre, *Obstacles to No-First-  
Use.*

Miller, Steven E., *The Utility of Nuclear  
Weapons and the Strategy of No-First-  
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Mueller, Harald, *No First Use: A  
European Perspective.*

Pan Zhenqiang, *On China's No First Use  
of Nuclear Weapons.*

Raja Mohan, C., *No-First-Use and  
India's Nuclear Transition.*

Rhineland, John B., *No First Use – It's  
Time is Not Foreseeable Whatever its  
Form.*

Singh, Jasjit, *No-First-Use of Nuclear  
Weapons: Credibility and Consequences  
of Strategy.*

Suh, Mark B.M., *The Implications of No  
First Use of Nuclear Weapons to Korea.*

John P. Holdren gave a presentation: *No  
First Use of Nuclear Weapons: Some  
Introductory Remarks.*

*Pugwash Netherlands*  
**The Groningen Manifesto**  
**Sharing the Planet: Population – Consumption – Species**

**F**rom 12-14 June 2002, Pugwash Netherlands called together a group of internationally renowned scholars for the Symposium *Sharing the Planet: Population – Consumption – Species* in Groningen, the Netherlands, to discuss the interrelated problems of high and rising levels of consumption and population and the associated problem of large losses of species.

Among the participants were Jane Goodall (UK), Anne Ehrlich (USA), Atiq Rahman (Bangladesh), Bas de Gaay Fortman (Netherlands), Hugo Estrella (Argentina), Eric Ferguson (Netherlands), Bob Goudzwaard (Netherlands), Bambang Hidayat (Indonesia), Radha Holla (India), Patricia Howard (Netherlands), Sergey Kapitza (Russia), Johan van Klinken (Netherlands), Carlos Mallman (Argentina), Patricia Morales (Belgium), Lucas Reijnders (Netherlands), Ton Schoot Uiterkamp (Netherlands), Phil Smith (Netherlands), Irna van der Molen (Netherlands), Koo van der Wal (Netherlands), Bob van der Zwaan

(Netherlands), Jan van Hooff (Netherlands), Frans Willekens (Netherlands), and Hamdallah Zedan (Canada).

The result of the Symposium, the *Groningen Manifesto*, can be found on the Pugwash Netherlands website [www.pugwash.nl]. The *Groningen Manifesto* was presented to the participants of the 52nd Pugwash Conference on Science and World Affairs in La Jolla. The manifesto has received attention at the World Summit on Sustainable Development (WSSD) in Johannesburg, where it was broadly distributed. During the summit its issues have been brought forward by Jane Goodall, Atiq Rahman and Jan Pronk during a special parallel session on 3 September 2002. The interconnected issues of population pressure, consumption volume and species preservation – so very basic to sustainability on the planet – will be treated in depth in a book to be published in 2003.

For more information, contact Eric Ferguson, Pugwash Netherlands, at [ferguson@antenna.nl](mailto:ferguson@antenna.nl)



*Paolo Cotta-Ramusino and Members of the 1997–2002 Pugwash Council in La Jolla.*

## The Weaponisation of Space An International Student/Young Pugwash Perspective

### Report:

by Will Marshall (UK\*), George Whitesides (USA), Iole de-Angelis (France), Yuri Takaya (Japan), Robert Schingler (USA), Paul Reilly (Ireland), Mark Lupisella (USA)

“I do say that space can be explored and mastered without feeding the fires of war, without repeating the mistakes that man has made in extending his writ around this globe of ours. ... Its conquest deserves the best of all mankind, and its opportunity for peaceful cooperation may never come again.”

—President John F. Kennedy, 12<sup>th</sup> September 1962

### Abstract

Humanity has a shared interest in a peaceful future in space. Deploying space weapons<sup>†</sup> threatens that future. The recent demise of the ABM treaty, the lack of a comprehensive weapons ban in existing space treaties, and developing American plans to deploy space weapons combine to create an urgent situation. A new system is needed to regulate the peaceful use of space, to specifically prohibit the deployment of space weapons, and to prevent an arms race in space.

### 1: Introduction

The youth of the world are concerned about the legacy the current generation will pass to them. Space weapons are particularly troubling in this context, as their deployment will impose an enormous burden on future generations. This burden, discussed in section 2, comes in addition to serious shorter-term destabilizing effects. Here we discuss the reasons why it is important to prohibit space weapons (section 2), the urgency of such prohibitions (section 3) and whether they are realistic (section 4). We also list some recommendations for what Pugwash could do about the issue.

This article has been written by the International Student Young Pugwash in collaboration with the Space Generation Advisory Council in support of the UN Programme on Space Applications (SGAC) and follows a position paper prepared for Working Group 2 on “Missile Defenses and the Uses of Space”, at the 52<sup>nd</sup> Pugwash Conference in La Jolla, USA [1]. Since then, ISYP/SGAC have been developing our position further and conducting meetings with space policy experts, in particular at the Space Policy Summit in Houston, USA.

### 2: Why prohibit space weapons?

The arguments against space weaponisation are manifold and pressing: weapons in space would be *destabilizing*, because they increase the probability of an arms race and reduce the time of weapon delivery; *polluting and hazardous*, due to their potential creation of space debris in Earth’s orbital sphere; *counter-productive*, due to their capacity to inadvertently destroy other satellites, including in particular monitoring satellites required for military activities; *inadequate*, due to the enormous technical challenges to their effective use and the availability of better Earth-bound alternative measures; *illegal*, in their potential conflict with existing treaties currently in force establishing space as a peaceful zone; and *immoral*, in that they bring the possibility of war into the boundless future of space.

These arguments may be analyzed in two parts:

- 1) How space weapons effect security development on Earth (near to mid-term)
- 2) How space weapons effect the future of humanity in space (mid to long-term)

A great deal of the current debate on space weapons focuses on the immediate issue of international security. Themes within this issue are familiar to Pugwashites: the effects of space weapons on regional and global political stability, and on their potential to initiate an arms race



that culminates with weapons of mass destruction in orbit. Many of these were presented in detail in Working Group 2 in La Jolla [1]. However, it is equally critical to consider the long-term ramifications of such weapons. Only by considering both of these time-frames can we make an informed cost-benefit analysis of space weapons and their impact on human security.

History teaches us that new strategically-important weapons quickly become embedded into national security strategies. In general, such weapons become so deeply embedded in the dominant political paradigm that they are largely impossible to remove from the strategic arena. Nuclear weapons represent a good example with which Pugwash is familiar, and there is no reason to think that space weapons shall be any different.

Put simply: our generation is concerned that once space weapons are deployed, it will be nigh-impossible to eliminate them. Thus, before humans expand into space, and establish the precedents of their civilization, we must seize the opportunity now to set up a robust legal framework to prevent the weaponisation of outer space. Space weapons represent a threat not only to other space systems and the national territories of other countries, but to the whole of humankind because of their effects on the balance of armaments and deterrence policy. In fact, space dominance increases the technological asymmetry between countries and drives an accelerated need for strategic weapons to achieve the same deterrence effects. For these reasons, a treaty prohibiting space weapons is essential.

### **3: What is the Urgency?**

There is much critical analysis pointing to the urgency for a treaty prohibiting space weapons [1,2]. The expiration of the ABM treaty, and the lack of a comprehensive weapons ban in existing space treaties, opens the door for the US to advance an aggressive space defense programme. With support from the highest levels, space weapons are clearly part of the current intent of US military strategy [3], representing a marked change from President Kennedy's speech quoted above, [4]. The time scale for the deployment of such weapons is just a few years. The intensity of the US effort can be gauged from the large investment in the National Missile and Ballistic Missile Defense programmes, which have a large and critical space component in their multi-tiered strategy [5], much of which has

been demonstrated as being operationally viable (to varying degrees of success) [6].

For these reasons, it is important not only to start an immediate international discussion on this issue, but also to create an appropriate international legal framework and to find substitute programmes capable of gaining the interest of the defense industry. Prevention is easier than cure; we have seen the difficulties of disarming weapons of mass destruction on Earth once they are created and entrenched. Our rapidly disappearing opportunity is to *prevent* space weapons from being deployed.

### **4: Is it realistic to prohibit space weapons?**

When discussing arguments in favour of preventing the weaponisation of space, we firstly note that most countries are against space weapons. On November 29, 2001, the U.N. General Assembly approved by a 156-0 vote the basis for a treaty establishing a permanent prohibition on space-based weapons (Resolution 56/535). The Resolution stated that Member Nations were "convinced that further measures should be examined in the search for effective and verifiable, bilateral and multilateral agreements in order to prevent an arms race in outer space, including the weaponisation of outer space." Earlier, on November 20, 2000, a similar U.N. General Assembly resolution to prevent an arms race in space (Resolution 55/32) was adopted with a 163-0 vote. In addition, a joint working paper on preventing space weapons was introduced by China and Russia in the United Nations Conference on Disarmament (UNCD). All of these provide an indication of broad support for such an agreement at the highest international levels.

Because of this global support, a treaty prohibiting space weapons seems quite feasible in any non-consensus based forum. Unfortunately, the traditional venue for such discussions, the UNCD, is consensus based. One possible solution around this problem is for a country which supports the prohibition of space weapons to host a treaty conference for interested nations. This model was followed successfully in the so-called "Ottawa Process", which led to the successful Ottawa Land Mines Treaty. As representatives of the Canadian government have repeatedly supported a ban on space weapons [7], Canada could be an appropriate host country for such a treaty conference.

Secondly, realistic treaties prohibiting space weapons have already been developed, such as the Space Preservation Treaty [8], which includes necessary verification measures. This treaty is paired with the Space Preservation Act [9], proposed legislation which has been recently introduced in the US Congress (H.R. 3616). Together, these could be an appropriate starting point for a treaty conference.

In analyzing the arguments of space weapons proponents, we must recognise that access to space represents a major defense and economic national interest, in addition to being the ultimate military high ground, and thus it is natural for military strategists to consider space weapons as a means to improving national security. General S. P. Worden of the U.S. Air Force argues that space weapons, along with information warfare, shall constitute the centre of the post-nuclear deterrence paradigm for the United States [10]. We must acknowledge that finding a realistic military strategy for the US and other major powers that avoids using space weapons is clearly not simple. In this sense it is not realistic to think that the US will abandon the policy of space dominance [11]. Even though space weapons do not seem to address the most pressing threats to national security, such as non-state terrorism, and that their strategic benefits will be vastly outweighed by the strategic costs in provoking an arms race, from a military perspective the short term national security gains are tangible.

To arrive at an adequate and sustainable prohibition, it is important that productive discussions continue between organisations like Pugwash and proponents of space weapons. Such discussions can shape the creation of a realistic future deterrence policy which avoids the use of space weapons and finds substitute long-term programmes capable of gaining the support of the defense industry. Towards this end, Worden also recommends that “An international regime of global, real-time monitoring could form the basis of the new global deterrent posture”. Efforts to facilitate dialogue and expand on strategies of this nature must be re-doubled. This is a challenge for Pugwash.

## 5: Recommendations

- 1) We recommend the establishment of an international treaty to embody current international customary law by:
  - a. Prohibiting the placing of primary conventional weapons in space (except under the conditions of protec-

tion against natural disasters, under international auspices).

- b. Incorporating clauses which include reporting, evaluation, public examination and the passing of appropriate disputes to the International Court of Justice (modeled on the Chemical Weapons Convention)

### *We recommend that Pugwash:*

- 1) Initiate an 18-month working group on space weaponisation charged with:
  - a. Establishing recommendations and a time plan for pragmatic steps toward the goal of preventing the weaponisation of space. The recommendations below should be among those considered.
  - b. Drafting a treaty prohibiting space weapons.
  - c. Convene a conference on space weapons including representatives from the military, senior politicians, scientists, academics and young people.
- 2) Initiate a campaign to unify and strengthen support for the above treaty, particularly within countries whose governments are moving towards the weaponisation of space.
- 3) Encourage scientists to withhold expertise on the development of space-based weapons

### *We recommend that International Student/Young Pugwash:*

- 4) Continue to discuss and formulate the position of youth on the weaponisation of space and to encourage high level debate on the issue.
- 5) Encourage youth groups to monitor and create public debate on the compliance of their country to the space treaties it has signed.

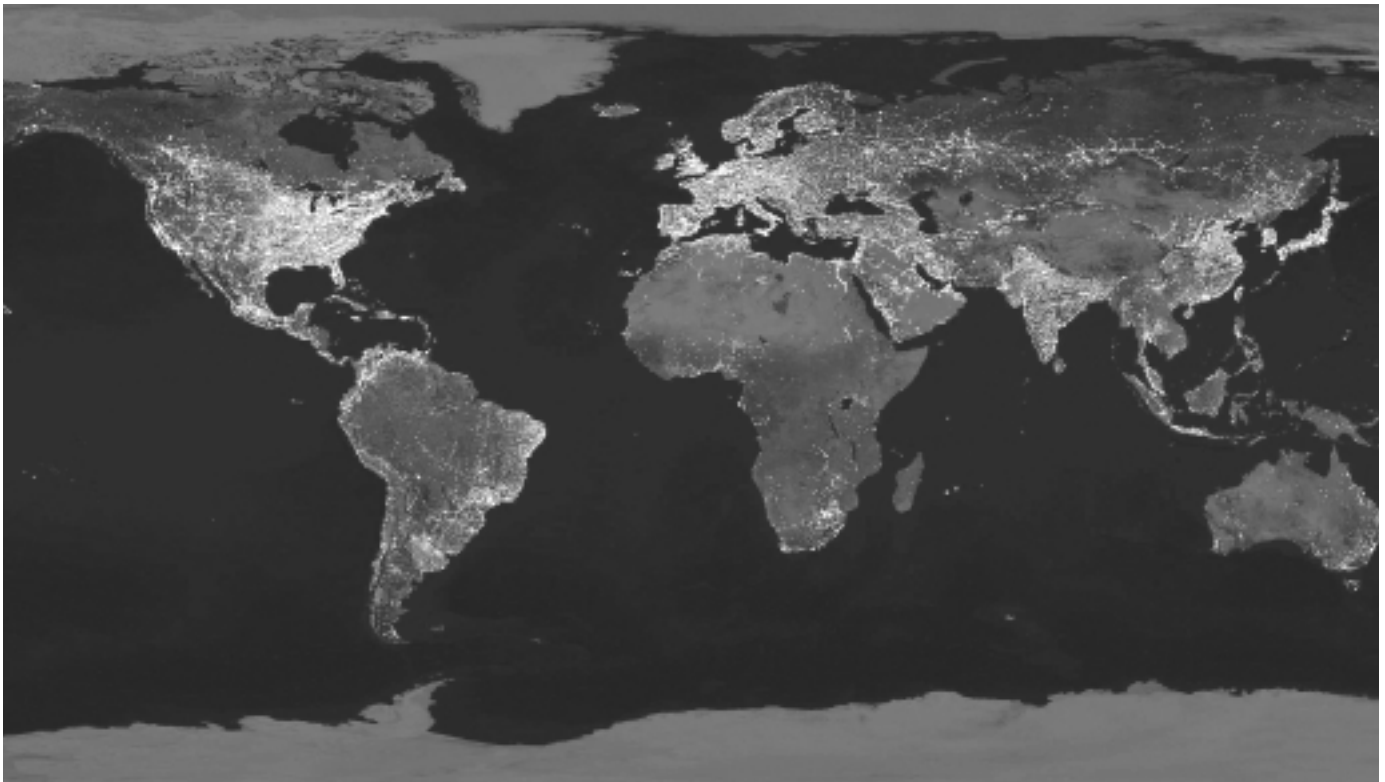
### *We recommend that in the longer term:*

- 6) The UN set up an International Committee for the Long-Range Future, initially for a period of 18 months, with the following goals:
  - a. To rigorously analyze the relative weights of risks to human security in a formal scientific fashion;
  - b. To assess future space development and security needs on a 50 year time scale and beyond;
  - c. To research the feasibility and goals of a permanently established Standing Committee on the Long-Range Future.

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- \* Available at <http://www.unsgac.org/sgs/files/.Projects/Peace/MustReadSection>

*We would welcome your feedback to this article; please address correspondence to [wsm@physics.ox.ac.uk](mailto:wsm@physics.ox.ac.uk)*



**Earth at night.** NASA photograph

## Tahseen Basheer

Ambassador Tahseen Basheer, 77, a major figure in Egyptian policymaking for many decades and a frequent participant in Pugwash workshops on Middle East issues, died 10 June 2002 in London.

Basheer was a senior policy advisor and spokesman for both President Abdul Nasser and President Anwar Sadat, as well as Ambassador to Canada and the Arab League, and he continued to be an influential Egyptian voice on international affairs well into the 1990s. After government service, he was director of the National Center for Middle

East Studies in Cairo, and in 1995-96 he was a senior fellow at the US Institute of Peace, in Washington, DC.

Basheer attended more than a half dozen Pugwash workshops, beginning with the *21<sup>st</sup> Pugwash Symposium on Peace and Development in Africa*, held in Cairo in January 1975, through to the *Pugwash Workshop on Middle East Security* held in Alexandria, Egypt in April 2001. His participation and insights were notable for their warmth and wit, and his incisive analysis and humanity in addressing complex Middle East issues will be missed.

## George Marx

George Marx, 76, an internationally renowned physicist and an active member of the Hungarian Pugwash group, passed away on 2 December 2002 in Budapest. Prof. Marx was a member of the Hungarian Academy of Sciences and the International Academy of Astronautics, and played important roles in the fields of particle physics, theoretical astrophysics and in bioastronomy. Known for his dedication to strengthening international scientific cooperation and science education, Prof. Marx first attended the 45<sup>th</sup> Pugwash Conference in Hiroshima, Japan in July 1995. In February 1998, he helped organize a Pugwash Workshop on *Science and Ethics*, which was held in Debrecen, Hungary, with support from the Hungarian Academy of Sciences. This Pugwash workshop coincided with a major conference in



**D. Berenyi, J. Rotblat, G. Rathjens, G. Marx.**

Budapest marking the centenary of the birth of Leo Szilard, with many Pugwash members attending and presenting papers, which Prof. Marx was instrumental in arranging.

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## Pugwash Council for the 2002–2007 Quinquennium

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**Prof. M.S. Swaminathan** is a renowned agriculture scientist. Considered the scientific leader of the Green Revolution, his approach in pioneering "ever-green revolution" is at the heart of what is now called sustainable agriculture. He is a past recipient of the World Food Prize, the Honda Award, the Ramon Magsaysay Award, the UNESCO Gandhi Prize, and the Indira Gandhi Prize for Peace, Disarmament and Development. He chaired the International Commission on Peace and Food, and is UNESCO Chair in Ecotechnology, and Chairman of the MS Swaminathan Research Foundation in Chennai, India; MS Swaminathan Research Foundation, 3rd Cross Street, Taramani Institutional Area, Chennai-600 113, India, Tel.: (+91-44) 254 2790 / 1698, Fax: (+91-44) 254 1319, E-mail: msswami@mssrf.res.in

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## Calendar of Future Pugwash Meetings

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9–16 February 2003 Andalo (Trento), Italy	<b>ISODARCO Meeting no. 49</b> , the 16th Winter Course: <i>The Surge in Nonstate Violence: Roots, Impacts and Countermeasures</i>
12–13 March 2003 Lahore, Pakistan	<b>Pugwash Workshop: Avoiding an India-Pakistan Nuclear Confrontation</b>
27–30 March 2003 Amman, Jordan	<b>9th Pugwash Workshop on the Middle East</b>
26–27 April 2003 Oegstgeest, Netherlands	<b>19th Workshop of the Study Group on the Chemical and Biological Weapons Conventions</b>
16–18 May 2003 Geneva, Switzerland	<b>2nd Pugwash Workshop on South Asian Security</b>
22–24 May 2003 Castellón de la Plana, Spain	<b>Pugwash Workshop: Preserving the Non-Weaponisation of Space</b>
29 May–1 June 2003 Bariloche, Argentina	<b>Regional Pugwash Workshop: Towards the Solution of Economic Inequities in Latin America</b>
*15–22 June 2003 Pyongyang, North Korea	<b>3rd Pugwash Workshop on East Asian Security</b>
16–26 June 2003 Candriai (Trento), Italy	<b>ISODARCO Meeting no. 50: 24th Summer Course: Nuclear Weapons in the New International Context: Hopes of Reductions and Risks of Proliferation</b>
26–28 June 2003 Paris, France	<b>Pugwash Workshop: The Social and Ethical Responsibilities of Scientists</b>
16–22 July 2003 Halifax, Nova Scotia	<b>53rd Pugwash Conference on Science and World Affairs:</b> <i>Advancing Human Security: The Role of Technology, Politics and Ethics</i>
2–5 October 2003 Como, Italy	<b>2nd Pugwash Workshop on Terrorism and Weapons of Mass Destruction</b>
8–9 November 2003 Geneva, Switzerland	<b>20th Workshop of the Pugwash Study Group on the Chemical and Biological Weapons Conventions</b>
*2004 Korea	<b>54th Pugwash Conference on Science and World Affairs</b>

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## **Pugwash Conferences on Science and World Affairs**

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