

**HERBERT E. MEYER**

October 19, 1984

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Dear Don:

Thanks very much for your letter of  
September 17, and for sending a copy of my  
book to [redacted] in Paris. I enjoyed your  
article on "The Threat of the Neo-Luddites."  
Let's make it a point to get together the next  
time we're in the same city.

All best,

*H. Meyer*

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REPRINTED FROM:

# Arms Control and International Security

edited by Roman Kolkowicz  
and Neil Joeck

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Westview Press / Boulder and London

*Westview Special Studies in International Relations*

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Published in 1984 in the United States of America by Westview Press, Inc., 5500 Central Avenue, Boulder, Colorado 80301; Frederick A. Praeger, President and Publisher

Library of Congress Cataloging in Publication Data

Main entry under title:

Arms control and international security.

(Westview special studies in international relations)

(Studies in international and strategic affairs series)

Bibliography: p

Includes index.

1. Arms control—Addresses, essays, lectures.
  2. Atomic weapons and disarmament—Addresses, essays, lectures.
  3. Security, International—Addresses, essays, lectures.
  4. Nuclear nonproliferation—Addresses, essays, lectures.
- I. Kolkowicz, Roman. II. Joeck, Neil. III. Series. IV. Series: Studies in international and strategic affairs series.

JX1974.A768855 1984 327.1'74 83-16801

ISBN 0-86531-662-7

ISBN 0-86531-663-5 (pbk.)

Printed and bound in the United States of America

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## The Threat of the Neo-Luddites

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*Donald M. Kerr*

Reliance on technological superiority has been a keystone of U.S. defense posture. Today, however, several threats to science and technology in the United States may adversely affect the nation's security and prosperity.

### **Technological "Quick Fixes"**

One of these threats comes from the friends and proponents of research and development (R&D) who have exaggerated confidence that crash programs in science and technology can rapidly solve national problems. This is the often suggested Manhattan Project or Apollo Program approach to technical problems. Not too many national problems are in fact amenable to the crash program approach. Following the first oil shock, in 1973, we attempted to solve the "energy problem" with rapid, massive federal spending. While this had some beneficial results in improvements in conventional technologies, it did little to advance the start-up date for complex, long-term energy supplies such as fusion reactors. We found that many programs in scientific research and development are responsive only to consistent efforts made over a long time.

We now are faced with a similar problem in national defense, the increasingly aggressive Soviet military buildup, which we may be trying to spend our way out of. This approach may be useful in making up deficiencies in readiness and supplies and buying off-the-shelf weaponry; it is not likely to be of much help in accelerating development of new, exotic, and very promising military technologies such as directed energy weapons and "brilliant" conventional weapons.

Scientific "breakthroughs" are in fact usually the result of steady progress in basic scientific understanding and gradual improvements in technological know-how. Technological advancement is usually evolu-

tionary, not revolutionary. But certain features in our society incline us not to appreciate the steady, consistent effort that must be given to ensure a productive research and development program. For one thing, most Americans maintain a fundamental belief in the natural technological superiority of the United States. Further, some of us believe that it stems from a native U.S. genius occasionally watered by federal funding. Few of us understand the nature and demands of the research and development process itself.

Another impediment to stable R&D support is the difference between the time horizon of the political decision makers who provide funding and the twenty-year time scale that characterizes many major development projects. When the payoff is so many years in the future, it is sometimes difficult to maintain the interest of the political community against more transient but more publicized budget priorities.

The consequence of these problems and misunderstandings is a dangerous overdependence on technological "quick fixes" to national problems, particularly in the defense area. Reliance on the crash program approach can be used as an excuse not to invest adequately in day-to-day scientific and technological research. Our inadequacies in R&D investment are most troubling in the defense area. Every year since 1971, the Soviet Union has outspent us in dedicated military research and development, and in 1981 their spending was about twice ours. Even the Reagan defense program increases will merely prevent the United States from falling further behind. Besides direct investment in R&D, we need a continuing high level of production of graduates in science and technology fields and investment in research equipment and facilities.

### **Neo-Luddism**

Other threats to technological development come from modern descendants of the Luddites. The original Luddites were primarily disgruntled and threatened laborers who broke the new machines of the Industrial Revolution, which they believed threatened their jobs. They were supported by some upper-class romantics who objected to the changes that industrialization was bringing to traditional society—in the form of large, smoky cities, the disappearance of the rural peasantry, and the like.

One type of modern neo-Luddite wants to return to simpler, supposedly happier times by rejecting the (usually exaggerated) consequences of technological progress. More prevalent in the 1970s than today, this attitude was reflected in such works as Robert Heilbroner's *Inquiry into the Human Prospect* (1974), which argued that

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in the last few years we have become apprised of these side effects of economic growth in a visible decline in the quality of the air and water, in a series of man-made disasters of ecological imbalance, in a mounting general alarm as to the environmental collapse that unrestricted growth could inflict.

The civilizational malaise, in a word, reflects the inability of a civilization directed to material improvement—higher incomes, better diets, miracles of medicine, triumphs of applied physics and chemistry—to satisfy the human spirit.<sup>1</sup>

This philosophy has led some people to advocate limits to growth and constraints on technology. Whatever its maligned side effects, however, technological advancement is the force behind the increasing ease and affluence of the industrialized world, and few people seem inclined to give them up. The vigorous efforts of the Third World to industrialize, in order to approach our affluence, show that most of the world will continue to aspire to technological development, whatever we do in the West. This group of neo-Luddites also fails to indicate how we would meet our national security needs without the technological superiority on which that security has long rested.

Although the rather romantic antitechnology arguments of these neo-Luddites can perhaps be set aside, another group of neo-Luddites presents a very different objection to technological advancement, one that we must take seriously. They claim that technological progress may in principle be a good thing and contributes meaningfully to socioeconomic improvement, but it also inevitably contributes to military technology. The advancement of military technology has led to deployment of more lethal and indiscriminate weaponry (especially chemical, biological, and nuclear weapons); political and military strategies appear to promise to use that weaponry in a massive and indiscriminate fashion. Although current weapons do not, as is sometimes stated, threaten to destroy life on earth, they do pose a threat to all organized societies and to Western civilization itself. In this sense, we must ask seriously if technological development may come to pose a threat that outweighs the benefits it can contribute.

Although we have tried to devise means to prevent or constrain the use of mass-destruction weapons, in fact the political, social, or intellectual capacity to prevent their use has not kept pace with technological advances. The tensions and rivalries between states have not been reduced; no world organization capable of preventing or containing war has arisen; the motives or inclinations of men have not improved enough to ensure that war will be eliminated.

We must address several questions: How can the catastrophe of a war that uses indiscriminate weapons of mass destruction be averted

without sacrificing the essential freedom and security of the West? More specifically, what part does technology play in creating the problem, and what should be done about technology in possible solutions to it?

### **Solutions to the Threat of Modern, Technological War**

There are two generic solutions to the threat posed by war in the technological age: (1) to control or eliminate the causes of war and (2) to limit the effects of war should it occur. Thus far, combinations of these two approaches, which are the staple of modern arms control efforts, have not succeeded.

The threat posed by the application of science to the art of war was recognized by the founders of modern experimental science, but they believed that the scientific enterprise also contained the solution to the problem it created. The purpose of modern natural science was to make man the master of nature so that he could escape nature's capriciousness and force it to work for man's benefit. The prosperity provided by science would give man the material means to develop his faculties to the full. Sir Francis Bacon stated that

the true and lawful goal of the sciences is none other than this: that human life be endowed with new discoveries and power. The introduction of famous discoveries appears to hold by far the first place among human actions . . . for the benefits of discoveries carry blessings with them, and confer benefits without causing harm or sorrow to any.<sup>2</sup>

The universal prosperity made possible by scientific discoveries would allow man to escape the commands of scarcity and deprivation; insofar as these are the causes of evils among men, their demise would allow for injustice and enmity to cease. The resulting spread of democratic, just, free regimes would be coextensive with the advance of the benefits of science, leading the world toward a universal and peaceful state.

Because science made this future possible, the potential military applications of technology would not come to pose a threat to civilization. To quote Bacon again:

If the debasement of arts and sciences to purposes of wickedness, luxury, and the like, be made a ground of objection to the inventions of modern science, let no one be moved thereby. For the same may be said of all earthly goods: of wit, courage, strength, beauty, wealth, light itself, and the rest. Only let the human race recover that right over nature which belongs to it by divine bequest, and let power be given it; the exercise thereof will be governed by sound reason and true religion.<sup>3</sup>

Another parallel effort to control the threat of unhampered military technology and eliminate war altogether appeared in the form of socialist and communist ideology. They both proposed to use science and new political institutions to eradicate the causes of hostility between men and states and to advance the world toward a universal and prosperous state. The socialists thought that they could develop a world commonwealth of socialist governments, which would be made peaceful by the elimination of capitalist and imperialist competition. On the other hand, the communists (the early Marxists) wanted a universal society from which governments themselves would fade away, in which all individuals would live together in affluent harmony. In the world envisioned by Bacon and in that dreamed of by the socialists and communists, technology would be only a boon to mankind, and in fact would be his prime benefactor.

Instead, the advancement of technology and the growing prosperity it brought about did nothing to ameliorate the hostilities between men and states. Communism, instead of fulfilling the promise of Marx, evolved into a permanent tyranny under Lenin, Stalin, and their successors. Soon it became evident that nations were destined to remain at daggers-drawn indefinitely and that progress toward democracy and universal peace was not preordained.

Today, because military technology has apparently outrun the main schemes to place it under rational or institutional control, the future and character of military technology are serious and conscious public concerns. It is from this failure and this concern that the arms control efforts of the post-World War II era have emerged.

Efforts to get military technology under control and prevent or reduce the consequences of war have followed several paths in recent years. One approach, advocated by the neo-Luddites, is to limit or control scientific and technological progress, either in directly military areas, or across the board. This was the approach taken in a series of articles in *Science* magazine on "Technology Creep and the Arms Race" in 1978. Efforts to constrain technology ignore several important facts, however. For developed nations, technology is bound up with the entire structure of their societies. Their economies and social and political institutions have developed in the context of technological progress. Their continued prosperity, world standing, and general national security depend on advancing technology. (Our reliance on military technology is obvious: The requirement of very advanced sensor and discrimination technology for early warning of attack and for remote verification of arms control agreements are two examples.) We depend on technology in more subtle ways for our security as well. The energy crisis, for example, showed that dependence on external supplies of some critical components of



our economy can pose serious threats to our prosperity. If not remedied by development of domestic energy resources, we could be forced into military confrontation to guarantee external supplies.

For the developing nations, technological progress is even more important, for they see it as the key to movement toward industrialization and its benefits. We may admonish them about the undesirable consequences of development on some aspects of their way of life, but they remain persuaded that the goods of development are worth the consequences. They would probably be even more reluctant than we to forego the benefits of technological progress.

It can be argued that although technological progress is demanded and beneficial in the civilian sector, we should place constraints on military technology. Unfortunately, military and civilian technologies are symbiotic and inseparable. Military technology has long contributed to civilian uses. For example, microprocessors and cryptology, developed in military programs, have found wide applications in civilian equipment. Recently, civilian technology has come to play a larger role in military capabilities. Developments in computer technology and materials research, conducted in the private sector for commercial applications, have made major contributions to improving military systems.

So again, limits on overall technological advance are perhaps possible, but they would severely affect our prosperity, our world standing and economic competitiveness, and our overall national security. They would also affect our social structure, probably requiring a major (and undesired) alteration in our way of life. In addition, limiting technological progress would eliminate one of the key functions that scientific R&D traditionally plays, that of providing insurance against technological surprise and obsolescence.

If limits on technological progress or on military technology are undesirable, must we be burdened with whatever unhappy military applications they make possible? There is scope for prudence and political guidance in choosing the direction of military technology and in the weapon applications we choose to develop. It is in these areas of directing and applying technology, not in attempting to control the growth of knowledge, that some mitigation of military effects may be hoped for.

Other efforts to avert a disastrous war have tried to reduce the threat from weapons of mass destruction, preeminently nuclear weapons. The prime focus of post-World War II arms control, these efforts have a long history—beginning with the (perhaps apocryphal) effort of Pope Innocent to ban the use of the crossbow (but only against other Christians) in 1139. The technology of the longbow and the military application the English made of it at Crecy may be an example of the danger involved in falling behind in military technology. Perhaps the fourteenth

century elite of France—knights in armor—saw the longbow as socially destabilizing. Whatever the reason, they failed—until more than sixty years later after their crushing defeat at Agincourt—to develop the technology that made knights in armor militarily extinct.

After World War I, treaties were designed to prohibit some of the causes and excesses of that war. Bans on chemical weapons (the Geneva Protocol) and an abortive ban on submarine attacks on noncombatant ships were examples of attempts to control excesses. Various efforts to control or eliminate armaments (the Versailles Treaty and the World Disarmament Conference), or to create a war-preventing League of Nations or "international police force" were examples of attempts to prevent war from happening again.

Since World War II, the control of nuclear weapons themselves, with both quantitative and qualitative restrictions, has been emphasized. If the arms race is itself a cause or contributor to war, as some people argue, successful agreements might reduce the risk of war. Some agreements also aim to establish stability, a balance that gives neither side an incentive or need to strike first in times of tension. And finally, nuclear arms limits or reductions have aimed (in U.S. eyes) at getting both sides to accept the MAD doctrine and to renounce strategic nuclear war as an instrument of policy.

Somewhat different approaches to arms control have been the 1946 Baruch Plan, which aimed to place nuclear weapons under international control, and the idea of nuclear weapon test bans, which might ultimately lead to the withering away of dependence on nuclear weapons.

At present, these negotiated approaches to arms control have not eliminated the threat or potential damage levels of war, although several arms control negotiations are now under way or in preparation. These include the START talks (where a new approach or on-site verification seems to be needed), the INF talks (to fill the gap left by strategic nuclear weapon negotiations), test ban negotiations, chemical and biological weapons control and conventional arms control negotiations (needed to cover the asymmetries between the military needs and capabilities of the nuclear powers).

### **What We Can Do**

These main lines of arms control of recent years seem to offer little hope. While some reductions may be possible from START and INF talks, even those will be difficult because of the characteristics of the weapon systems involved. And even reduced arsenals would possess enormous destructive power. In addition to attempting to obtain whatever improvements we can through negotiated arms control agreements, there

are two things we must do. In the short run, we have no recourse but to maintain the pace of technological advancement. The United States desires peace and the retention of the international status quo; consequently, maintaining our lead in weapons technology gives the best chance for continued peace. (Technical superiority is especially important in light of our inferiority in numbers of weapons and manpower.) Technological progress is also vital in other security-related areas (e.g., a secure energy supply and increased industrial productivity) if we are to avoid falling victim to outside circumstances and are to maintain our ability to stay out of conflicts as long as we wish to do so.

In the longer run, we must consciously exploit those promising developments in military technology that offer some hope for reducing the possible damage of war, should it start, while maintaining or even increasing our security. One trend in military technology is toward the ability to create more discriminating, less massive, more secure weapons. This development, made possible by progress in detection, discrimination, and guidance technologies, improvements in warhead lethality, and greater capability for complex battle management, may in time allow for the deployment of a credible military defense with less risk of resorting to nuclear weapons or other weapons of mass destruction. For example, multiple nonnuclear warheads might be deployed on our weapon systems in Europe, effectively taking over the antiarmor role that now can only be accomplished by battlefield nuclear weapons. Developments like this offer the prospect of a future battlefield where the destruction is limited in large part to combatants.

Technological advances may also permit development of viable strategic (and even tactical) defenses, perhaps for a time shifting the military advantage from the offense to the defense. We might then move from a strategy of mutual assured destruction to mutual assured survival. One significant military option would be the ability to ward off an incoming attack without the loss of territory or the destruction of population. To have the ability to choose appropriate responses to military challenges, without the fear of immediate impending destruction, would be satisfying both politically and militarily. To achieve that position, however, will take more than reaching some rough technological parity with the Soviets; it will take a courageous long-term investment—with high risk—to lay the scientific and then technological groundwork for a significant strategic defense not linked to instant escalation.

Besides being desirable as a way to move technology away from massive and indiscriminate destruction, such developments are necessary for U.S. defense policy. In an age of strategic parity and theater and conventional inferiority, we need to develop military forces that we are not self-deterred from using, as may be the case with our current

battlefield nuclear weapons. Our military deterrent would thus become more credible and those nuclear weapons for which there is no alternative at present would be protected from criticism.

The choice of weapon systems characteristics can drastically alter the perception of their intent. For example, theater nuclear forces heavily weighted toward ballistic missiles might be perceived as a first-strike capability and thus destabilizing; while greater emphasis on cruise missiles would indicate a retaliatory posture.

Over the long run, emphasizing such developments might lead us out of the dangerous situation we now face, reducing the threat that military technology poses to our nation and our civilization. Such prospects need to be examined soberly in terms of our national needs and purposes, and a national strategy must be developed for investment in scientific and technological research and development that ensures vigorous support of the trends most suited to those national purposes.

Given the harsh realities of our world, the attempts to control military technology development proposed by the neo-Luddites hold not promise but danger. We must consider the opposite course—enhancing those technologies that allow us to reduce tensions, improve international stability, and reduce the threat to national survival. We can take this course unilaterally, without having to wait for the results of desultory arms control negotiations, without having to wait for the development of goodwill or other desirable but unlikely improvements in the political climate or organization of the world.

#### Notes:

1. Robert L. Heilbroner, *Inquiry into the Human Prospect* (New York: W. W. Norton, 1974), pp. 19 and 21.
2. Sir Francis Bacon, *The New Organon and Related Writing*; Fulton H. Anderson edition (Indianapolis: Bobbs and Merrill, 1960); p. 71.
3. *Ibid*; p. 117.