

## THE QUEST FOR THE DEMILITARIZATION OF INTERNATIONAL RELATIONS

Openness versus Secrecy in Research and Development \*

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### 1. Changing our mode of thinking

As the Cold War fades away, the time seems ripe for a fundamental restructuring of international relations, aiming at their demilitarization and establishing lasting and stable peace. As indicated recently by George F. Kennan:

It ought now to be our purpose to eliminate as soon as possible, by amicable negotiations, the elements of abnormal military tension that have recently dominated Soviet-American relations, and to turn our attention to the development of positive possibilities of this relationship, which are far from insignificant.<sup>1)</sup>

The quest for the demilitarization of international relations, with a redeployment of resources for positive developmental possibilities, is today a befitting and timely imperative. The problem facing humanity is not only to halt and reverse the arms race between the major powers, with the portent of new exotic weapons around the corner. Equally urgent is also to put a stop to the proliferation of nuclear (and chemical) weapons and their long-range delivery systems into highly sensitive and conflict-ridden areas of the Third World: the Middle East, the Persian Gulf, South Asia and Latin America.

Recent developments on the international scene, and especially the relaxation of East-West tension, tend to veil the dangers that are still with us because of the global arms build-up. We should not be lulled into quiescence. A distinct feature of the cyclical course of international relations since World War II, from the Cold War to détente and again back to tension, has been the intermittent arms race. Despite the periodical reduction of tension at the moments of détente

military preparedness has never slackened. Military laboratories — employing approximately a million of the best qualified scientists and engineers on a global scale — are constantly working full gear to improve and modernize existing weapons as well as to invent and develop new, more fearful ones. Nowadays we may hear less of policy directives for the ability “to fight and win a nuclear war”: but, according to Robert McNamara, former US Secretary of Defense:

the Pentagon’s strategic planning, weapon development, and arms procurement continue to be driven by a determination to maintain dominance at each stage of a nuclear conflict, which is assumed could last for days or weeks until one side or the other prevailed.<sup>2)</sup>

And this, in an action-reaction manner, should be true for both West and East.

Back at the dawn of the nuclear age, Albert Einstein defined our predicament by noting that “the unleashed power of the atom has changed everything save our mode of thinking”. Two generations later, and with some 50,000 nuclear weapons deployed around the globe, our mode of thinking on war and peace has still not changed, despite the obvious dangers in continuing this course. We have been benumbed by the horror weapons poised at our homes. International relations and military planning are still dominated by suspicion, mistrust, fear and hostility. How can we find ways to transcend this state of affairs?

This paper tries to draw attention to the secret exertion of military laboratories as one of the main motor forces of the arms race as well as a determinant of distrust and enmity in international relations. There is a close interrelationship between the secrecy of the arms build-up on the one hand, and the discord, the lack of confidence between the actors in the arms race on the other hand. I contend that the extent of relaxation of international tension depends largely on the degree of openness in military affairs, particularly in new weapon research and development — the power plant of new armaments. With today’s arms race mainly a competition in science-based modern military technology, some transparency in the workings of military R&D, coupled with disarmament measures aimed to constrain the impulse of military technology, seems essential to the advance of détente and the pursuit of stable peace. Eventually, within the framework of comprehensive disarmament, military laboratories could be — indeed, they should be — converted to serve civilian human needs.

## 2. The secret breeding ground of armaments

Science-based modern technology, as operationalized for our daily needs as well as for military objectives by research and development (R&D), is today central for shaping our human conditions, present and future. And yet, even with this paramount importance in national and international life, large parts of the R&D exertion are screened by secrecy. Apart from the socio-economic sensitivity of R&D a principal reason for this is the interpenetration of civil and military pursuit. Military R&D has expanded into almost all disciplines of hard and soft sciences, from the achievements of the highest technology to medical and socio-behavioural knowledge, in the service of modern warfare. In the process, military R&D has gathered weight, with a far-reaching influence in all domains of R&D, civilian R&D included. This is especially the case in countries who are both heavily engaged in the arms race and at the same time are leading in global R&D.

The R&D establishment is a huge and powerful one, scattered around the world. Yet, secrecy has meant that reliable and comparable data on its manpower and expenditures (particularly concerning military R&D) are wanting. Some insight may be gained from Unesco statistical estimates: that in 1980 there were globally 3,756,100 scientists and engineers engaged in R&D (89.4% of these in developed countries), consuming altogether US \$ 207,801 millions annually (93.7% spent in developed countries).<sup>3)</sup> Unesco also notes an extraordinary dynamic growth in recent years: between 1970 and 1980, world R&D manpower increased by 44% and its expenditure rose by a mammoth 335% — an indication of the highly capital-intensive nature of the R&D endeavour.<sup>4)</sup> Supposing a similar expansion of R&D in the 1980s, we may assume that by the close of the present decade the number of scientists and engineers employed in R&D could reach some 5 million globally and its budget some US \$ 700 billion annually.

What, then, is the share of military R&D in the above estimates? Due to secrecy no exact data are available. A 1972 UN study estimated the share of military R&D as 40% of global R&D expenditure.<sup>5)</sup> In a more conservative vein, a 1981 UN study valued it as in the order of 20 — 25% as regards both manpower and expenditures.<sup>6)</sup> The *1987 SIPRI Yearbook* estimated the share of military R&D to roughly 25% of global R&D spending, and calculated that in 1986 it was approximately US \$ 85 — 100 billion in current prices; and it estimated world military R&D manpower (scientists, engineers and support personnel) to “at least one and a half million people”.<sup>7)</sup> In 1988, Prof. Eugene B. Skol-

nikoff of MIT figured that the global R&D budget amounted to roughly US \$ 400 billion per year, of which “a reasonable estimate, possibly conservative, is that one third is motivated directly or indirectly by military-security concerns”.<sup>8)</sup> As we see, estimates vary. But, to cite Colin Norman, “the feeding of the world’s military machine is thus the predominant occupation of the global research and development enterprise”.<sup>9)</sup>

The following table, based on Unesco statistics, gives an indication of the share of military R&D in total R&D, for various countries. The data are not fully comparable, as they relate to different years; also, in various countries military R&D may be concealed in other R&D items (such as the “advancement of knowledge”, which generally includes defence-oriented basic research; or “ener-

**The national public fund budget for research and experimental development — %**

	USA (1982)	UK (1983)	Franch (1980)	FRG (1983)	Japan (1984)	Italy (1976)	Sweden <sup>2</sup> (1981)	India (1984)
<i>Major aim</i>								
Earth, seas and the atmosphere	1.2	1.7	3.0	1.9	1.9	10.5	0.3	5.1
Civil space	5.5	1.9	6.2	3.9	10.9	—	0.1	10.5
Development of agriculture	2.6	5.2	3.9	2.2	22.7	3.1	1.3	19.8
Industrial development	0.4	6.5	9.3	12.0	11.1	10.4	52.3	12.7
Energy	6.7	5.5	7.5	15.1	29.1	20.8	2.8	17.2
Transport and Communication	2.3	—	2.7	1.2	2.8	0.4	1.6	4.3
Education services	0.3	—	—	—	—	0.1	—	0.1
Health services	11.5	3.8	4.4	3.2	5.3	3.0	0.2	2.8
Socio-economic services	0.9	2.3	1.3	2.3	1.4	1.0	1.1	0.6
Environment	0.5	1.1	1.1	2.9	2.8	0.7	0.7	1.5
Advancement of knowledge	3.9	22.2	22.2	44.0	3.4	44.6	31.9	4.8
Defence	64.3	49.6	36.5	10.1	6.3	4.5	7.8	17.3
Others	—	0.3	1.8	1.2	2.4	1.0	—	3.3

Source: *Unesco Statistical Year book 1988*, Statistics on Science and Technology, table 5.15

Notes: 1. No date were available for countries with centrally-planned economies (USSR, China, Eastern Europe), as well as for a number of Third World countries such as Indonesia, Iran, Egypt, Algeria or Libya.

2. Total expenditure (public funds + private)

3. The respective percentage R&D expenditure for defence in some other countries: Australia (1984)—9.6%. Canada (1983)—7.2%. Spain (1984)—10.2%. (total expenditure). Switzerland (1975)—4.9% (listed in the same table).

gy”, which in the USA covers nuclear weapon development; or “civil space” which may have military components). Nevertheless, the table shows a revealing picture.

Thus, the three nuclear powers listed in the table spend between 36.5 to 64.3% of their governmental (federal) R&D funds on military R&D. Although no parallel data are available from other nuclear power, the USSR and China, we may assume similar or even larger proportions, given the drive to catch up with and surpass Western military technology. We must emphasize that military R&D is the fastest growing item of military expenditures. In the USA, military R&D as part of military spendings increased between 1953 and 1984 from 5.93% to 12.7%.<sup>10)</sup>

The table also indicates some important economic corollaries. Not only are a large part of finite R&D resources crucial for development diverted for unproductive military purposes. The data have also some relevance to the dynamics of economic performance and productivity, as is particularly striking in the case of the United States and Japan: the US percentage of federal R&D funds spent for military R&D is ten times higher than the parallel governmental funds in Japan. The consequences in economic competitiveness are there for all to see.<sup>11)</sup>

Symptomatic is also the high percentage of public R&D funds spent for military R&D in India, a developing country. Here the diversion of a large part of finite R&D resources for military objectives backfires, not only quantitatively in limiting civilian R&D. The priority attention to capital-intensive high-tech military technology rebounds also qualitatively, by constricting the intermediate and appropriate technology which is so fundamentally important for the developing economy. The economic opportunity costs are high.<sup>12)</sup> Of no less consequence is the momentum for the proliferation of the arms race to the Third World.

In terms of the global armaments momentum, even though the huge material/human resources invested in military R&D are weighty, equally important is the mode of operation of the military laboratories. Built into military R&D are powerful pressures for armaments expansion and solidification.

Research for weapon modernization and innovation in military laboratories have become a perennial endeavour with no finite close. Each breakthrough in military technology is but seen as a stepping-stone to new frontiers of military performance and force augmentation. Weapons of offence are as a rule complemented with weapons of defence. The “follow-on imperative” is intrinsic to military R&D. This is reinforced by secrecy-induced worst-case planning aiming

to pre-empt the adversary. Moreover, the R&D process is stretched out by long lead-times, with gestation periods requiring years for origination, design, prototype-framing, repeated testing, development and production of new weapon systems.

The cumulative effect is that the arms race becomes routine. It assumes a life of its own, proceeding independently of any arms control negotiations or shifts in governments. While public opinion excitedly follows the intricacies of the diplomatic game, the secret technological drive in military laboratories, least visible to the public eye, is proceeding full speed, without interruption. The arms race is projected far into the future.

Here we should draw attention to the inner technological momentum of the nuclear build-up. Contrary to the general perception of a well-planned and orderly extension of the nuclear arsenals, reality is that the nuclear build-up has followed the incidental amassment of ever-new varieties of nuclear warheads and their delivery vehicles in the course of weapon modernization and technological momentum from the military laboratories. As confirmed by Robert McNamara:

The twenty-five thousand nuclear warheads that each nation [the US and USSR] possesses did not come about through any plan. Instead, they emerged through the indiscriminate application of continuing technical innovation.<sup>13)</sup>

The technological momentum from the military laboratories has imposed itself willy-nilly on the political decision-making process. The intermittent and secret exertion of military R&D serves as the engine of armaments. Acting in conjunction with the action-reaction phenomenon, military technological innovation and competition, veiled in secrecy, fuels the arms race and stimulates redundant military build-ups. It drives politics into blind alleys of confrontational wrangling.

### **3. A historical reminder**

#### **3. 1. The first use of atomic bombs**

How did we manage to end up with a world dominated by nuclear weapons? Many historical, circumstantial, technological, military and political factors contributed to the emergence of nuclear arms. In this multi-causal genesis, it may be of special interest to trace the role of secrecy and secret decision-

making as a determinative variable in the course of events, the first use of atomic bombs that was to unleash the nuclear arms race.

It is not difficult to understand the initial anxiety of concerned Allied scientists and politicians during World War II to pre-empt the feared invention of an atomic bomb by Nazi Germany; likewise we can appreciate the required confidentiality to forestall such an outcome. However, the deep secrecy surrounding the development of the atomic bomb in the Manhattan Project, imposed as an emergency measure, was to continue long after the fall of Germany, and into the first use of the atomic bombs against Japan. Historical evidence accords with the view that the bombing of Hiroshima and Nagasaki was effectuated without any informed consideration of the consequences, physical (such as the radiation dimensions) or political (such as the ushering in the nuclear arms race) — despite concerned critical voices of senior scientists involved in the Manhattan Project (see below).<sup>14)</sup> A momentous turn in the annals of mankind was engineered, in secret, by a narrow political-military circle led by the US Secretary of War, dazzled by the allure of transient political power.

Seen in a historical perspective, the decision to drop atomic bombs on Hiroshima and Nagasaki seems to have been motivated more by the US desire to impress the Soviet Union and to make it “more manageable” in drawing up the post-war political map of the world, than by the wish for the surrender of Japan, which was anyhow imminent.<sup>15)</sup> This secret decision to employ the atomic bomb as an instrument of great-power diplomacy was to give birth to the fateful race for nuclear supremacy and, subsequently, to nuclear proliferation.

A knowledgeable assessment of the circumstances of the first use of the atomic bomb leads to the conclusion that “less secrecy would have meant a more rational postwar world.”<sup>16)</sup> This is also the gist of the contention of McGeorge Bundy on “The Missed Chance to Stop the H-Bomb.”<sup>17)</sup> “The bad habit of obsessive secrecy,” McGeorge Bundy writes, and the eagerness “to keep ahead of public debate” prompted President Truman’s 1950 secret order for an all-out effort to produce the hydrogen bomb, foreclosing any attempt for a possible understanding with the Soviet Union on banning the H-bomb.<sup>18)</sup> Needless to say, Stalin’s deep-seated and intense secretiveness in trying to catch up in the nuclear arms race also has to bear its share of the blame for the nuclear aberration.



### 3. 2. The concern of the nuclear scientists

A number of prominent scientists, Nobel Prize winners and senior participants in the Manhattan Project, though initially committed to pre-empting the acquisition of the atomic bomb by Nazi Germany, had second thoughts about the use of the bomb. This concern became manifest especially after the fall of Germany, the following completion of the bomb and its imminent use against Japan. It came again to the fore in 1949, on the eve of the crash programme to develop the H-bomb, the so-called “super”. Leading roles were played by Niels Bohr, Leo Szillard, James Frank, Isidor I. Rabi and Enrico Fermi. It may be interesting to note that Albert Einstein, who in 1939 had signed the letter to President Roosevelt indicating concern about possible German efforts to procure atomic capability, had not been invited to participate in the Manhattan Project out of doubts about his political attitudes and pacifist beliefs.<sup>19)</sup>

The first to express anxiety and to draw attention to the long-term consequences of the development of atomic weapons and to the need of “foresalling a fateful competition” between the great powers was Niels Bohr. In a confidential memorandum to President Roosevelt of July 1944, Bohr emphasized that

a weapon of unparalleled power is being created [and]any temporary advantage however great, may be outweighed by a perpetual imbalance to human security. The prevention of a competition prepared in secrecy will therefore demand such concessions regarding exchange of information and openness about industry effects, including military preparations, as could hardly be conceived unless all partners were assured of a compensating guarantee of common security against dangers of unpredictable acuteness... It is in such respects that helpful support may perhaps be afforded by the world-wide scientific collaboration... Personal connections between scientists of different nations might even offer means of establishing preliminary and unofficial contact...<sup>20)</sup>

Two other confidential appeals by concerned scientists relate directly to the impending dropping of the atomic bombs on Hiroshima and Nagasaki on August 6, 1945. They included a plea for a technical demonstration of the effects of the new weapon in an uninhabited area, rather than dropping the bombs on population centres.

The so-called Frank Report to US Secretary of War, Henry L. Stimson, of 11 June 1945, signed by J. Frank, D. Hughes, L. Szillard, T. Hogness, E. Rabi-

nowitch, G. Seabord and C. J. Nicholson, stated:

Nuclear bombs cannot possibly remain a “secret weapon” at the exclusive disposal of this country for more than a few years... Unless an effective international control of nuclear explosives is instituted, a race for nuclear armaments is certain to ensue... We believe that these considerations make the use of nuclear bombs for an early unannounced attack against Japan inadvisable... [It would] prejudice the possibility of reaching an international agreement on the future control of such weapons. Much more favorable conditions for the achievement of such an agreement could be created if nuclear bombs were first revealed to the world by a demonstration in an appropriately selected uninhabited area.<sup>21)</sup>

On 17 June 1945 followed another petition to President Truman, drafted by Leo Szillard, the discoverer of the nuclear chain reaction, and signed by 68 members of the Metallurgical Laboratory in Chicago. It stated i. a.:

Discoveries of which the people of the United States are not aware may affect the welfare of this nation in the near future. The liberation of atomic power which has been achieved places atomic bombs in the hands of the Army... A nation which sets the precedent of using these newly liberated forces of nature for purposes of destruction may have to bear the responsibility of opening the door to an era of devastation on an unimaginable scale... We, the undersigned, respectfully petition: first, that the United States should not resort to the use of the atomic bomb in this war unless the terms which will be imposed upon Japan have been made public in detail and Japan knowing these terms has refused to surrender; second, that in such event the question whether or not to use atomic bombs be decided by you in the light of the considerations presented in this petition as well as the other moral responsibilities which are involved.<sup>22)</sup>

This in fact meant a desire to outlaw the use of the atomic weapon.

The views of the various atomic scientists — both the petitioners and those on the War Department Panel of Scientists (A. H. Compton, E. O. Lawrence, J. R. Oppenheimer, and E. Fermi) — were summed up by the Secretary of the War Department, George L. Harrison, in a top secret memorandum to the Secretary of War of 26 June 1945:

It is interesting that practically all of the scientists, including those on the

panel, feel great concern for the future if atomic power is not controlled through some effective international mechanism. Accordingly, most of them believe that one of the effective steps in establishing such a control is the assurance that, after this war is over, there shall be free interchange of scientific opinion throughout the world supplemented, if possible, by some system of inspection... In the meantime, however, they feel that we must, even before actual use, briefly advise Russians of our progress.<sup>23)</sup>

The advice of the nuclear scientists was not heeded. Atomic bombs were indeed dropped on Hiroshima and Nagasaki. Secretary of War Stimson himself in an article published in the February 1947 issue of *Harper's Magazine* tried to justify this decision primarily on strategic-political grounds but also because, remarkably, of the technical uncertainties and risks of an advance demonstration:

Nothing would have been more damaging to our effort to obtain surrender [of Japan] than a warning or a demonstration followed by a dud — and this was a real possibility. Furthermore, we had no bombs to waste.<sup>24)</sup>

In other words, a blind pursuit of atomic diplomacy, without even being fully sure of the workings and effects of the atomic bombs. In the aftermath of Hiroshima and Nagasaki, the War Department Panel of Scientists, in a letter to the Secretary of War of 17 August 1945 noted:

It is our opinion that no military countermeasures will be found which will be adequately effective in preventing the delivery of atomic weapons... We have grave doubts that this further development [of atomic weapons] can contribute essentially or permanently to the prevention of war. We believe that the safety of this nation—as opposed to the ability to inflict damage on an enemy power—cannot be wholly or even primarily in its scientific or technical prowess. It can be based only on making future wars impossible.<sup>25)</sup>

The Soviet Union soon followed suit in developing its own atomic bomb which it tested in August 1949. Both the USA and USSR intensified the drive to come up with the “super” H-bomb.<sup>26)</sup>

In October 1949 the 9-man General Advisory Committee (GAC) to the US Atomic Energy Commission was called to give its opinion on all-out effort to develop the “super”. The GAC report, declassified in 1970, consists of three parts: an introduction signed by the chairman, J. R. Oppenheimer; a majority

statement signed by J. B. Conant, H. Rowe, C. S. Smith, L. A. DuBridge, O. E. Buckley and J. R. Oppenheimer; and a minority statement signed by E. Fermi and I. I. Rabi.

From the introductory note:

We are all agreed that it would be wrong at the present moment to commit ourselves to an all-out effort toward its development [of the 'super']. We are somewhat divided as to the nature of the commitment not to develop the weapon. The majority feel that this should be an unqualified commitment. Others feel that it should be made conditional on the response of the Soviet government to a proposal to renounce such development. The Committee recommends that enough be declassified about the super bomb so that a public statement of policy can be made at this time... In one form or another the statement should express our desire not to make this development. It should explain the scale of the general nature of the destruction which its use would entail...<sup>27)</sup>

From the majority statement:

We recommed strongly against such action [of an all-out effort to develop the 'super']. We base our recommendation on our belief that the extreme dangers to mankind inherent in this proposal wholly outweigh any military advantage that could come from this development... A super bomb might become a weapon of genocide... We believe a super bomb should never be produced... In determining not to proceed to develop the super bomb, we see a unique opportunity of providing by example some limitations on the totality of war and thus of limiting the fear and arousing the hopes of mankind.<sup>28)</sup>

The minority statement by the two Nobel Prize winners is by any ethical-moral standard most outspoken:

It is clear that the use of such a weapon [a super bomb] cannot be justified on any ethical ground which gives a human being a certain individuality and dignity even if he happens to a resident of an enemy country... A desirable peace cannot come from such an inhuman application of force... For these reasons we believe it important for the President of the United States to tell the American public, and the world, that we think it wrong on fundamental

ethical principles to initiate a program of development of such a weapon. At the same time it would be appropriate to invite the nations of the world to join in a solemn pledge not to proceed in the development or construction of weapons of this category. If such a pledge were accepted even without control machinery, it appears highly probable that an advanced stage of development leading to a test by another power could be detected by available physical means...<sup>29)</sup>

The position of the scientists who had been involved in the Manhattan Project and later in the consultations preceding the development of the H-bomb was evidently not uniform. There was no full unanimity in their assessment of the long-term consequences of developing and perfecting nuclear arms. On the one hand, the scientists were proud of their achievements; on the other hand they were bewildered when confronted with the use made of their inventions. The dilemma between the commitment to the war effort and the ethical-moral inhibitions to make use of the atomic bomb was differently comprehended and perceived. A majority finally acquiesced to the idea of the atomic bomb as a deterrent to war. Thus, for instance, while reluctant to blunder into development of the H-bomb, the GAC members simultaneously recommended as a security alternative:

an intensification of efforts to make atomic weapons available for tactical purposes, and to give attention to the problem of integration of bomb and carrier design in this field.<sup>30)</sup>

Nonetheless, the *cri de coeur* of concerned atomic scientists who called for a halt to the use of the atomic bomb and the development of the H-bomb, as well as for international control and the outlawing of the use of nuclear arms, stand as a momentous historical episode at the threshold of the nuclear age. These scientists drew their inspiration from a scholarly insight into the monstrous nature of nuclear arms, as well as from a normative anxiety for the fate of humanity. Inherent in this position was a sense of social responsibility for the use made of their discoveries. A gap was developing between the scientists' humane idealism and yearning for a non-violent civilized world on the one hand, and the wish of the political-military leadership for instant expediency, irrespective of long-term consequences.

The main remedy and prescription for a way out of the nuclear nightmare the scientists saw in lowering, as much as possible, the veil of secrecy on the in-

human nature of nuclear arms and the working of military R&D, nationally and internationally. Their idea was that through greater openness, in a collaborative international effort, one could pave the way to a more peaceful world. This prescription went in line with the code and ethics of science requiring openness of scientific research and the free flow of information between scientists across national borders, as well as sharing research concerns with society so as to serve advancement of science and the genuine needs of society.

Eventually, however, the appeal of the concerned atomic scientists was repudiated. Their words in the ear of those in power were silenced, not least by the secrecy and social isolation of military laboratories.

It may be that the agitated military-political climate of World War II and its Cold War aftermath were not conducive to the type of action recommended by these prominent atomic scientists. However, with hindsight, there is a lesson to learn: excessive secrecy in military affairs tends to thwart peaceful international understanding and efforts at demilitarization of international affairs. Furthermore, it is the secret exertion of military laboratories which at base generates security fears, impels the arms race and induces the employment of force instead of political measures to resolve international conflict.

#### **4. The long socio-political shadow of secrecy**

A measure of confidentiality can be essential in certain circumstances of emergency, of protection of society or diplomatic communication. As a general rule, however, secrecy—particularly excessive secrecy—as opposed to openness, enlightenment and informed consent, is detrimental to expedient functioning of society in the interests of democracy, social progress, scientific advance, security and peace. As expressed by Prof. Jerome B. Wiesner, former President of MIT:

Lack of information caused by secrecy restriction has been perhaps the most important single source of malfunction of our society during the past quarter century. The most dramatic example of this is found in foreign policy and military fields, where the electorate at large, and even the Congress, has frequently been unable to make reasonable judgements about proposed or on-going activities of the executive branch because of the unavailability of information with which to validate operating assumptions.<sup>31)</sup>

Openness is like fresh air to a healthy living body. Openness in internation-

al and domestic affairs serves the advancement of such values as freedom, togetherness, truth, social justice, human rights, participatory democracy and peace among nations. Moreover, in scientific R&D – which by definition should serve the advancement of society and the betterment of the human condition – sharing information within the scientific community and close communication with society on the nature and consequences of particular research projects is a fundamental prerequisite of creativity, scientific integrity and successful discharge of social responsibility. Openness is indeed part and parcel of the ethos and moral philosophy of science.

Secrecy in science and technology, apart from being objectionable on ethical and moral grounds, has a stifling effect on science itself. Science and the pursuit of knowledge thrive in conditions of openness, debate and exchange of experience and thought. Conversely, in a closed secret environment science loses wind, lags behind, becomes sterile. It is no coincidence that authoritarian and secretive powers are less advanced in modern science and technology than are societies with fewer restrictions in scientific communication. As stressed by James B. Conant, “secrecy and science are fundamentally antithetic propositions.”<sup>32)</sup>

Likewise, undue secrecy is harmful in security affairs. We are living in a world made transparent by the revolution in informatics and communication technology, by “open skies” and a fair insight into the common fund of scientific knowledge, as Academician Andrei D. Sacharov reminds us:

very few secrets are really important. As I feel it, the less there are of them, the better it is for world stability...The notion of the military and diplomatic secret should be abolished.<sup>33)</sup>

There is little really hidden before the eyes and intelligence of the adversary (as opposed to a certain ignorance of the public). Whatever secrets there are, they will be shortlived. Even technological breakthroughs become common knowledge in no time, as indicated by the almost parallel acquisition and deployment of modern weapon systems by East and West. In developing the H-bomb, Edward Teller and Andrei Sacharov read from the same books of modern science.

Secretiveness is a divisive force. It nurtures a culture of covert action and deceit. It breeds suspicion, distrust, fear and hostility. It upholds enemy images. The centre of gravity of these discordant perceptions lies in the secret working

of military laboratories, the technological kernel of armaments.

The imposition of secrecy on military R&D also has fateful consequences, both for the unfolding of the modern scientific potential as well as for the economy. Once it assumes a controlling position in all R&D, civilian R&D included, military R&D extends the mantle of secrecy far beyond military affairs. It impedes the free flow of information both within military R&D and vast areas of civilian R&D. As stated by Edward Teller:

Under present rules, research done in our national [military] laboratories cannot be shared with civilian industries. When we fail to expose people to problems they could help solve, we remain unaware of the loss. We now have millions of classified documents. We also have failing productivity. Rapid progress cannot be reconciled with central control and secrecy. The limitations we impose on ourselves by restricting information are far greater than any advantage others could gain by copying our ideas.<sup>34)</sup>

The socio-political, economic and security shadow of secrecy is long indeed. It has a particularly pernicious effect on armaments, anchored as they are today in military technology and military laboratories. The secret labour of military R&D has a dual negative effect: functionally it serves as a powerful driving force behind the arms race; in the behavioural-perceptual domain it serves to heighten mutual fear and distrust that counteract and bar disarmament efforts. Secrecy and disarmament simply do not mix.

## **5. From secrecy to openness in research and development**

In a Cold War atmosphere, military R&D has become the sacred cow of armaments. That it was necessary for national security was seldom questioned; its utility was almost taken for granted. There was little deliberation and study on its mode of operation or its role in the arms race.

Today, with arms control and disarmament again on the agenda, and with a new spirit of openness, circumstances seem opportune for a more objective and critical appraisal of the impact of military R&D on international relations. With a deeper understanding of the functioning of the military laboratories and their role in the armaments drive, we need to bring the issues of military R&D into open debate.

The history of post-World War II disarmament efforts has seen several mo-



ments of near-accord on disarmament measures, moments which eventually were upset by the thrust of evolving military technology. To such lost opportunities belong the Baruch Plan on the control of nuclear energy; the mid-1950 close agreement on conventional and nuclear disarmament stalled because—as stated by President Eisenhower in his 21 July 1955 address at the Geneva Conference of Heads of Government—

the scientists have discovered methods of making weapons many many times more destructive... these same discoveries have made much more complex the problems of limitation and control and reduction of armaments...<sup>35)</sup>

Further, there was the 1961 US-USSR agreement on principles of negotiations for General and Complete Disarmament (GCD), endorsed and applauded by the United Nations.<sup>36)</sup> This faltered in the wake of the explosion of new military technology, particularly the diversification of nuclear weapons and their delivery systems, in the early 1960s.

Analysis of the above course of events clearly reveals the harmful role of the momentum of military technology in sustaining armaments and barring disarmament efforts. The actual outcome in the early 1960s was that disarmament efforts were replaced by attempts at “arms control”: balancing of force structures so as to contribute, in the classical wording, to

the avoidance of war that neither side wants, in minimizing the costs and risks of the arms competition, and in curtailing the scope and violence of war in the event it occurs.<sup>37)</sup>

Even after 30 years of arms control negotiations, the results remain meagre.<sup>38)</sup> We have landed in a spiralling, unwieldy arms race in quantity and quality, where each accord on quantitative arms limitations is offset by modernizing remaining weapons and deploying new, more sophisticated weapon systems. Between the signing of the SALT I agreement in 1972 on strategic arms limitation and 1987, the US and USSR together increased their strategic nuclear warheads from 10,409 to 24,426;<sup>39)</sup> between 1960–1985, global military expenditures rose by 248% in real terms.<sup>40)</sup> Moreover, the arms race took a new turn reaching out to the outer space and the development of new fearful exotic weapons like Kinetic and Directed Energy Weapons, including nuclear-pumped

X-ray lasers. The deficiency of arms control is perhaps best reflected in the failure to arrive at a Comprehensive Nuclear Test Ban after a quarter of century of on-and-off negotiations ever since the inadequate Partial Test Ban Treaty was concluded in 1963. As nuclear testing is crucial for weapon modernization and development, this failure stands as a symbol of the overall inadequacy of arms control.

It is thus time for us to halt and reflect. We need to rethink well our nuclear predicament, its causes and driving forces. We must find ways to stall and restrain the momentum of military technology. With partial measures of arms control found failing, a return to comprehensive disarmament negotiations may be in order. Taking advantage of the new wave of détente in international relations, we may be well advised to reconsider the desirability and feasibility of General and Complete Disarmament, a scheme which only a short time ago was considered realistic by the major powers, and still is upheld by the United Nations as the ultimate disarmament objective.<sup>41)</sup>

It may be particularly worthwhile to reread the successive US and Soviet draft proposals of 1962 for a Treaty on General and Complete Disarmament (GCD). A crucial clause in these drafts concerns the fate of military R&D.

The US "Outline for Basic Provisions of a Treaty on GCD in a Peaceful World" of 18 April 1962 provides for the establishment of an International Disarmament Organisation (IDO) within the framework of the United Nations. In an advanced stage of the disarmament process, this organisation would:

- a) collect reports from the Parties to the Treaty on any basic scientific discovery and any technical invention having potential military significance and
- b) on the recommendation of expert study groups work out agreed arrangements for verification by the IDO that such discoveries and inventions were not utilized for military purposes.<sup>42)</sup>

Furhermore the US Treaty Outline stipulates that

The Parties to the Traty would agree to support full international cooperation in all fields of scientific research and development, and to engage in full exchange of scientific and technical information and free interchange of views among scientific and technical personnel.<sup>43)</sup>

Also the Soviet "Revised Draft Treaty on GCD Under Strict International

Control” of 22 September 1962 provides for the establishment of an IDO within the framework of the United Nations. According to the Soviet Draft Treaty, inspectors of IDO

shall exercise control over the disbanding of troops and over the destruction of armaments and military equipment, and shall control the conversion to peaceful uses of transport and other non-combat equipment, premises, proving grounds etc.<sup>44)</sup>

In concrete reference to military R&D, the Soviet Draft Treaty stipulates:

All scientific research in the military field at all scientific and research institutions and designing offices shall be discontinued [and] Inspectors of the IDO shall exercise control over these measures.<sup>45)</sup>

Though the provisions on military R&D in the US and Soviet Draft Treaties on GCD are rather general, they may well point to the right direction. By now it should be evident that unless we can restrain military technology, bring the military laboratories under some control and make their work more transparent with a view, ultimately, to their gradual conversion for peaceful purposes, the arms race cannot be fully halted and reversed. The time may have come for the line of action suggested by the Soviet Draft Treaties on GCD to be elaborated in detail. This should become the subject of broad public debate with the concept of GCD elevated and transformed into a material force for peaceful change.

If we are to demilitarize international relations and establish stable and lasting peace, we shall have to—consciously and conscientiously—initiate a process of moving from secrecy to openness in research and development. Plans need to be elaborated for the redeployment of resources and step-wise conversion of military R&D for civilian uses within the framework of GCD. The magnitude of the tasks ahead needs to be measured in historical terms of a transition from war-prone international relations to a demilitarized and intrinsically peaceful world, in line with the UN Charter vision of “saving succeeding generations from the scourge of war.” With enough political will, this should be possible. To quote the 1962 Working Draft for the Preamble of the Treaty on GCD agreed by the United States and the Soviet Union, approved by the Eighteen Nations Disarmament Committee:

General and Complete Disarmament under strict international control is a sure and practical way to fulfill mankind's age-old dream of ensuring perpetual inviolable peace on earth.<sup>46)</sup>

Today, we are one generation later into the nuclear age, with a revolutionary upswing in military technology. Surely, the need to revert to comprehensive disarmament measures is greater than ever. We shall have to redeem science and technology from its military entanglement—for the benefit of mankind and the betterment of the human condition.

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