

SCORPIONS IN A BOTTLE

Since last summer the Carnegie Program at Caltech has been considering the perils of nuclear parity and the prospects for arms control. This is the way things stand.

by Cushing Strout

In 1945, when the United States dropped two atomic bombs on Japanese cities, there was a widespread realization that a new and menacing era had begun. Those who took dark views turned out to be right. Fifteen years later the thermonuclear arms race has provoked many to wonder, as gallows humor has it, whether posterity *is* around the corner.

A low-range megaton bomb has the explosive power of all the conventional bombs dropped on Germany and Japan in World War II. The age of missiles has made it clear that, in a total war, civilian populations would be as directly involved as the old-fashioned soldier in his trench. Bristling with weapons of an unprecedented capacity for devastation, the super-powers stand in hostile, suspicious rivalry. Other countries work to develop their own atomic and nuclear capabilities, and the diffusion of these awesome instruments inevitably increases the danger of accidental war, or a conflict between the major powers produced by the catalyst of a calculating third party.

The arms race itself has become a source of dangerous insecurity in a divided world. Its continuance also stimulates fears that the democratic welfare state will become a "garrison state," with defense spending monopolizing the national budget and the military having a disproportionate influence on policy.

Recognition of the hazards of this new world has excited growing interest in the problems of arms control. Since last summer the Carnegie Program at Caltech, organized by David C. Elliot, professor of history, has supported a steady influx of visiting experts from America and abroad on defense, disarmament, and diplomatic questions. These lectures have been open to faculty, students, and the public. Members of both scientific and humanities faculties have also met with the speakers in weekly seminars to explore further this treacherous terrain of policy, probability, and possibility.

With a large part of California's industry devoted

to defense work, and the nearby Rand Corporation specializing in defense strategy, the Caltech seminars have been mainly concerned with the prospects for controlling the arms race, in the hope of keeping the dragon in his cave, blunting his claws, or moderating his fierceness. No one claims to have tamed the beast, but a lot has been learned about the difficulties of keeping him at bay.

The complexity of the problem stems from the linkage of diplomatic, military, and disarmament strategies, which must harmonize with one another. Yet each is itself a tangle of tight knots, and there is no clear set of instructions for unravelling them, or weaving them together in a solid rope that we can be sure will bear our weight across the canyon of the 1960's. It is clear, however, that in the nuclear age there is a law of diminishing returns to the process of seeking security by merely amassing armaments to deter a potential aggressor.

A strategy of deterrence based on nuclear power is not guaranteed to work; it *may* fail. An aggressor convinced of his capacity to knock out an enemy's weakly-protected retaliatory power might be tempted to launch a surprise attack. Or he might fear an impending attack and seek to strike first. Diplomatic misunderstanding, false alarms in the warning system, or irresponsibility in the chain of command might trigger off an accidental war. A third party might deliberately provoke a conflict between the major powers. An indecisive limited war, fought with conventional forces, might turn into a nuclear struggle. None of these possibilities can be ruled out.

A rational policy cannot be based on complacent assumptions about possible enemy strategies, but in preparing for the worst possibilities there is a danger of losing sight of the probabilities. Most experts do not envisage a bolt from the blue. Nuclear war is more likely to occur because of fear (whether justified or not) of an opponent's impending attack or



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because of accident. These probabilities are what lend urgency to the need for arms control.

Experts agree that these hazards can be reduced by scrapping the all-or-nothing approach implied in John Foster Dulles's policy of "massive retaliation," which put almost sole reliance on a nuclear response (target unspecified) to any local aggression. This strategy implied that the deliberately limited character of the Korean War was a mistake, and it threatened the possibility of an American nuclear strike on Moscow, for example, as a response to Soviet aggression anywhere in the world. It narrowed the choice to total war or back-down, thus gravely crippling flexibility. It also made no sense in a time of nuclear parity, when the use of nuclear weapons would provoke a nuclear reply. A rational use of force requires a strategy of graduated deterrence that allows different levels of force to be met by appropriately limited replies.

The concept of graduated deterrence raises the vexing question of limited nuclear wars. Most experts believe that, in vital areas like Western Europe, the possibility of keeping any nuclear conflict limited is chimerical. In the last administration there was much emphasis on so-called tactical nuclear weapons as a means of "modernizing" conventional forces. This approach is defensible as part of a search for a full spectrum of deterrence, rather than for the illusory cheap security that made the Dulles doctrine so attractive to budget-balancers.

The argument for having nuclear weapons of various yields for tactical use against enemy forces is based on the need to deter or meet limited aggression in remote areas, where the risks of enlarging the scope of conflict can be minimized. But tactical nuclear forces are *not* a panacea to justify an inadequate conventional capability. Their dangers are obvious in reference to the densely populated industrial centers of Europe. Attacks there on military supply depots, railroad centers, and harbors might be called "tactical"

by the generals, but nobody else — particularly the victims in nearby cities — would agree.

It would seem wise to keep nuclear weapons that are intended for tactical use sharply separated from conventional forces, and held in reserve to prevent any aggressor from being tempted to use them. Once non-conventional weapons become involved in a local conflict, it may become, in some situations, all too easy — especially under military and popular pressures for victory — to "escalate" into full-scale nuclear war.

Weapons analysts have pointed out that nuclear striking forces which are primarily effective only for an offensive blow are both vulnerable and provocative. (Air force bombers on the ground are a good example.) Visiting British strategists were especially critical of the decision in 1957 to plant Thor missiles (IRBM's) on American bases in Britain and of General Norstad's proposal of last October to put IRBM's under NATO control. These weapons — which have a range of 1500 miles and are unprotected (except by dispersion and number) from enemy retaliation — may look very provocative to the Russians in their line of fire, as if the West were planning to shoot them first.

The vulnerability and provocation of relatively unprotected nuclear striking forces (defects which have marked the American defense system until recently) will be much changed by the current development of solid-fuel, long-range missiles in submarines, concrete silos, or moving railroad cars. By providing a much more protected retaliatory power than the Strategic Air Command or other missiles offer, these new devices, because of their range, concealment, or mobility, tend to reduce the danger of surprise attack and the need for quick response in case of an accidental strike. They also lack the offensive look of relatively unprotected weapons which are primarily useful only for a first strike. But the pace of uncontrolled technological change will undoubtedly upset any "balance of terror" between rival Polaris systems, which are

immune to a knockout blow by a first strike.

At this point a spectrum of solutions to the problems of arms control begins to appear. Some put their confidence in a balance of power between relatively invulnerable retaliatory weapons, with the major powers tacitly recognizing the need for unwritten restraints on provocative or belligerent actions. Others are hopeful that a realistic bargain can be struck on a fairly comprehensive multilateral disarmament treaty without jeopardizing national security. Still others are convinced that unilateral tension-reducing actions (not affecting the nuclear deterrent itself) must be taken by the United States to create an atmosphere free of the accusatory self-righteousness of "cold-war" postures (as illustrated by the recriminations over the U-2 spy-plane episode) before realistic agreements can be secured. Such steps (beginning, for example, with an offer to share medical information about space flights) would be planned to expect eventual reciprocating actions by the Russians.

These different approaches need not be inconsistent nor exclusive, but they tend to make a difference in detail. What, for example, should be done about anti-missile missiles and fallout shelters? If such a missile could be technically developed, would it improve our defense position, or tip the scales by stimulating the enemy to increase his missile force — or even to attack before he lost the chance to win? Similarly, would a public shelter program condition people to accept nuclear conflict and appear threatening, as if preparations were being made to back up a first-strike that would provoke an expected nuclear reply? Or is it needed to protect our population in case deterrence fails?

These are some of the ambiguities of the problem. It may well be that the limited military value of the proposed Nike-Zeus anti-missile would not be worth its great expense, but that it would be reasonable to

have a modest shelter program, as opposed to a massive "crash" effort made in a belligerent spirit at a time of international high tension.

The coming of nuclear parity also tends to affect NATO strategy. The West has depended on American commitment to use nuclear weapons, if necessary, to deter an all-out attack on Western Europe. NATO's conventional forces (20 divisions) are needed to resist limited military probes of Allied resolution, or to control local uprisings that might flare into wider conflict. Some argue now that it is no longer credible to Russians or Europeans that an American president would invite sure nuclear destruction of American cities by giving a nuclear response to a Soviet attack on Europe. This dilemma is underlined when both sides have protected retaliatory power, because populations, rather than nuclear forces, then become vulnerable. This situation puts a premium on conventional forces, which were dangerously downgraded by the "massive retaliation" strategy.

Again there is a range of solutions to this new problem for the alliance. Some suggest an increase in conventional forces to meet possible aggression in Europe; others propose a full-fledged NATO nuclear deterrent, under a command and control designed to give the alliance as a whole the opportunity to decide upon its use. Somehow the Europeans — whether they fear that America will be too hesitant or too precipitant — must be given a sense of having their finger on the trigger, rather than being compelled to depend upon a purely American decision about the level of force to be used.

Here the issue is joined between those who feel the primary problem is to make Western deterrence more credible to the Russians and those who think it needs only to be made more credible to the Europeans. If the American guarantee of support is still good, because the Soviets could not risk mounting a serious

Carnegie Lecturer Sir Solly Zuckerman (right), professor of anatomy at the University of Birmingham — with Harrison Brown, Caltech professor of geochemistry.





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attack without striking also at the major source of possible retaliation (the United States), then a vigorous but prudent American political leadership might do much by itself to allay European anxieties. Many analysts discount the probability in either case of major Soviet aggression in Europe. They argue that Khrushchev, having abandoned the Communist dogma of inevitable war, is confident that techniques of subversion and military or economic aid are sufficient to expand Soviet influence. Since 1945 the Red Army, however important as a threat in the background, has not been the spearhead of Soviet expansion.

If this diagnosis of Soviet policy is correct, the West stands a better chance of controlling the arms race by multilateral agreements on the test-ban and disarmament. These treaties do not depend on friendliness, but on the common recognition of the insecurity of the arms race. Before the U-2 episode much progress was made in narrowing the gap on inspection procedures for the test-ban. No one expects to find a foolproof system, but there is greater risk in the future diffusion of nuclear weapons if tests are not controlled.

A test-ban affecting weapons above the 20-kiloton range (the approximate size of the Hiroshima bomb) would, above all, provide a basis for estimating the good faith of the participants, and therefore of the chances for future inspected agreements on the bolder step of arms reduction itself. Unfortunately, it has

been hard to strike a bargain on the test-ban because of Russian resistance to violation of their secrecy by inspection procedures (which are themselves both complicated and expensive) in return for a small step in arms control from the point of view of disarmament.

The logical next step after achievement of a successful test-ban agreement would be a disarmament treaty. Since the Acheson-Lilienthal Report of 1946, proposing internationally controlled atomic disarmament, the issue has been exploited for propaganda purposes by both sides with few serious proposals. In 1955 the Soviet Union showed a new seriousness by accepting the reality of the problem of evasion and inspection. Experts point out that it is likewise necessary for the West to recognize the legitimacy of Russian refusal to settle on inspection procedures apart from actual disarmament proposals. Any violation of the Iron Curtain is a serious military disadvantage to the Soviets, and it can be compensated only by the prospect of a substantial reduction in arms. In this respect it might be easier to take a big step.

The current Russian insistence on the goal of total disarmament, however, conflicts with the Western tendency to put its confidence in deterrence for protection. It may yet be possible to strike a bargain involving some substantial measures of gradual, phased disarmament — especially if political tensions can be reduced. Here there is controversy over how far such steps should go.

The “stable-deterrent” theorists, who seek security in a balance of power between “second-strike” forces, would prefer to lean on some nuclear weapons, on the assumption that they provide more stability than a disarmed world in which a cheater might acquire a great nuclear advantage. A few of those who argue this way seize the nettle by a plea for a strategy for *winning* a nuclear war, if deterrence fails. Others, who see no meaning in such a “victory,” put their confidence in Soviet prudence, large-scale disarmament, and international police forces. Options in this area depend very largely on a reading of Soviet reactions, intentions, and policy.

American delegates at the Pugwash conferences with the Russians report that the Soviet representatives are not as sophisticated as the West about arms control problems, but they seem to be genuinely aware of the new dimension given to war by nuclear weapons and the growing dangers of nuclear diffusion and accident. The popular cliché, “You can’t trust the Russians,” ignores the common hazards that all nuclear powers face and the ability of the Soviets to recognize them. The Russians have only to apply the same kind of prudence the public expects them to use in recognizing the deterrent effect of the Western defense system.

The persistent whisper in the gloom at most of the seminar sessions has been: What about China? The

future of negotiations to prevent the spread of nuclear weapons and to restrain the arms race is not promising without Chinese participation, but the grim consensus is that there are no current signs that China is interested in reducing the tensions of the world, or even in accepting Khrushchev's version of "peaceful co-existence." It may be, however, that the current alarming aspirations for independent nuclear capabilities on the part of the French, the Israelis, and the Chinese may mature into a sad disillusionment with the enormous expense, diplomatic rigidity, and fearful tensions that "nuclear plenty" brings. An agreement between Russia and the West might put much pressure on the Chinese to join.

The longer the world waits to become serious about arms control the more difficult it becomes to achieve. Political conflicts and fears have produced the arms race, but it has a momentum and impact of its own which politicians and citizens cannot afford to ignore. The commitment of President Kennedy's administration to the problem reflects, on the national level, the same concern that generated the Carnegie Program on arms control at Caltech.

Nearly everyone who has participated in the series has felt that the West has badly lacked leadership, preparation, and clarity about arms control measures. In the past no clear direction has been given to the

problem, which has been lost sight of in the rivalry of the military services and the press of other business of the departments.

There is widespread agreement, among those with experience as scientific advisers, upon the need to focus responsibility for advice to the President in a special assistant, who meets regularly with the Secretaries of State and Defense, and for a Congressionally established agency to perform the expensive work of technical research and development. The responsibility for negotiation itself must, of course, be confined to the State Department.

The nuclear age has been described as "two scorpions in a bottle." We are all in the bottle. The pursuit of national security has led the United States to form alliances, promote foreign aid programs, and build nuclear weapons. It now demands a serious search for arms control. If this can be achieved, the struggle for competitive coexistence may then be removed from the nuclear plane, where all stand to lose, to areas where the West can work to show that history, contrary to Communist dogma, is on the side of "open societies." As armaments are reduced, it will then become necessary to develop institutions other than war for settling international disputes. The opportunity, hedged by the running out of time, awaits. Decision will be difficult, experiment perilous.

CARNEGIE PROGRAM: Science and Government

Lecturers, 1960-61

Herman Kahn, Rand Corporation —
On Thermonuclear War

Alan Sweezy, Caltech —
The Economic Effect of a Substantial Reduction in Arms Expenditure

Myron Rush, Rand Corporation —
Khrushchev's Strategic Views

Dan Elsberg, Rand Corporation —
Theory and Practice of Blackmail

Henry Rowen, Rand Corporation —
National Security and Arms Control

Andrew Marshall, Rand Corporation —
Modes of War Initiation

Amron Katz, Rand Corporation —
Inspection Systems

James Digby, Rand Corporation —
Active Defense and Deterrent

Albert Wohlstetter, Rand Corporation —
The Test Ban as a Test of Attitudes on Arms Control

Harrison Brown, Caltech —
Moscow Pugwash Conference

Gen. Maxwell Taylor, USA (ret.) —
A Blueprint for National Security

M. Jules Moch, France (UN) —
Why Disarmament is Necessary, and How to Police It

Gen. B. J. Schriever, USAF —
Air Force Space Program

Henry A Kissinger, Harvard University —

Do We Want Disarmament?

Warner Schilling, Columbia University —
The Decision to Make the H-Bomb

Sir Charles Snow —
The Scientist in Government

James R. Killian, MIT —
Science and Foreign Policy

Edward L. Katzenbach, Jr., Cambridge Research Center —
Command and Control Problems

C. E. Osgood, University of Illinois —
Psychological Aspects of Policy Formation

Jerome B. Wiesner, MIT —
The Development of a Stable Defense System

Thomas Schelling, Harvard University —
Arms Control and Military Strategy

John Strachey, MP (UK) —
British Attitudes to the Deterrent

John Hanessian, AUFS —
The Antarctic Treaty

Kenneth Boulding, University of Michigan —
Conflict Resolution

Denis Healey, MP (UK) —
NATO Strategy and Arms Control

Daniel Lerner, MIT —
European Defense Attitudes

Ithiel de Sola Pool, MIT —
Public Opinion and Policy

W. K. H. Panofsky, Stanford University —
The Test Ban

I. I. Rabi, Columbia University and Sir Solly Zuckerman, University of Birmingham —
Science and Public Policy

Arthur Larson, Duke University —
Arms Control Through World Law

Louis B. Sohn, Harvard University —
Zonal Inspection for Disarmament

Joseph E. Johnson, Carnegie Endowment for International Peace —
Reflections of a Peacemonger

A. Topchiev, USSR —
A Russian View of Pugwash

James J. Wadsworth —
Negotiating with the Russians

Richard Leghom, Itek Corporation —
Linus Pauling, Caltech —
Report on the Oslo Conference