

Debate on the arms race

Victor Weisskopf's provocative article "A peril and a hope" (July, page 30), when taken in conjunction with the editorial on page 80, goes far to constitute a ringing endorsement for the Administration's arms-control policy, and certainly voices a strong appeal for reawakening public debate on nuclear arms in a manner analogous to the debate over the Vietnam War. Allow me to sketch the reasons why I feel uneasy with the thrust of the two pieces.

I will use the first person because of my conviction that this sort of thing is intensely personal. I am forced to reason subjectively about the future of mankind and nuclear weapons because the problem is non-quantitative. I can, of course, count forces on both sides, and even invoke the processes of linear programming to investigate the outcome of hypothetical nuclear exchanges. But I cannot quantify the risk or the consequences of nuclear war under the present, or any other set of conditions of nuclear preparedness. It is impossible for me to demonstrate that disarmament initiatives, including SALT and the atmospheric test ban, reduce the risk of war. Could it be that by tilting the relative strategic balance in favor of the USSR, SALT increased the risk of war, or that by denying us knowledge of nuclear-weapons effects the atmospheric test ban has done the same? Above all, it is impossible for me to quantify the value of preserving life and freedom as I know them in this country today, even in a relative sense as compared to the value I could attribute to life under a Communist regime. Thus, the more I attempt to apply my training to cast light on the problem, the more I am led to the recognition that any answers must be as much social as physical.

It may be that many physicists have puzzled through a pattern of thought similar to mine and reasoned that the shaping of US opinion alone was not the problem. This could help to account for the decreasing activity noted by Harold Davis at APS meetings over the last decade, and even explain in part the increased number of physicists in government from ACDA to DOD. Perhaps our interest is the acquisition of new data as to the relationship between physics and society, a hope of developing a method of



solving defense problems, which is similar in nature to the scientific method that has served us so well. At least some of us are motivated toward individual work on this problem in preference to continued collective debate, which seems to generate more heat than light.

At any rate, many of my colleagues agree with me that our training in physics and mathematics is of little use to us in answering social or political questions. I find more useful my own interpretation of history in the large, and the development of US/USSR relations over the past thirty years in the small. In contrast to Weisskopf's thinking, I have convinced myself that the source of the problem is beyond the control of US public opinion; that is, it lies in the intractable nature of Soviet leadership. Given that this is so, I hope that time will ameliorate the Soviet position, and am supported in this hope by the belief that ours is the better system, the better way of life, and that over time, being of mankind as ourselves, the people and the leaders of Russia will come to realize this. Until that time comes I will share your deep concern that Man's folly may lead to catastrophe. But I cannot share what I read as endorsement of the policy of the present administration, nor urge public support of unilateral

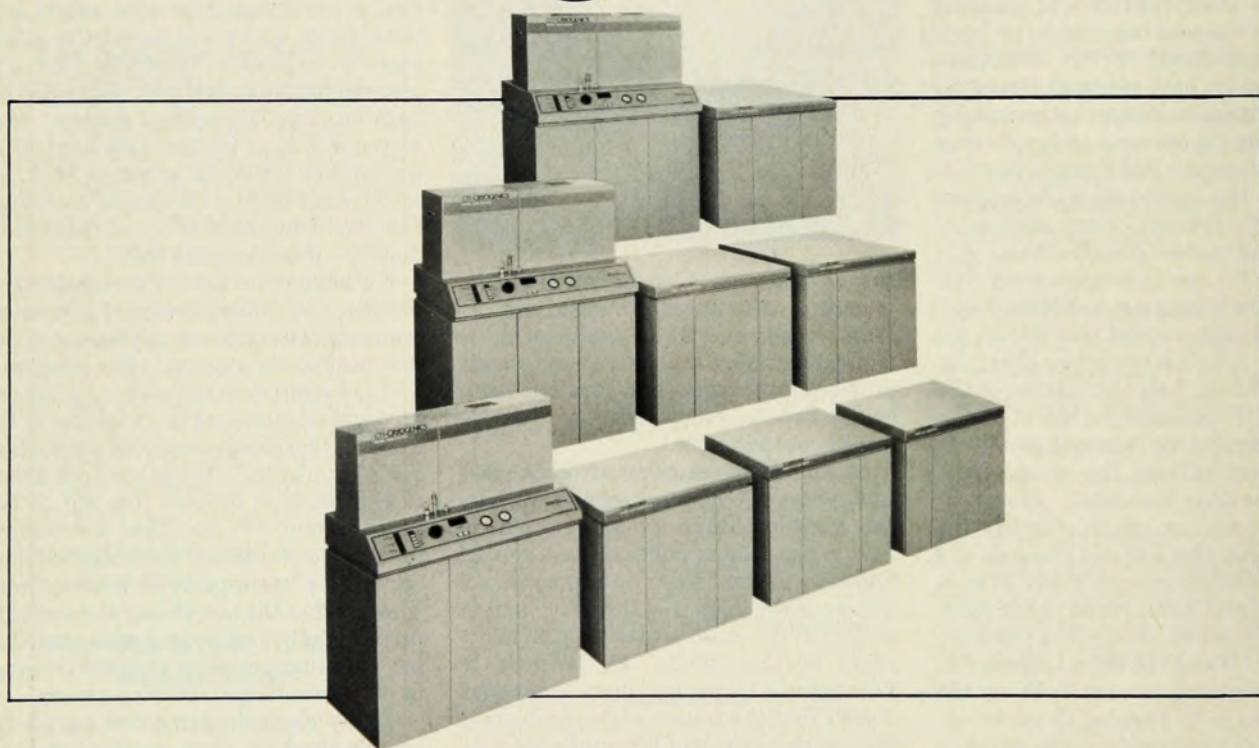
arms control actions without clear evidence of good faith on the part of the Soviets.

Finally, I have long viewed the word "absolute" with a certain amount of suspicion, in that it connotes absolution from the use of reason and the necessity to ponder over matters of import in human and physical affairs. It appears to me that Weisskopf's use of the term "absolute priority" implies a greater precision of knowledge than I believe possible. It implies the evaporation of uncertainties in things social as well as physical. This in turn implies a restriction or termination of our struggle for new insight into those fields where our knowledge is imperfect. In physics, uncertainty led us to complementarity and thus to greater insight into the old puzzle of duality. May we not still hope for the same kind of inspiration in the social affairs of Man, for an understanding of the puzzle Weisskopf sets us in his discussion of mankind's duality—greatness and folly?

We have little use for imperatives in physics, yet imperatives and absolutes, even exhortations are in the lexicon of our foremost social experts. We have long avoided references to "authority" in the physical sciences, yet in social life we listen as authorities detail for us what is and is not "thinkable." It was just such a time of confusion in physics that led to the development of the new mechanics, founded as it was on "unthinkable" and apparently unsupportable assumptions. The fact that the new theory was useful in predicting the outcome of new, as well as old, experiments led us to rapid progress in understanding nuclear processes.

Today a branch of that new knowledge has resulted in great national debate. Those who believe that the control of nuclear arms must be accomplished by negotiation are loath to see the US strategic inventory improved or made more capable in any way. Those who believe that the USSR is building a superior strategic force as an integral component of a correlation of forces meant to impose Soviet will on the United States are prone to advocate immediate corrective action. Must we believe that history will make judgment as to which is the course of greatness, and which the course of folly? Or can we hope that our descendants will

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view our actions as those of a people motivated by hope, but eventually guided by prudence, who avoided the comfort of the absolute in searching for a realistic solution?

GOUGH C. REINHARDT

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7/21/78

You are to be commended for urging "Priority for arms control" in the July editorial. Unfortunately, the naivete is astonishing and the logic of the editorial is incomprehensible.

Nearly 50% of all physical scientists and engineers are engaged in military research. This figure is hard to pin down but it is certainly approximately true in light of the fact that military R&D accounts for twelve billion dollars, versus three billion dollars for total energy research in the 1978 federal budget. These scientists are the ones whom you mention are involved on a professional basis and of whom you state "We can take comfort in the fact that these physicists are on hand within government circles. . ."

These physicists have not made the situation better, and there is no comfort in the fact that they are on hand in government circles. They do know how terrible the arms race is—both in its catastrophic possibilities and its waste of money, material and human resources—but they do nothing about it. They give lip service to the ideal of the "social responsibility of the scientist" while continuing to perfect every conceivable means of mass killing. They employ the fallacious argument "If we don't do it, someone else will," to perpetuate and to justify every conceivable folly in the arms race of which humankind is capable.

We physicists continue to make the same mistakes as the humanitarian giants Einstein and Szilard (and now Weisskopf) did. They didn't see that the bomb was a greater menace than Hitler—until the bomb was almost in hand. Today we have no Hitler as an excuse. The proximate and future danger is the same—the worsening arms race. When are we physicists going to learn that the more numbers of and the more sophisticated weapons we develop only increase the chances of nuclear war and decrease our security?

JOHN DOWLING

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8/1/78

In all honesty, Weisskopf's article should read as "A great peril with little hope." The subject of nuclear weapons and the prospect of nuclear war are closely inter-related problems. Since early history the building of weapons is directly related to their use in warfare. With few excep-

tions, each new and technologically deadlier weapon eventually finds use in the field of battle. Examples are numerous; they start with the crossbow, then the gun, then gunpowder, and finally the atomic bomb—all of which were deployed lethally after being made. Empirically, it appears that once Man makes a new weapon, he commits himself to use it. There exists also the general rule that the more available the weapon, the more recourse to it. It is rare for an army not to avail itself of the latest and most efficient weapons even to fight an inferiorly armed enemy. The brutal fact is that weapons are made and used, no matter what type they are. Nuclear weapons are no exceptions. Their being vastly deadlier does not deter us at all from making them, nor will it prevent us from using them. One may reasonably expect that a substantial amount of the nuclear stockpiles that nations have been amassing against one another will ultimately be used—that nuclear war is inevitable. With little doubt, we shall witness a massive nuclear war in the next few decades.

Will Man grow sensible fast enough to prevent a nuclear catastrophe? Except for a miracle, such a turn of events appears unlikely. It is practically impossible to expect human nature to change suddenly for the better in a few decades. Studies in human evolution show that evolutionary changes in Man occur at least on the order of tens of thousands of years. It is safe to assume that Man will behave in the same way that he has in the last five millennia of his history. In this period Man waged wars constantly. Entire civilizations, whole empires have perished in wars fought with more primitive weapons. In all likelihood, we shall follow suit except with modern nuclear weapons.

The answer then to the question "Is there a way out?" is that there is no way out of the peril of nuclear war. Clearly it is pointless to argue whether the war will be an "all out" or a limited nuclear exchange. Common sense dictates that in the event of a nuclear war we shall fight with the nuclear weapons at our disposal. This means that we shall use as many nuclear weapons as we need to win the war. And in view of the large nuclear arsenals of contending nations, there appears to be a high likelihood of using a significant fraction of our nuclear armory. That this be an "apotheosis of irrationality" should not come as a surprise. In this respect, Man has acted irrationally from ancient times down to the present by always using the most advanced technological weapons available to wage war.

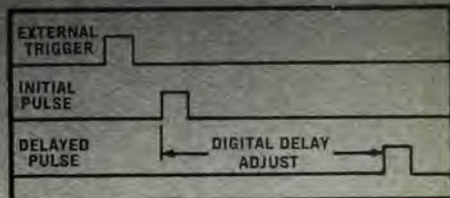
Is there no hope then? Although the picture looks bleak, there may still be hope. However, it may come by indirect and circuitous paths. One possibility is that the human remnants from the global devastation will perforce develop such an

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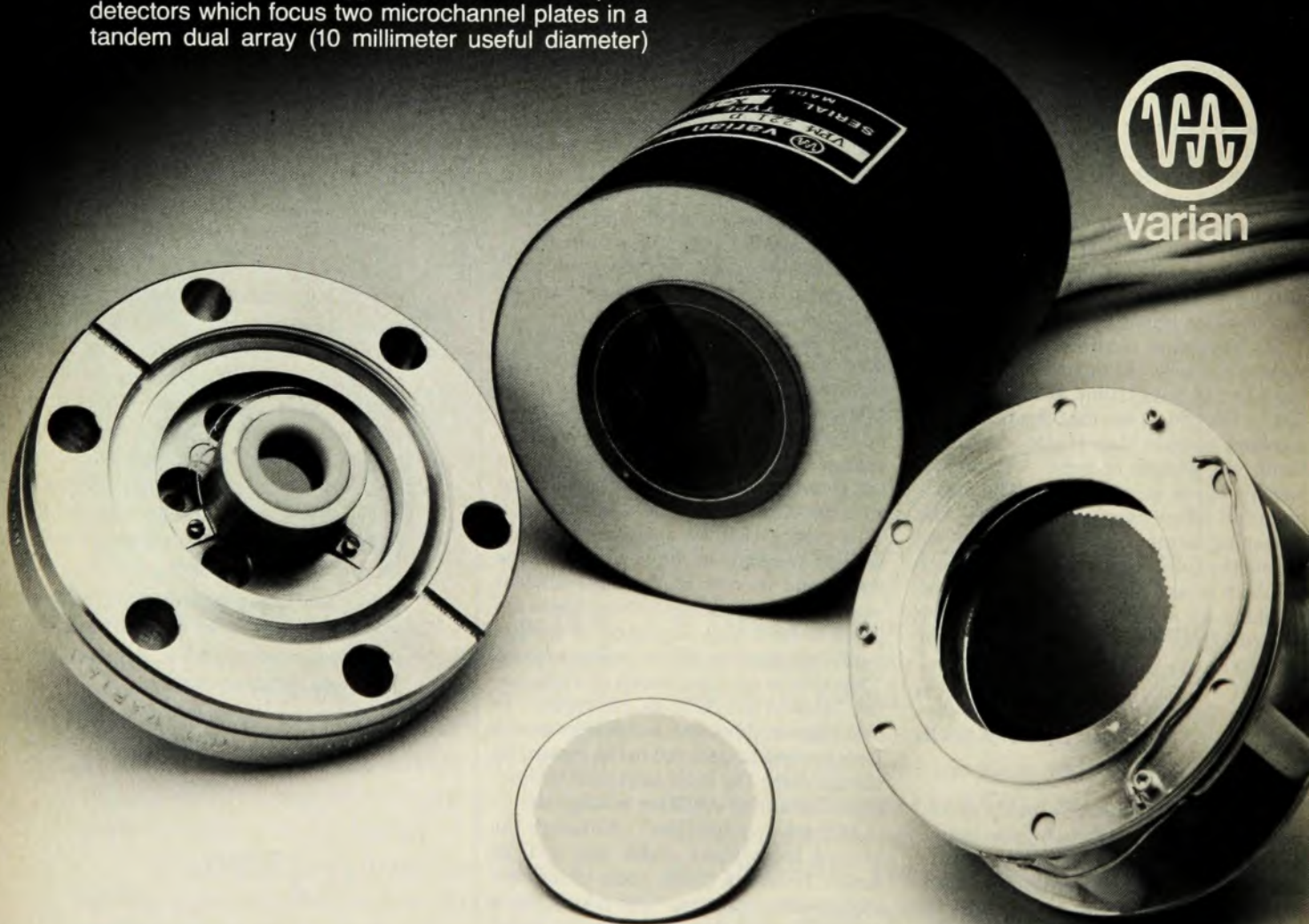
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aversion to nuclear war that they will evolve into a society that abhors nuclear arms and whose principles are radically different from ours.

In the meantime, we should admit the fact that many of us are either passively or actively engaged in work that contributes to a society that builds nuclear weapons to wage nuclear wars.

LEONARD C. DY
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7/13/78

THE AUTHOR COMMENTS: Gough Reinhardt's letter fulfills an important need in a fair discussion about nuclear weapons: it represents arguments against arms control and for an arms race with the other superpower. I assume that Reinhardt agrees with our principal aim, avoiding nuclear conflict, and disagrees only with the methods of achieving it. His interpretation of my use of the word "absolute" seems to differ from mine. What I meant was "first priority" and I hope that Reinhardt agrees with this meaning when applied to a nuclear war.

I also share his hope that time will ameliorate the Soviet position because ours is the better system. However, I fear that an unbridled arms race will not give us the time to wait for this development. On the contrary, it will make the outbreak of a nuclear war more probable and would reduce the chances of a turn in the Soviet position.

Because of the superiority of our technical abilities, it is our side that determines the speed of the race for better weapons. Most innovations have been done first in the US, and have forced the Soviets to reinvent them as fast as possible, much faster than they would if we had not preceded them. In other words, every new weapon development will be directed against us a few years later, except if the holocaust breaks out before the Russians have caught up, in which case both of us will be annihilated anyway. Those who advocate military superiority over the other side instead of a balance of forces should keep that in mind.

I do not, and never have advocated unilateral nuclear disarmament. I do think, however, that one should consider most seriously a slow-down of innovations, and a tentative unilateral decrease of the number of nuclear weapons, in order to see whether the other side would follow. After all, we have much more than enough to destroy the other side many times over, and the economic burden of the build-up is relatively much larger for them than for us.

I only see advantages in any step towards a negotiated mutual arms control. I cannot understand Reinhardt's statement that SALT or any test ban tilts the balance in favor of the other side (who

has the better computers to simulate a bomb test?). Every action that slows down the race gives us more time to wait for and increases the probability of a change in the Soviet position.

Reinhardt's remark about the value of life in freedom compared to life under Communism puzzles me. We will never be faced with this alternative without a nuclear conflict, except if we carry out total unilateral nuclear disarmament which, of course, is no solution. After a nuclear war there will be neither a Communist regime nor life in freedom.

I agree only in part with John Dowling's comments and I do not share his view that Harold Davis's editorial lacks logic. We cannot stop our weapon production unilaterally forever; such a step obviously would increase the danger of nuclear war started by the other side. We therefore unfortunately need people who work in the weapon field. However, a certain measured reduction of our nuclear potential may be advisable, since it may perhaps be followed by a Soviet step in the same direction.

It is imperative to slow down the development of new bombs and new ways of delivery and it is largely in our hands to do so. Here, the scientists working on these developments could have a decisive influence; in particular when a given innovation would be destabilizing, meaning that it would increase the chances of a first strike.

Leonard Dy may be right but it is the sacred duty of all of us to do what we can to prove him wrong. After all, the ways of human-kind have changed before in less than 10^4 years; from hunter-gatherers to agriculturists; from a feudal to an industrial society. Today, however, we have much less time to change the habits that Dy describes so eloquently. I cannot share his "hope" that things will become better only after the great catastrophe. Then it is too late; the world will be different, probably uninhabitable, and everything we consider great and beautiful will be lost.

The situation cannot, is not, and must not be completely hopeless. We must do everything in our power, we must create a strong public opinion against nuclear weapons, we must change our priorities and we must succeed. The great experiment of nature that mankind represents must not end in dismal failure.

V. F. WEISSKOPF

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8/14/78 Cambridge, Mass.

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