Letters

Is Civil Defense Provocatory?

Both the opponents and the proponents of civil defense seem to trap themselves into arguing a false issue, and this was almost as true of the AAAS symposium at Berkeley (News and Comment, 7 Jan., p. 53) as of other debates on the subject. The operating assumption apparently is that an attacker's major and perhaps sole purpose in launching a nuclear strike would be to kill the maximum number of people in the victim country.

For died-in-the-wool opponents, the favorite route of escalation-of-argument depends, indeed, on the assumption of an implacable aggressor obsessed with the desire to kill people (Americans). To caricature it only slightly, the argument runs this way: if we have a "small" civil defense program, the attacker expands his arsenal a bit; a "large" civil defense effort provokes doubling or an order-of-magnitude increase in severity of attack; a "really big" program has the attacker hurling thousands of 100-megaton (or 1000-megaton) bombs (and cobalt at that); finally, "maximum hardening" has him building a Doomsday machine and wrecking the entire planet. No thought is given to whether any aggressor would care—or be able—to commit the requisite amount of his country's resources and production time to this one goal.

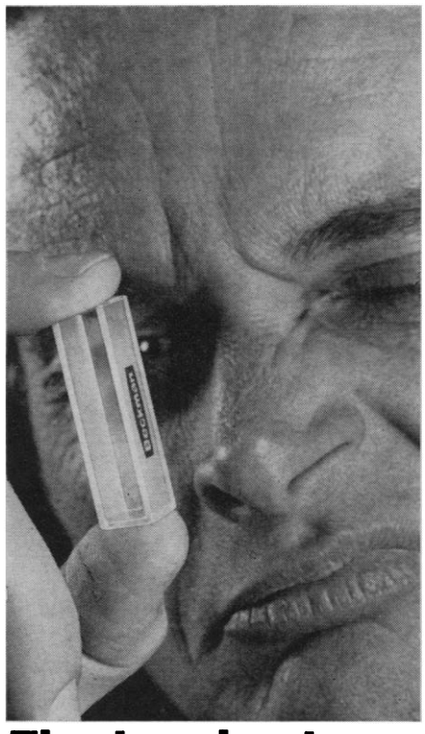
As a participant in the symposium reported, military men seem not to get excited about civil defense. In my experience, people who are capable of seeing any kind of military use for large-scale nuclear attacks (people on our side; I do not know anybody on any other side) generally do not give a damn about civil defense—ours or "theirs." Soviet planners, strategists, and targeting specialists probably do not care much about it either. In studies of possible (and computer-simulated) nuclear attacks, the data and curves that arouse the most interest—that targeters and strategists "like"—are those that show maximum industrial damage. For retaliatory purposes, the "exciting" curves are those that show greatest loss of industrial floor space by the Soviet Union. These are favored over other curves, from other possible targeting patterns, that show greater Soviet population losses. Presumably the Russians take a similar view.

Why should this be? Are strategists, targeters, and colonels inherently tender-hearted? They are human, of course. But their starting assumptions are different from the assumptions of most people who publicly debate the value of civil defense. However irrational a large-scale nuclear war might be, targeters assume that it would at least be initiated in some rational mode—for a military and political purpose. The attacker's first purpose would be to eliminate his adversary as a threat and as a world power. His primary intent, then, would be to strip his victim of military potency (especially nuclear-retaliatory capability). Next he would want to cripple or "destroy" his victim as an industrial, technological, and economic force. If he calculates he can achieve these things with a certain level and pattern of attack, he has little motivation to increase the attack just to kill civilians. Large numbers of surviving civilians, as many have suggested, are hostages and may be a factor in reducing or eliminating retaliatory moves. They also constitute an urgent problem for their own government. At any rate, they are militarily and politically harmless.

The idea of "overkill" is practically always misunderstood by opponents of civil defense, and often by its proponents, too. Nobody is ever interested in "overkilling" a target. The overkill point in calculations is where waste of ammunition begins. At that point, the targeting objective has certainly been achieved. Damage curves from studies of possible attacks—whether the studies are classified or unclassified—show that the significant destruction of both life and property is done with "the first few detonations" (the actual number, which fluctuates slightly from study to study, is always in the low hundreds). The curves exhibit a rather sharp knee not far beyond that point. More and more delivered warheads kill fewer and fewer people apiece, and damage less and less property. "Following the curve" any farther gets more and more expensive. Follow it off the chart, and you will be using one entire missile at a time to kill one person at a time.

It should not be difficult, with open-library research, to demonstrate that attack patterns that might kill, say, 20 to 30 percent of the Soviet population might destroy more than 90 percent of current Soviet industrial capability, or at least cripple it enough to make its repair and recovery irrelevant to whatever crisis triggered a nuclear exchange. Nor should it take much effort to show that while 50 to 90 percent of the American population might die in the same exchange, some 40 to 50 percent of our industrial plant and at least as much of our general infrastructure could survive. (I am recalling here old attack patterns in which assumed civil-defense levels for both sides varied between zero and some maximum.) The "asymmetry" exists in part because population and industry do not stand in the same geographical relationships in the United States and the Soviet Union.

Classified estimates are undoubtedly more precise than mine, but the preceding paragraph probably reflects current vulnerabilities fairly well. We may be deterred from attacking the Soviet Union only because we cannot accept the population losses even "light" retaliation would bring; the Russians are certainly deterred from attacking us because they cannot accept the industrial losses even "light" retaliation would cause. (So much, then, for the fear that Soviet decision-makers might be willing to "sacrifice" a major portion of their population. Chinese strategists might now see it all differently; Mao used to claim to; but when China has more industrial plant and infrastructure to lose, it will probably see



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it this way, too. And China will lose interest in killing foreigners as its romantic willingness to sacrifice Chinese lives diminishes.)

In a paper (unclassified but unpublished) on integral, quick-access, multi-use shelters in new buildings, Richard I. Condit, of Stanford Research Institute, once warned that the shelter portion should be the only truly hardened part of a building, and that nothing else in the city should be hardened; an attacker should be given no incentive for increasing the intensity of his attack. Condit hypothesizes that the attacker would tend to be economical and would be willing to allow people to survive if he could deprive them of their city (and the power and wealth it embodies). I think he correctly assumes that destruction of wealth and power rather than life would be the main conscious and unconscious motivation of the attacker.

Unless it can be proved that nuclear attacks would be launched only by implacable fanatics intent on wiping out entire populations (and intent on little or nothing else, ever) some level of civil defense high enough to make a real difference looks like a prudent investment. Even very high levels are not really provocative, since an American shelter cannot kill a single Russian or knock out a single factory, missile silo, railroad yard, or harbor.

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The Grant System

The system of individual project awards made on the basis of scientific merit after careful evaluation by panels of experts recruited from across the country has been a large factor in establishing the high quality of science in our larger centers and in the steadily rising standards in smaller, outlying institutions. The success of this system has been widely acknowledged (see the remarks of Monod in Report from Europe, *Science*, 19 Nov. 1965).

Don K. Price (21 Jan., p. 285) and D. S. Greenberg (*Harpers*, Jan. 1966) pinpoint this as the key issue in the current effort to substitute large institutional grants for individual project awards. The issue is put squarely by Price: "But as the government broadens the basis on which it gives support to universities and begins to make much broader grants for institutional or program support, the scientific ability of particular investigators becomes proportionally less important and more importance attaches to a vast range of subjects on which the specialized scientific knowledge of an advisory panel is much less decisive." He goes on, "It would be positively to the advantage of the universities, I believe, if their own members did not have so predominant an influence in making of grants to them, and if the government should rely a great deal more on a career government service of high quality." The practical development of this point would be the award of large bulk sums to individual institutions and the eventual elimination of direct support of talented individuals.

In my opinion the hazards and losses in assigning to institutions nearly total control of their research funds are much greater than those of the present system. We already have an example of the possibilities. The Sloan-Kettering Institute has been awarded a lump sum of $4.3 million dollars, 47 percent of its research budget, replacing individual support for 52 projects. This will, in the words of the New York *Times* (12 Jan.), "with very few restrictions enable the recipient institution to use the funds from the so-called 'single instrument' grant as it sees fit. For example, it could use money originally ear-marked for a slow moving program for the swift expansion of research on a 'breakthrough.' In effect, this method expresses support for an institution's total research program, a spokesman for the Public Health Service said in a telephone interview."

The basic problem seems to be a failure to recognize that nearly all important advances in knowledge come initially from individuals with good ideas and not from the planned exploitation of problems selected by career administrators. The very purpose of the scientific endeavor is lost in the concern for efficiency and quick returns and a politically satisfying distribution of funds. In general, scientists are working to obtain new knowledge of ultimate use to mankind. If this goal is important, then we should be giving our greatest support to the most competent and creative individuals. Who is better prepared to make the judgment of competence than other scientists? What criteria other than scientific merit should take precedence?