

THE NUCLEAR ARMS RACE: TRENDS, DYNAMICS, CONTROL

I. *Facing the threat*

International relations after World War II were marked by two processes of paramount importance. On the one hand, against a strong resistance of vested interests and past formations, and overcoming cold war fallacies, the international society came to accept a profoundly changed socio-political status quo in Europe, Asia, Africa and Latin America. On the other hand, new problems of technology and economy, of ecological balance and energy supplies, of food and population, of disparities in wealth and of a just world order, moved to the forefront of human preoccupation. But while the center of gravity of politics and diplomacy shifted from traditional nation-state concerns towards a preoccupation with global issues, one central problem seems to overshadow all man's activities. It is the acute danger inherent in the fast growing nuclear armaments. The actual meeting of crisis and conflict on the international scene on the one hand, with an aberrant nuclear arms race on the other, is fraught with incalculable consequences. It may threaten mankind's very survival. One cannot but regard developments with deep apprehension.

Though the perception of looming peril linked to nuclear armaments is present with all of us, we hesitate to draw conclusions. The general awareness of the real facts seems still to be low. It might thus be helpful to trace the development of nuclear arms, to point to its dynamics, review the efforts to bring the nuclear arms race under control, and try to appraise the dilemmas posed by this race.

Three developmental features and trends stand out in the evolution of nuclear armaments: (a) a movement from quantitative growth to qualitative refinements, with an extraordinary take-off in highest technology in recent years; (b) a parallel shift in technological design and strategic doctrine from the initial built-in unsophisticated usability of nuclear weapons to their operationalization and adaptation to complex, real-life and modern war scenarios; and (c) an accelerating drift in proliferation of nuclear know-how and weapon technology, with a growing momentum to broad nuclear weapon proliferation.

A race in quantities

Developments in the first two decades after the Hiroshima bomb were marked basically by a race in quantities, moving from the atom to the hydrogen bomb, from lower to higher yields in single warheads. The subsequent stages of this race were made visible by the escalation of yields from the largest World War II pre-nuclear bomb, the »blockbuster«, with an explosive power of *ten* tons of TNT, to the Hiroshima bomb with a yield of fifteen *thousand* tons of TNT, to warheads now counted in *millions* of tons of TNT. It was thus an upward race from kiloton to megaton bombs, with a simultaneous feverish quantitative build-up of nuclear arsenals.

In the process, the nuclear powers acquired a potential for massive destruction unparalleled in history. The very order of magnitude has radically changed. As a measure of comparison, we may recall that all the bombs dropped by the United States in World War II on Germany and Japan had a cumulative explosive power of two megatons of TNT, while today one larger nuclear warhead in the arsenals of the United States and the Soviet Union may surpass this figure a 10—15 times. Taken together, the nuclear warheads now in the hands of the great powers have an explosive power exceeding a million times the yield of the Hiroshima bomb, enough to wipe out humanity many times over.¹

The dry figures defy imagination. Their meaning in terms of destructive potentialities may even evade the grasp of most shrewd strategists. Lacking trial and error, they can rely on paper studies and simplistic abstractions only, which in themselves are too macabre to contemplate. Just recently, the head of the US Arms Control and Disarmament Agency, Fred C. Iklé, pointed to the fact that our knowledge of the effects of nuclear weapons is still very low and depends to a large extent on chance discoveries. The most recent example he cited, is the accidental discovery a year or two ago that nuclear explosions might bring about the destruction, or partial destruction, of the ozon layer in the stratosphere that helps to protect all living beings, from ultraviolet radiation.²

But the military establishment went on undisturbed. Parallel and following the development of the bomb, efforts were made to advance the technology of delivery vehicles. The great strategic breakthrough came with the introduction, at the time of the first Sputnik in 1957, of intercontinental ballistic missiles, the ICBM. In quick succession followed then the low-penetration bomber, the forward land-based missiles, the supersonic bomber, the heavy ICBM, and the high-speed reentry missiles.

¹ Cfr. Statement by Ambassador Alfonso Garcia Robles, Representative of Mexico, at the 655th meeting of the Geneva Conference of the Committee on Disarmament on 4 March 1975, Doc. CCD/P V. 655, p. 33.

From quantity to quality

All these developments accentuated the threat policy of massive destruction. But the tools acquired were still low in manoeuvrability and operational use. It was only in the past decade that development of nuclear arms was channelled from quantity to quality moving dramatically ahead in improved usability and efficiency. Nuclear warfare was made thinkable. With advanced weapons at hand, military strategists could develop fanciful scenarios of »limited« nuclear warfare, »flexible« options and »selected« targeting, »exchange« of nuclear blows and low-collateral damage. One of the names given to this kind of scenarios is counter-force strategy, meaning less than all-out nuclear warfare. In reality, it is naive to believe that nuclear war could be fought in such a way. By a simple logic of escalation it would have to lead to holocaust. No delusion can hide the fact that counterforce strategy means open-ended war planning.³ Yet the tools were made ready and provided in a diversified assortment of nuclear warheads and new generations of much improved missiles devised by military research and development.

As far as nuclear warheads are concerned, attention turned to the marriage of their explosive power with greater technological efficiency, and to development of bombs with smaller charges but highly advanced performance. In hard target destruction, a doubling of accuracy proved to compensate an eightfold reduction in yield. The race thus shifted to qualitative improvements: higher speed and greater range, more precise targeting and guidance, greater penetrability and manoeuvrability, better performance and reliability, and automation.

In this context, the strategic nuclear arsenal was supplemented by a large variety of tactical nuclear weapons, their size ranging from some Hiroshima bombs to sub-kilo levels. They differ from strategic nuclear weapons mainly in range. Though with a shorter range they are sometimes as powerful as strategic weapons. It is estimated that actually all the nuclear powers accumulated a stockpile of nuclear warheads, strategic and tactical, growing towards the 100,000 mark — much in excess to the number of targets the most exalted military planner could invent.⁴ The last in the series

² Fred C. Iklé: Remarks before the Council on Foreign Relations, Chicago, 5. September 1974, *ACDA Publication 74-5*, pp. 5-6.

³ Cfr. Report on counterforce by the Federation of American Scientists, *Public Interest Report*, Vol. 27, No. 2; and Frank Barnaby: »The Nuclear Deterrence Debate«, *World Armaments and Disarmament, SIPRI Yearbook 1974*, Stockholm 1974, pp. 55-71.

⁴ G.B. Kistiakowsky and H.F. York: »Strategic Arms Race Control Through Test Limitations«, paper presented at the 24th Pugwash Conference on Science and World Affairs, Baden, Austria, September 1974, p. 5.

of these weapons is the so-called miniature nuclear bomb or »mini-nuke« combining relatively low explosive power with extreme precision of targeting and possible reduced radioactive fall-out. The mini-nuke is especially designed to blur the threshold between nuclear and conventional warfare so as to make it more feasible and palatable.

At the same time, the perfectioning of the bomb was synchronized with the advancement of missile technology. The most important breakthrough in this field were the on-board equipment of missiles with computers and the development of the MIRV — the multiple independently targeted reentry vessels, i. e. ballistic missiles with many warheads earmarked for different targets. The last word in this series is the MARV — manoeuvrable reentry vessels capable of changing direction in flight to evade possible defensive missiles.

In sum, from a stage of rough, uncertain and artless performance, nuclear warfare was lifted in the minds of military planners to highly sophisticated and operational levels. Nuclear weapons were streamlined and adapted for ready consumption. The push for modernization and innovation knows no pause.

II. *Disarmament negotiations*

The danger of nuclear armaments is generally recognized. Repeatedly, the United Nations, individual governments and different public opinion bodies have drawn attention to the threats involved. The number of resolutions, statements and calls demanding a halt to the nuclear race runs into thousands. There is also a proliferation of international forums dealing with disarmament. Negotiations have been going on for years. But results are meagre.

Nevertheless, public opinion, astonishingly, seems to exhibit a frightening complacency.

One of the reasons may lay in the fact that knowledge of the realities is very dim. A number of circumstances contributed to this situation. First of all, official information is scarce, and possibilities to gain insight are minute. An air of great secret veils the armaments process, while its advances are defended by a powerful establishment symbolized by the political-industrial-military-technological complex. But also the very disarmament negotiations may have added to pacify the people. A series of multilateral and bilateral, US-Soviet, arms control agreements concluded in recent years created the impression of progress in disarmament, and helped thus to build up a sense of false security. The same can be said of public perception of détente.

However, the fact of the matter is that disarmament negotiations had little impact on nuclear armament. While negotiations dragged

on, and the United Nations year by year adopted dramatic resolutions calling for arms reduction, armaments continued unabated, new generations of weapons were developed and deployed, and weapon expenditures rose. Since the end of World War II, arms spending have trebled in constant prices.⁵

Concerning nuclear weapons, disarmament negotiations focussed on banning nuclear weapons tests, nuclear non-proliferation, and the US-Soviet Strategic Arms Limitation Talks (SALT). In all these areas agreements were reached expressing restraints and committing the parties to curb the nuclear arms race. In actual fact, however, nuclear weapon development was not checked. The general feature of these accords was a reduction of the disarmament concept to partial measures, and relegating then these measures to marginal fields of little effect on weapon development. Comprehensive measures were replaced by limited action in non-essential areas.⁶ The real outcome was rather to legalize, rationalize and accelerate armaments in fields of high priority for the military, and central for weapon development. At the same time, continuing negotiations sustained the belief that arms control is gaining ground.

The test ban treaties

The first agreement dealing with nuclear arms was the 1963 Partial Test Ban Treaty which prohibits nuclear tests in the atmosphere, in outer space and under water. It thus responded to public anxieties about the harmful effects of nuclear fall-out. Yet it imposed no restrictions on the continuation of nuclear weapon tests in the underground. In fact, nuclear weapon testing after 1963, in comparison to the period 1945—1963, accelerated by a ratio of 60 per cent; the United States, the Soviet Union and Great Britain changing only the testing environment from the atmosphere to the underground, while the newcomers — France and China — who did not join the PTBT, continued nuclear tests in the atmosphere.⁷

The 1963 Treaty contains a provision committing the parties »to the speediest possible achievement of an agreement of general and complete disarmament . . . which would put an end to the armaments race and eliminate the incentive to the production and testing of all kinds of weapons, including nuclear weapons.«⁸ But this pledge was not implemented. Instead, the United States and the Soviet Union signed in July 1974 another partial measure agreement: the Treaty

⁵ SIPRI Yearbook 1969/1970 and SIPRI Yearbook 1974, op. cit., p. 266, resp. 206.

⁶ Cfr. Bernard T. Feld: »The Charade of Piecemeal Arms Limitation«, *The Bulletin of the Atomic Scientists*, Vol. XXXI, No. 1, January 1975, pp. 8-16.

⁷ See tables in SIPRI Yearbook 1974, op. cit., pp. 508—509.

⁸ Text *ibid.*, p. 502.

on the Limitation of Underground Nuclear Weapon Tests, to so-called Threshold Treaty, which prohibits underground nuclear weapon test with a yield exceeding 150 kilotons, beginning March 31, 1976.⁹ The appearance, again, is of restraint. In reality, nuclear weapon development is not halted. The treaty still permits weapon tests having an explosive power ten times greater than the Hiroshima bomb. Moreover, modern technology has no difficulties to relate such »model« tests to weapons with a larger yield.¹⁰ It has, in reality, been noted that in the years preceding the 1974 agreement both the United States and the Soviet Union went over to nuclear weapon testing which in a few instances only exceeded the 150 kiloton threshold.¹¹ In such circumstances, six months after the conclusion of the Threshold Treaty, the UN General Assembly again adopted a resolution which »condemns all nuclear weapon tests, in whatever environment they may be conducted« and »emphasizes once more the urgency of concluding a comprehensive test ban agreement.«¹²

The Treaty on the Non-Proliferation of Nuclear Weapons

Similar critique can be directed against the 1968 Treaty on the Non-Proliferation of Nuclear Weapons. It is a very fragile partial measure agreement suffering strongly from the lack of a comprehensive approach. Firstly, against widely raised demands during discussions preceding its conclusion, the Treaty does not provide for a comprehensive ban of nuclear weapon tests which should logically serve best the aim of non-proliferation. Instead, it contains only a loose promise »to pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament.« (Article VI.)¹³ Secondly, there is a basic asymmetry in the treaty in the balance of obligations and responsibilities between the nuclear powers and the non-nuclear weapon states. While the treaty prohibits the acquisition of nuclear arms by the non-nuclear weapon states, it does not impose any restrictions on the nuclear powers, parties to the treaty — the United States, the Soviet Union and Great Britain — which would limit the improvement or increase of their nuclear arsenals. It thus tends to sustain the actual unhealthy status

⁹ Text in Geneva Disarmament Conference Doc. CCD/431.

¹⁰ Cfr. Statement by Inga Thorsson, Representative of Sweden, at the 651st meeting of the Geneva Conference of the Committee on Disarmament on August 13, 1974, Doc. CCD/PV. 651, pp. 6—10.

¹¹ Cfr. graph in William Epstein: »The Proliferation of Nuclear Weapons«, *Scientific American*, Vol. 232, No. 4, April 1975, pp. 22—23.

¹² UN General Assembly resolution A/RES/3257 (XXIX) of 30 December 1974.

¹³ Text in *Nuclear Proliferation Problems*, Stockholm International Peace Research Institute, Stockholm 1974, pp. 307—312.

quo in nuclear armaments. Together with other provisions concerning the security of non-nuclear weapon states and the transfer of technology for peaceful use of nuclear energy, which are of a somewhat discriminatory nature, the treaty rather builds up pressures for nuclear proliferation.¹⁴

This has been proved by events. Two nuclear powers, France and China, did not accede to the treaty. Neither was the treaty signed by a number of states with near-nuclear capabilities, the so-called threshold states, such as Argentina, Brazil, India, Israel, Pakistan and South Africa. India, in fact, joined the nuclear club by exploding in May 1974 its own nuclear device. As no distinction can be made at the present stage of technology between explosions for peaceful purposes or for weapon development, India's claim of peaceful intent is here of minor importance. Furthermore, some other threshold nations signed but did not ratify the treaty. Included in this group are Western Germany and Japan, as well as states situated in conflict areas which could acquire nuclear capability, such as Egypt, Turkey, Libya or South Korea. However much one would like to wish nuclear weapon proliferation checked, it is difficult to see the NPT effectively fulfilling this task. Unless partial measures are replaced by comprehensive steps, prospects are rather dim.

SALT negotiations and agreements

Neither do the protracted US-Soviet SALT negotiations and the resulting agreements establish a barrier against nuclear weapon development and proliferation. The initial hopes were not realized. Pointing to this fact, the UN General Assembly, in a special resolution adopted after the November 1974 Vladivostok Ford-Brezhnev meeting, called on the United States and the Soviet Union »to broaden the scope and accelerate the pace of their strategic arms limitation talks«, stressing once again »the necessity and urgency of reaching agreement on important qualitative limitations and substantial reductions of their strategic nuclear weapon systems as a positive step towards nuclear disarmament.«¹⁵

The two SALT agreements, the 1972 Treaty on the Limitation of Anti-Ballistic Missile Systems, and the 1972 Interim Agreement on Certain Measures with Respect to the Limitation of Strategic Offensive Missiles, as well as the Vladivostok understanding, contain several basic flaws. There are, first of all, loopholes concerning the quantitative ceilings of offensive nuclear weapons. Apart from the fact that in each case the ceilings adopted were higher than the actual

¹⁴ Cfr. Frank Barnaby: *Preventing nuclear-weapon proliferation*, SIPRI, Stockholm, 1975.

¹⁵ UN General Assembly resolution A/RES/3261 (XXIX) of 9 December 1974.

deployment of respective arms, according to the principle of »upward parity«, quantitative growth is still permitted both in the throw weight of strategic missiles and in the number of warheads to be installed in the MIRVed launchers. Moreover, the accords leave to the parties complete freedom in multiplying tactical offensive nuclear weapons which surpass several times the number of strategic nuclear arms. As mentioned before, tactical nuclear weapons acquired in recent years vital importance in strategic designs.

Yet the greatest flaw in the SALT agreements is in the provisions dealing with qualitative characteristics. All the accords expressively permit »modernization and replacement« both in ABM systems or their components (Article VII of the ABM Treaty), and of strategic offensive ballistic missiles and launchers (Article IV of the Interim Agreement).¹⁶ The parties are then free to continue the qualitative race to the open-ended frontier of technological capabilities. Taking into consideration the almost infinite possibilities of mix new qualities — of range, speed, accuracy, guided targeting, penetrability, manoeuvrability and so on — the prospects are rather for an unabated race towards new ceilings of nuclear strength. There was deep-felt concern to avoid such prospects when the UN General Assembly called for »important qualitative limitations« in strategic weaponry.

No disarmament and little control

The review of the actual results of nuclear disarmament and arms control negotiations leads us to the conclusion that there is no disarmament and little control. Indeed, no one single nuclear warhead or missile were destroyed as a result of these negotiations. The very term »disarmament« seems misleading. Once understood and linked to the idea of »general and complete disarmament«, as still repeated in many accords and UN resolutions,¹⁷ the concept of disarmament has been depreciated and eroded to mean but partial measures of marginal value. To be sure, partial measures may sometimes be helpful. However, they become detrimental if instead of fostering progress they perpetuate the old.

In the process, the goal of disarmament was replaced by arms control, meaning not to halt but to slack and curb the arms race. The aim is not anymore reduction of armaments but keeping existing forces at a certain balance, whatever the level of armaments. A formidable task at a time when fast expanding military technology

¹⁶ Text in *SIPRI Yearbook 1973*, pp. 20—28.

¹⁷ At its 1974 XXIX session the UN General Assembly adopted seven resolutions under the general heading »General and Complete Disarmament« calling for a cessation of the nuclear arms race, nuclear disarmament and complete disarmament under strict and effective international control (Resolutions A/RES/3621 (XXIX), A—G).

tends persistingly to destabilize this balance. Additionally, the transformation of international relations from bipolar to a multipolar power constellation, and the emergence of new global competitive patterns, tend to thwart the superpowers' attempt at an exclusive joint steering of the arms race. Thus, the results of the arms control negotiations are less than encouraging. Despite the agreements concluded, nuclear weapons continue to be produced and deployed in appalling quantities and ever more advanced qualities.

III. *Armaments dynamics*

The insane course of nuclear armaments and the difficulties to bring them under control find strong stimulation and inducement in contemporary armaments dynamics and dominant strategic theories. A powerful set of structural factors — economic, political and technological — combine to fuel the race.

The simple and widespread explanation of the arms race is that of an external oriented competitive interaction between different actors on the international scene, build on national anxieties. According to this theory armaments are driven by rivalry constellations between two or more states, an arms build-up by one side prompting countermoves of the adversary. It relies on a model of action-reaction which actually leads to constant overreaction. The dynamics in this model is to a great extent impelled by secretiveness which breeds excess, redundancy and over-measure. It is further sustained by economic interests of those who profit or are fed by the armaments industry; by corporate interests of the bureaucracy; by the designs and needs of political elites; and by the military in pursuit of more and better arms. The unholy coalition of these forces, known in almost all nation states, is generally subsumed under the socio-political term of military-industrial-bureaucratic complex.¹⁸

Deterrence theory

The action-reaction rationale fits well the dominant to-day deterrence doctrine. Essentially, deterrence strategy relies on the threat of Mutual Assured Destruction (the MAD concept) in the event of war. Each conflicting party is striving for maximum strength so as to gain the ability of a defeating retaliatory second strike on the population and industrial centers of the enemy in case of a nuclear

¹⁸ Cfr. Adam Yarmolinsky: *The Military Establishment* (New York: Harper & Row, 1971); Seymour Melman: *Pentagon Capitalism* (New York: McGraw-Hill, 1971); and David Holloway: »Technology and Political Decision in Soviet Armaments Policy«, *Journal of Peace Research*, Vol. XI, 1974, No. 4, pp. 257—279.

first strike. With the attention fixed on the nuclear armaments of the adversary, the exact dimensions of which always in doubt, the deterrence posture incessantly generates creeping nuclear escalation.

There exists, of course, a basic contradiction between the protestations that deterrence serves the maintenance of peace, and its inherent dynamics that upholds armaments. Being the incarnation of a threat policy, deterrence by its very nature leads to constant war preparation. By perpetual contingency planning in terms of worst possible cases, it is most susceptible to over-reaction and overdesign. It just favours a race in armaments to the extreme.

The dangers of a deterrence posture go much beyond the very armament dynamics. They pointedly touch the sensitive area of crisis management. The basic assumption of the deterrence doctrine that political leaders on both sides of the conflict tend to behave in a rational way is more than dubious. It is only vaguely grounded in political psychology. Historical examples to the contrary are legion; not to speak of elements of stress in crisis situations and simple miscalculations. In fact, deterrence politics are open for hazardous ventures. Far from coherence and rationality, it is fraught with peril and ruin.

Apart from the outward orientation, deterrence policy has also an internal dimension. To sustain a threat posture versus an external enemy, a need arises for internal mobilization around such a policy. Thus, prolonged deterrence requires sufficiently intensive enemy images — crude in times of cold war, more refined in times of détente. Such images become then a regular feature of political life; a mixture of manipulation and self-fulfilling prophecy, promoted irrespective of outer realities.¹⁹ Again, secrecy in armaments and defence policy helps to feed anxieties and to keep the dynamics alive. In the process, the outward orientation of deterrence intertwines with the self-sustained internal dynamics, autistic and self-centered.

The technological imperative

By closer analysis, it turns out that the outward oriented action-reaction theory offers a rather inadequate explanation for armaments' dynamics. More and more we come across internal factors of crucial importance. High on the list seems to be the technological war machinery and its derivatives. With the mounting role of modernization and qualitative improvements of weapon systems, armaments become increasingly impelled by the technological imperative — an autonomous drive built up internally by military research and de-

¹⁹ Cfr. Dieter Senghaas: »Towards an Analysis of Threat Policy in International Relations«, *German Political Studies*, Vol. I, 1974, pp. 59—103.

velopment and the armaments establishment.²⁰ As a rule, military research and development is mainly preoccupied with its own technological advances. It is never satisfied with the status quo and each improvement is taken as a stepping-stone for further technological expansion. The atmosphere of secret does not allow to keep close track on enemy advancements. Military research and development is then largely doomed to react to its own achievements, in a continual pursuit of perfection. It is a process immanent in the development and deployment of ever newer weapon systems. The long cycle and long-lead of these schemes form a continuum generating the so-called »follow-on imperative« which propells armaments and tends to act independently of outside events.²¹

One has to recall that military research and development, East and West, employs today about 400,000 scientists and engineers with a budget of 20—25 billions of dollars annually which in itself weighs heavily on the armaments process.²² By its technological verve and push it has become a momentous driving force behind the arms race. Together with the bureaucratic, military and industrial establishments it forms the pivotal mainstay of armaments.

The bargaining process

In another dimension, the very arms control negotiations in recent years contributed to reinforce the armaments dynamics. To an extent that negotiations were a learning process revealing the posture of the adversary, his strategic thinking, and his deeply ingrained competitive attitudes, they served to identify and focus on the most sensitive areas of the arms race. They prompted increased expansion in these areas. And to the extent that weapon stocks become assets in the diplomatic game, negotiations added incentives to augment these assets. The very protractedness of the negotiations favoured such impulses and course of action.

One specific negotiations technique deserves special attention. It is the so-called method of »bargaining chips«, which tends strongly to induce the armaments dynamics. In order to sustain its negotiations power each party strives to build up elements of strength which then accumulate to become essential parts of the very armaments process. As experience has shown, bargaining chips are never bargained away but become part and parcel of new ceilings and »upward parity« packages. One of the best examples here is the

²⁰ Cfr. Dieter Senghaas: »Armaments Dynamics and Disarmament«, *Economic and Social Aspects of Disarmament*, W. von Bredow (ed.), BPP Publications 1975, pp. 105—134.

²¹ Cfr. Ron Huisken: »The Dynamics of World Military Expenditure«, *SIPRI Yearbook 1974*, pp. 123—129.

²² *Ibid.*, p. 141.

case of the MIRVed launchers. Initially, the MIRVs were developed by the United States to counter imagined Soviet advances in anti-ballistic missiles and to gain thus better negotiating positions in the SALT talks. But though anti-ballistic systems fell short of expectations, and their development was by common consent arrested, the MIRVs proved to be a major success. They soon became one of the key assets in strategic arsenals. It is only natural that successful weapon systems developed within the framework of bargaining chips are then permanently retained by the military. Highly knowledgeable arms controllers maintain that not a few of the new weapons developed in recent years would not have seen the light of day were it not for the SALT negotiations.²³

In a sense, a number of difficulties in the SALT negotiations were generated partly by the fact that technological innovation tended to outpace initial accords. Every improvement and technological advancement tended to destroy stability and balance established by earlier understandings. Negotiations and the technological race intertwined to invigorate the very armaments dynamics.

New vicious circles

Finally, a word should be added on inputs into armament dynamics by the particular component elements of the military-industrial-bureaucratic complex. The recent qualitative take-off in armaments opened new opportunities and gave added stimulus to their operation and doings. The military became encouraged by the highly improved instruments of war, and more so by the promise and vision of even more perfect weapons. The new tools revolutionized the art of warfare introducing such concepts as »automated battlefield« or matériel-intensive warfare replacing the traditional heavy reliance on manpower. Machine supplanting the human being.

These new horizons of warfare tend to develop strong pressures by the military for technologically ever more refined equipment. Military research and development as well as the armaments industry are urged and pushed ahead to fulfill the order. Parallely, the political establishment, reassured by modern military capabilities, is induced to exploit the new armaments build-up as a trump in diplomatic dealings, as a kind of a present-day »big stick«, to solve many of the intractable contemporary crisis problems. Thus, additional vicious circles of armaments dynamics are emerging, the transformation in technology and production providing new inspiration for the military-political elites, and these in turn pressing on the productive forces for greater efficiency and output.

²³ Cfr. G.W. Rathjens, A. Chayes, J.P. Ruina: *Nuclear Arms Control Agreements: Process and Impact*, Carnegie Endowment for International Peace, 1974.

Horizontal nuclear-weapon proliferation

A separate category in the gathering momentum of nuclear armaments is the horizontal proliferation of nuclear weapons to areas and states outside the borders of the present-day nuclear powers. Actual dissimination of nuclear technology and nuclear materials throughout the world, which is increasing at great rate, offers innumerable opportunities for diversion of nuclear energy from peaceful to military uses, and for non-nuclear states to acquire the bomb.

At the beginning of 1975, fifteen countries, the nuclear-weapon nations excluded, had already installed nuclear power reactors and another 29 had research reactors in operation.²⁴ Today, the world's nuclear power reactors produce about 25,000 kilograms of plutonium annually, to rise probably four times by 1980. Accumulated resources of plutonium in non-nuclear weapon states will by that time, theoretically, suffice to produce 12,000 nuclear weapons of the Hiroshima bomb size.²⁵

The dynamics of horizontal nuclear-weapon proliferation is crossing in many directions. There is, first of all, the competition between the two superpowers and the contestant powers such as China, France, or Great Britain. Linked to this competition is global economic and political rivalry which in recent years, especially in the wake of the energy crisis, has led to a redundant rush in the export of nuclear technology and reactors to many parts of the world, including areas of latent conflict. Though the declared nature of these deals is said to be peaceful use of nuclear energy, the military implications are obvious.

Second to the doings of the nuclear powers, the dynamics of horizontal nuclear weapon proliferation covers the aspirations of a number of threshold states. The fact of the matter is that though only one of them, India, dared to explode its own nuclear device, all of them — a dozen in number in Europe, Asia, Africa and Latin America — have the capabilities to produce nuclear weapons. The formal adhesion to the nuclear club might be a matter of convenient circumstances. It may also come suddenly in time of crisis. Proliferation in this group of states contains dangerous connotations of regional conflict. One may point to pairs of states in hostile relationship which actually fought hot wars in recent decades: India and China, India and Pakistan, Israel and the Arab states, or some Latin American nations. Driven by power competition, intense nationalism, status ambitions or security anxieties, the threshold states are actively engaged in enlarging their nuclear know-how and its applications to weapon development.

²⁴ Frank Barnaby: *Preventing nuclear-weapon proliferation*, op. cit., pp. 13—19.

²⁵ *Ibid.*, p. 17.

One may take a step further and reflect on additional danger spots for nuclear-weapon proliferation. Such spots potentially exist in disputed areas with unsettled territorial and political claims. An acute example is the case of Southern African fighting a rear-battle against forces of decolonization. South Africa has not signed the Treaty on the Non-Proliferation of Nuclear Weapons, is rich in uranium, and is moving fast to the establishment of a nuclear industry. It has certainly the technical expertise to produce nuclear weapons. Potential danger spots for nuclear weapon proliferation could also emerge on the borders of states divided as a result of World War II, such as Germany and Korea. Western Germany has not ratified the NPT, has 33 nuclear research reactors and ten power reactors. The German Democratic Republic has one research reactor and two power reactors. Also South Korea has one research reactor and plans to install two power reactors before 1980. Though there is a superpower sanction for the existing status quo in both areas, revisionist tendencies might induce local development of nuclear-weapon capabilities.

In longer perspective the threat of nuclear-weapon proliferation may expand to encompass many countries of the Third World. The drift in this direction could be fed by the conflict-loaded relations between developed and developing nations focussing on redistribution of wealth, historical grievances and asymmetries in many economic and political fields. Nuclear-weapon proliferation to these countries must not come in the form of an arms race, which could only be a lost case, but simply as an attempt to gain a leverage of threat in the protracted struggle. Similar peril, perhaps even more acute, may arise from actions of non-governmental bodies in search of strength.²⁶ It is now generally admitted that there is little secrecy about nuclear weapon technology, and any small disaffected group, if it gets hold of the materials, should be able to produce a crude fission weapon.²⁷

In sum, as long as nuclear-weapon development by the nuclear powers is not halted and genuine steps are taken to fully outlaw and destroy these weapons, so as to make their very existence a crime against humanity, the dynamics of horizontal nuclear proliferation would tend to persist and increase.

IV. Dilemmas, options, exigencies

A thorough review of the facts and an analysis of trends in nuclear armaments cannot but cause alarm. There is no exaggeration

²⁶ Cfr. M. Willrich, »Non-governmental nuclear weapon proliferation«, *Nuclear Proliferation Problems*, op. cit., pp. 168—198.

²⁷ Cfr. D. Krieger: »Nuclear power: a Trojan horse for terrorists«, *ibid.*, pp. 187—198.

in the statement that human survival is at stake. While the world is literally living on a nuclear powder keg, further nuclear armaments greatly outpace all efforts to bring them under control. The talk is about security, while in real fact the world is becoming insecure as never before. Considering the dynamics of armaments, the prospects are for spiralling development, deployment and proliferation of ever more perfect, ready to use nuclear weapons.

Our predicament can perhaps best be illustrated by the situation in Europe. Apart from strategical nuclear weapons, and not counting the nuclear arsenals of Great Britain and France, the United States and the Soviet Union have stored and deployed in central Europe 10—15,000 tactical nuclear weapons. Estimates differ; but they converge to a figure of 7—10,000 American and 3,500—5,000 Soviet warheads.²⁸ Their cumulative explosive power is within 50,000—75,000 Hiroshima bombs.²⁹ Yet the most horrifying aspect of this build-up is the fact that it grew in a wanton erratic manner, as a spin-off of technological advancements and cold war agonies. And though no rationale strategic doctrine for the use of these weapons could be devised, nothing was done even to reduce their number. Moreover, war games are conducted to find out possible effects of their use. And the conclusions are fearful: according to a report on such games quoted by former US Assistant Secretary of Defense Alain Enthoven, in testimony before the Senate Foreign Relations Committee: »Even under the most favourable assumptions about restraint and limitations in yields and targets, between 2 and 20 million Europeans would be killed in a limited tactical nuclear war . . . and a high risk of 100 million dead if the war escalated to attacks on cities.«³⁰

With deterrence as the guiding doctrine, the possible prospects are even worse. Former US Deputy Assistance Secretary of Defense, Morton Halperin put it this way: »The NATO doctrine is that we will fight with conventional forces until we are losing, then we fight with tactical nuclear weapons until we are losing, and then we blow up the world.«³¹

Détente with armaments

We might feel reassured by certain symptoms of détente. But détente has never been a conflict-free onward and upward process leading to an ever improved international atmosphere. It has known

²⁸ Cfr. Jorma K. Miettinen: »Schlesinger's New Strategy and Its Implications for Europe«, *Bulletin of Peace Proposals*, Vol. 5, 1974, p. 310; and *The Defense Monitor*, Washington, Vol. IV, No. 2, February 1975, pp. 1—3.

²⁹ *Ibid.*, p. 2.

³⁰ *Ibid.*, p. 3.

³¹ *Ibid.*

and still knows its ups and downs. In recent years we have lived through many cases of international crisis, and only less than two years ago we experienced a worldwide nuclear alert. There certainly are elements of weakness in the structure of détente criss-crossing in many directions: within the nuclear powers, between the developed and developing nations, between the rich and the poor, between the big and the small. But most confusing and disquieting is the reality of détente with armaments, both processes steered by the same international actors.

There is, no doubt, contradiction in this state of affairs. Should détente prevail, armaments must be curbed. No verbal commitment is enough. Deeds would have to follow. Concerning nuclear weapons, a series of measures are overdue: a comprehensive test ban treaty, a solemn engagement by the nuclear powers on a no-first-use of nuclear arms followed then by a general outlawing of the use of these arms in any circumstances; and finally, complete prohibition of nuclear weapons and destruction of all nuclear stocks.

In present-day political circumstances, the above ultimate desiderata may sound utopian. But in absence of dramatic change our hopes for a betterment of human conditions are on weak grounds indeed. We are living in momentous times. For the first time in history mankind, impelled by laws of global interdependence, is confronted by a must of active human internationalism. Critical global issues call for a solution. But none of these issues — of poverty, hunger, resources or pollution — can possibly be solved without at the same time seriously addressing ourselves to the problem of disarmament, without a vision of a disarmed world. It is imperative to bar prospects of war and holocaust, and it is vital to channel the immense human and material resources wasted on armaments for the satisfaction of human needs. This is the challenge before us. Yet time is running short. Should nuclear catastrophe be checked, there has before long to be a definite and visible retreat from the brink.