By Joshua Lederberg

Dr. Lederberg is a Nobel Prize-winning professor of genetics at Stanford University who is also a student of the arms race and efforts to achieve arms control.

The STRATEGIC arms limitation talks (SALT), which will resume next month in Helsinki, have been labeled the key to world survival through the next decade. Even if we frame the arms race as a byproduct of international politics rather than as a living, demonic being with independent existence, no one doubts the value of a critical search for practical limitations on the arms spiral.

Arms investment is shaped by dynamic interplay of domestic and international forces, actions and reactions, as much as by negotiated agreements. More than any other process, nevertheless, these explicit agreements require us to examine the assumptions that underlie our strategies of defense and of conciliation.

In my own view the most important function of the arms limitation conferences is their educational value for the participants, so that the many internal policy-making forces within each country may better understand the full depth of their national interests, and how these may be pursued in the light of the perceptions of the other nations. It would then be a mistake, as Fred Kline stressed for other reasons in "How Nations Negotiate," to judge the value of diplomatic negotiations solely in terms of the agreements formally concluded.

Economic Factors

Forth the eyes of the poor countries, our commitment to the arms race has drained the very resources that might finance international development. Their political pressure (like an implicit threat that India might join the nuclear club) is certain among the main forces that have dragged the United States and the U.S.S.R. to the conference tables in Vienna, Helsinki and Helsinki.

Whether the pattern of arms limitation now under negotiation within the SALT framework will result in much savings from arms budgets is problematic. The benefits may be a long-range consequence of the political stability that is the central aim of strategic policy. In the short run, there is more likelihood to be only a shifting of expenditures to the programs left out of the agreements.

The obvious, and in many ways desirable, contender here is the naval option. Despite its expense as a launch platform, the submarine has long been advocated as the way to separate the retaliatory force from vulnerable entities, and to provide another resource for assured destruction of an attacker.

Missile-launching surface ships, despite their vulnerability, may also be undeservedly neglected as inexpensive decoys and early-warning lures to dilute an enemy's first-strike capability. The value of cheap, vulnerable platforms must, however, be carefully calibrated in order not to be confused with a false hope useful only for a first strike. There will be no lack of alternative proposals, some quite plausible, to buy more reliability and to plug potential gaps in systems dedicated to finite security.

Another stated argument for arms control is that the very accumulation of the stockpile, with its vast potential for overkill, makes it more likely that nuclear war will break out. There is a core of rationality to this argument. The technology of nuclear weapons is likely to leak and proliferate in some proportion to the total effort devoted to them. The nonproliferation treaty would have been unnecessary if every nonnuclear country had first had to finance a Manhattan project to learn to make a bomb. Furthermore, the chance of an unattended psychotic or accidental firing with its potentially catastrophic consequences, is larger the more weapons abound, other things being equal.

As to "overkill," the metaphor makes sense for a first-strike capability — a small percentage of the stockpile of either superpower could wipe out civilization — but a creditable deterrent must still be perceived as inflicting a pre-emptive attack. Overkill potential is exactly what stabilizes the system to make unlikely the actual use in anger of a nuclear weapon.

From this point of view, it is pointless to discuss nuclear parity or sufficiency or superiority in terms of numbers of missiles, which is the fashionable game. The accuracy of intelligence about the location of missile launch sites, the precision of guidance, the shrewdness of target selection, the security of command and control, and above all how well these are perceived by an enemy and by ourselves-these now become far more crucial to deterrence than an advertisement of crude numbers of missiles or of warheads. The essential function of strategic arms is to ensure that they will never be used by either side, and that any threat of their use works to stabilize rather than to intensify the relations of competing nations.

Will Stalemate Last?

The ARM'S RACE having progressed to an effective stalemate, which has worked better than anyone could have hoped 25 years ago, its main hazards today come from its side effects on both international and national policies. The most serious of these is an unrelenting anxiety and suspicion about possible technical breakthroughs that might break the stalemate.

At any level, this leads to the mutual reinforcement of distrust about each side's intentions and plans. At another it provokes the constant search for the technology to do it first here. The main argument openly leveled by most academic physicists against the ABM is that it simply will not do any of the several jobs for which it is purportedly designed. The real force of their anxiety is that a long-range program of ABM research might eventually develop methods that more credibly offer a prospect of antimissile defense.

Needless to say, it would be comforting to devise a world in which defense had a real margin over attack, but how do we get there except through closely monitored mutual agreements? In the process, the existing balance will be broken, and we will face the most serious risks of either side's feeling compelled to undertake a pre-emptive attack. At the very least both sides would strive to redouble their offensive weaponry in order to sustain the credibility of their retaliatory potentials.

Effective defense against missiles evidently remains quite remote, but it might be technically achieved at the far end of an extensive program of trial and development, of which Safe - guard is the first step. This is a technological "Race to Oblivion," the history of which has been authoritatively documented in Dr. Herbert York's recent book of that title.

Dr. York recounts how the arms race mentality was exploited with great skill and mendacity in the 1980s to fund redundant and useless weapons systems, and to ensure that each of the services in an imperfection unified defense establishment would be placated.
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from vulnerable cities.

He believes, as I do, that the security of the country depends only in part on technical innovation, and that we must address our greater efforts to stabilizing the security of the world if we are to have any for ourselves.

But we cannot overlook the need for technological creativity, which will rapidly disappear if we do not repair the sources of the cynicism of our youth about the legitimacy of our national goals. By building so heavily on technological bases or security, while neglecting the causes of internal dissatisfaction, we have impaired our military security far more than any missile deficit would imply.

Sputnik Overrated

Mutual misperceptions of strategic posture undoubtedly fueled the gravest international confrontation to date, the Cuban missile crisis in 1962. Dr. York recalls how we separated our military capability from the capability of assured destruction by allowing the major cities to be mined by the other side. The idea has been revived from time to time, but like R.C. Crypto-Hammer's suggestion that we multiply nuclear weapons, his jitters are your problem, too.

An Overdrawn Parable

In 1961, THE LATE Leo Szilard wrote a fictional parable, "The Mined Cities," wherein the superpowers had exchanged the capability of assured destruction by allowing the major cities to be mined by the other side. The idea has been revived from time to time, but like R.C. Crypto-Hammer's suggestion that we multiply nuclear weapons, his jitters are your problem, too.

The problem of surprise attack can be formulated in military, qualitative terms than any other aspect of defense strategy. There are still many uncertainties, for example the operational reliability of important weapons programs, and the level of nuclear retaliation that would be so "unacceptable" to a potential attacker as to deter him. Nevertheless, the analyst can make a fairly simple model of the array of forces, and ignore the complexities of mass psychology and political decision-making to the point of concluding that the submarine. It is absolutely incoherent that antisubmarine detection programs should be based on the scientific predictability of any political confrontation.

The simplicity of the problem to the rational analyst, and its appeal to the paranoia of the antirational, have captured our attention and resources out of proportion to the role of surprise attack in world conflict. By overdesigning our solutions to this problem, we leave ourselves over prepared to cope with the actual difficulties of today's world.

What to Do?

All sides are approaching the conclusion that mutual defense against surprise attack needlessly consumes an inordinate share of our resources. We seek a new pattern of reciprocal arms disposal whose very momentum would be the best assurance that it was not merely a gamble for strategic advantage. This would be hard to construct, merely against the fears, angers and entrenched interests of important elements within both superpowers.

A simple moratorium on the employment of strategic weapons has been suggested, but has been entangled in contentious differences over whether it should embrace aircraft, tactical missiles, and so on.

From a technical standpoint, the most amenable place for controls is testing; a comprehensive freeze on all missile tests would be most easily verified, and would provide the utmost assurance against the perpetuation of a costly technology. However, none of these require precise re-entry after a brief, high velocity warhead. Furthermore, nothing would be lost in requiring a definite pattern of international participation in space missions to ensure that these were a net benefit to the whole earth from which they have embarked.