The Two Ethics: Ultimate Ends or Ethical Responsibility

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How profoundly symptomatic of the intellectual confusion of our times it is that an author builds a case for a new approach to peace and disarmament on the grounds of man's unalterable irrationality. Is it really possible that those of us most optimistic about social progress and human betterment are turning away from the Enlightenment faith in Reason and Science? Or are these persons searching for, and advocating, a more profound scientific approach than that thus far tried in man's quest for peace and international good will?

These questions are posed for the reader by the publication of Anatol Rapoport's **Strategy and Conscience** (Harper and Row, 1964. 323 pp. $6.95). Rapoport, "a mathematician, psychologist, [and] game theory innovator," devotes the first two-thirds of his stimulating book to a critique of rational decision theory and of the application of this rapidly developing social science to military problems. In the last third, Rapoport presents his own alternative approach to peace and disarmament. As a bonus to those of us lost in a world of "stochastic" models and "minimax" strategies, Rapoport appends a glossary of terms and a list of references to the literature of decision theory and strategic analysis. Unfortunately, many of the important writings on the latter subject are neither on his list nor discussed by him in the text. But this is anticipating a reservation yet to be made about the validity of Rapoport's critique of strategists.

Before introducing and evaluating Rapoport's thesis, perhaps it would be best to define the term *strategist*. For Rapoport the strategist is less a person than a social role; by strategist he means "someone who at the moment conceives international problems in strategic terms"—that is to say, a person who sees foreign affairs primarily in terms of conflict and power struggle, and who advises government on the optimum ways by which it can best its opponents.

In view of his rather intemperate condemnation of the strategists, Rapoport is no doubt appropriately discreet in identifying only one or two of them by name. But for the benefit of those few readers to whom the term *strategist* may be a novelty, Rapoport means those civilian social and natural scientists, such as Charles Hitch, Herman Kahn, and Albert Wohlstetter, who have played important roles as administrators, researchers, and advisors in the shaping of postwar American military strategy. Their unique contribution has been the application of the techniques of social science, such as cost-benefit analysis and game theory, to the solution of military problems.

As an expert on decision theory and the author of one of the better known treatments of game theory, *Fights, Games, and Debates* [(1960), reviewed in *Science* **133**, 1241 (1961)], Rapoport has impressive credentials for undertaking an evaluation of the applied social science of strategic analysis. Accordingly, his critique of formal decision theory is both effective and interesting. He makes us very much aware of the sloppy and glib way many persons use such concepts as "probability," "calculated risk," and "zero-sum games." Furthermore, he is convincing in his argument that subjective evaluations and not objective facts lie closest to the core of the prevalent analyses of strategic problems. His analysis certainly bears out his contention that, in a world of imperfect knowledge, there is no such thing as "the rational solution" to a problem and that, under such circumstances, personal preference, however clothed in scientific nomenclature, undergirds policy analysis and action.

But if Reason, at least as it is defined by Rapoport, is unreliable, what then is to be our guide? Do we seek out some new authority in our intuition, or do we return to an old one such as natural law? Or has Reason been so defined by Rapoport that he is knocking down only a straw man—and is it therefore possible that there may still be a basis for confidence in man's reason (writ small)? Or, does Rapoport himself believe that there is a science more profound than that of formal decision theory upon which to base action?

The rest of this review will be devoted, at least by implication, to a consideration of these questions. The first task, therefore, is to present Rapoport's criticism of the strategists and to inquire whether he has correctly described and evaluated their activity. Second, what does Rapoport suggest in place of reliance upon strategic thinking? And, finally, how is one to assess this opposition of views and put it within some more meaningful perspective?

Rapoport's critique of the strategists, found in the second part of the book, is both intellectual and ethical. On the basis of his earlier analysis of the inadequacies of formal decision theory, Rapoport seeks to show the perils of strategic thinking. In essence, he argues that the strategists build into national strategy their own prejudices because of the absence of objective methods by which they can (i) order "utilities" (goals) such as those that underlie a nation's foreign policy, (ii) determine the statistical probability of (hopefully) nonrepetitive events such as thermonuclear war, and (iii) find "saddle points" under conditions of uncertainty such as those that characterize the East-West confrontation.

Rapoport argues that the fundamental underlying assumption of the strategists is, unfortunately, that of the unbreachable and mutual hostility of East and West. This oversimplification of seeing the world in terms of the "*good* we" and the "*bad* they" has several reprehensible consequences, Rapoport believes. First, or so Rapoport reasons, international politics are viewed as a zero-sum game in which one side or the other must lose (p. 105). Second, this basic orientation of the strategists functions as a self-fulfilling prophecy; by playing the game to win rather than by trying to find solutions in which

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both sides can win, the strategists of the East and those of the West confirm each other's arbitrary assumption about the other's innate hostility; as a result the strategists feed the fires of the Cold War.

Rapoport illustrates his point from two areas of strategy: fallout shelters and deterrence theory. The construction of fallout shelters, Rapoport argues in rebuttal to some strategists, is not merely a form of insurance against a "natural" disaster. Unlike a natural calamity such as a flood, a war is willed by men, and the construction of fallout shelters has psychological consequences for man's will to war. The construction of fallout shelters, Rapoport reasons, not only communicates one's own warlike stance, but also has a deleterious impact on public opinion. In contrast to insurance against uncontrollable natural events, a policy of shelters has consequences that increase the probability of the actual occurrence of the event one wishes to avoid.

Similarly, as Rapoport sees it, a policy of deterrence is based on the *possibility* of aggressive behavior on the part of another, which, it is assumed, can only be prevented by the threat of dire punishment. Rapoport contends, however, that this potential aggressiveness is not an objective fact but an assumption based on the prejudices and values of the strategist. The strategist, basing his deterrence policy on such an assumption, communicates to the other party a sense of hostility and produces a reciprocal fear of aggression. Thus, by eliciting a negative response, deterrence-thinking operates as a self-fulfilling prophecy (p. 107).

The basic logic of Rapoport's argument is, on balance, no doubt sound. In the last analysis all action is based on unproven assumptions that are generated out of one's own values and limited experience. We all weigh the evidence differently in trying to determine the sources of the present world conflict and to fashion appropriate responses to it. No doubt too many strategists, including some in positions of authority today, have made regrettable errors of a psychological and political nature. But in agreeing with the general thrust of Rapoport's critique, one need not agree with his specific charges. The strategists as a group are neither as methodologically naïve nor as belligerent as he suggests.

There are of course many naïve writings by strategists, and some written in a bellicose vein. But those who think along such lines, I would suggest, are in a small minority and are least influential in policy making. On the contrary, the writings of those strategists most influential in policy making are seemingly least affected by the exaggerated promises of game theory and computer simulation. These persons have their weaknesses, but their failings are not the ones stressed by Rapoport. In fact, strategists were among the first to point out, in the jargon of the trade, the destabilizing consequences of a vast shelter program. Moreover, many strategists were the earliest and foremost critics of that ultimate in the application of deterrence theory, massive retaliation.

Actually few strategists, contrary to what Rapoport would have us believe, see the cold war in terms of a zero-sum game between opponents with completely opposed interests. In fact, the concept of arms control and related policy innovations such as the "hot line" were put forth by strategists in order to take advantage of the mutual interest of the United States and the Soviet Union in preventing thermonuclear war. Unfortunately, one will not find in this book a discussion of such matters, and herein lies one of its major faults. Rapoport does not give us an examination and evaluation of the *actual* methods, assumptions, and behavior of the strategists. Instead he has given us a critique of *formal* decision theory which they seldom use, an examination of assumptions which rarely underlie the strategists' analyses, and a critique of behavior which is highly atypical. An empirical study of the strategists, this new and very important breed of experts, is certainly called for; regrettably it will not be found in this book. Nor can this review do more than suggest that one is needed. But such a study might well reveal that the strategists are actually too negligent of scientific method rather than being overly dependent on it.

What Rapoport does give us is a scathing ethical indictment of the strategist. He sees the strategist as the dehumanized perverter of science who, like the Nazi doctor, is devoid of ethical responsibility. At times Rapoport writes forgivingly, because the strategist, in his naïveté, appears to know not what he does in perpetrating the Cold War. At other times, Rapoport morally condemns the strategists with a slashing pen.

No one has put the moral issue that divides the strategists and Rapoport better than the German sociologist, Max Weber, who saw men pursuing one of two separate modes of ethical conduct. There is, on the one hand, an "ethics of ultimate ends" where the actor keeps his own conscience clean regardless of the consequences; the pacifist who sits by while evil is done to others is the extreme of this type. At the other extreme, there is the person committed to an "ethics of responsibility"; this is the person who sees a necessity in committing lesser evils in order to prevent the commission of greater evils. Between these two commitments, a man must choose: Rapoport has chosen an ethic of ultimate ends; the strategists have chosen an ethic of responsibility. Rapoport is as wrong, therefore, to condemn a priori the ethics of the strategists as many of them are wrong to argue that their applied "science" is amoral and truly scientific. What is required, therefore, if one is to evaluate the ethical standing of the strategist, is an assessment of his moral commitment and of the actual consequences of his activity. Unfortunately, Rapoport fails to provide this type of empirical investigation.

Just as we need a description of the strategists' behavior, so we need an evaluation of it. Such an evaluation is beyond the scope of this review, but perhaps one point is worth making. It has to do with the consequences of the strategists' thinking on recent national security policy.

By 1960 two developments—one intellectual, the other technological—had come near fruition. The first was the achievement among many of the strategists of a large degree of consensus on such strategic questions as (i) the need to replace massive retaliation by a policy of selective response to Soviet misbehavior, (ii) the need for a stabilized strategic deterrence, and (iii) the need for specific arms control measures. The second development was the revolutionary implications of the shift from "lumbering" manned bombers to quick-strike intercontinental missiles as the main component of America's retaliatory force.

The policy implications of these two developments tended to reinforce one another and to increase concern over such matters as improved command and control of the strategic striking force. A third element was needed, however, to bring these developments

to their logical conclusion—the management philosophy of the new Secretary of Defense, Robert McNamara. To McNamara effective management meant centralized management of the military establishment. The strategists assembled by McNamara to serve as his general staff provided the concepts and management tools by which this centralization was brought about; the missile and its quick reaction time provided the necessary impetus for centralized command and control of the nation's defenses under the Secretary and the President.

This role of the strategists in strengthening civilian control over the means of world destruction certainly must be considered in evaluating the consequences of their behavior. Whether their actions are to be judged morally good or evil depends on one's view of the nature of the East-West struggle. Rapoport would no doubt see little good in this attempt to "rationalize" the employment of military power. But a fair and thorough analysis of the role of the strategists should at least take these matters into consideration.

In place of the strategists' science what does Rapoport propose? If rationality deceives us, what alternative do we have? Upon close examination we discover that Rapoport is not really proposing an abandonment of the Enlightenment faith in Science and Reason, but, on the contrary, his book goes back to the fundamentals of that earlier and now waning faith.

What Rapoport proposes is that the United States and the Soviet Union base their security policies on a more profound science than that of game theory and strategic analysis. This more profound science is that of human behavior. If we are to escape the self-reinforcing assumptions of mutual distrust and hostility engendered by strategic thinking we must, he argues, learn more about the psycohological dynamics underlying our behavior. An awareness of the sources of our own behavior will assist us in overcoming the impediments to peaceful cooperation.

In contrast to the view held by strategists, Rapoport sees the Cold War primarily, if not solely, as an ideological conflict. Its source in effect is psychological. The political differences over Germany and the Middle East are but symptomatic of the deeper ideological tension. The task of behavioral science, then, is to bring about ideological disarmament.

Specifically, Rapoport believes that ideological disarmament could begin through a realization of the strengths and weaknesses of each side in the Cold War. Each side has unique values that ought not to be destroyed through ideological conquest. Similarly, each side has weaknesses that ought not to be perpetuated through its ideological victory. The beginning of wisdom is an awareness that the ideological victory of either communism or capitalism would be bad. Instead we must see the current situation as a non-zero sum game in which, through the cooperation of "liberals" in both East and West, the best and complementary values of each society can be preserved for a new and universal civilization.

The weakness of the Soviet Union is its political immaturity (p. 239). It has yet to eliminate the Leninist-Stalinist tradition of communist orthodoxy and fear of free thought. The Russian strength is the Russian's social maturity and cosmopolitanism—the identification of the ordinary Russian with values and interests beyond narrow Russian nationalism.

The United States, for its part, enjoys political maturity but lacks social maturity (p. 278). The American is free to think what he will but his thinking is enveloped within a narrow provincialism. He can not identify with humanity at large. Rapoport argues that the American, unlike the Russian, has yet to become a true citizen of the world.

Rapoport addresses his book to the progressives in East and West who can rise above the weaknesses in their respective societies and overthrow the Stalinists and the Rightists in their midst, the perpetuators of the status quo. Through ideological rapproachment, the liberals in both camps can destroy the will to use nuclear weapons. Hopefully, Rapoport concludes, the leadership of East and West would undertake programs to change the perceptions of mutual hostility which now underlie the "science of strategy" and the Cold War. To this end Rapoport wrote his book.

Wherein lies the fundamental difference between the strategists and Rapoport? It rests, I think, in differing assessments of the role and efficacy of reason in human affairs. Both are rationalists in that they would ground human behavior on knowledge of the social and physical worlds. But from classical times there have been two rationalistic traditions—a conservative and a radical one. The conservative position takes its stand with the Greek historian Thucydides who saw the world ruled mainly by necessity; reason can assist man to adapt to necessity, but reason or science can do little to change the course of events. The social, political, and technological forces of the world overpower and confound reason. Power, interest, and pride rule the world and reason can do little to control these passions. The most that reason or science can do is to assist men better to adapt themselves to a world of never ending international power struggle. In such an anarchy the successful statesman must learn the "science" of military strategy, diplomacy, and alliance.

In contrast, the Greek philosopher, Plato, gave voice to the radical tradition that, through reason, man can transform the world and escape the forces of necessity. There is a deeper science of the right order of things which reason can discover. What is needed is the philosopher-statesman who can bring this deeper reality into existence. Reason and science are not merely instruments by which to adapt to the world but the means by which to transform it.

It is to this latter, idealistic tradition that the Enlightenment *philosophes* and Rapoport himself belong. And just as the *philosophes* called for a benevolent despot to remold society in the image of Reason, Rapoport makes his plea to the rulers of the Soviet Union and the United States (p. 281). Through application of the insights of modern behavioral science, these rulers could morally transform their respective societies.

For most strategists, on the other hand, reason can assist only in the managing of inevitable conflict and in minimizing its evil consequences. Reason in its modern garb, or social science, cannot control the forces of necessity which rule the social and political worlds. Conflict in society cannot be eliminated, only managed. In such a world, some scientists have an ethical responsibility to study war and its conduct if the values of the society and, hopefully, mankind as a whole, are to be preserved.

This presentation of the contrasting views on reason and ethics does not resolve the problems raised by Rapoport. At the most, it only places the issue of strategy and conscience in a more balanced perspective than that provided by Rapoport's polemical ap-

proach. Each of us must weigh the demands of individual conscience and social commitment as best he can. Rapoport's book has the virtue of raising this eternal issue for the citizen and scientist in a new era of human experience. Unfortunately, his own passion has prevented him from examining the problem with the care it deserves. Yet, if Rapoport has opened up a dialogue on these matters, and I hope he has, this provocative if frequently disappointing book will have served an important purpose.

Experimental Archeology

The Experimental Earthwork on Overton Down, Wiltshire, 1960. P. A. Jewell, Ed. British Association for the Advancement of Science, London, 1963. 108 pp. Illus. $4.50.

With the development of more precise analytical methods in archeology during the past few years, it has become increasingly important for the archeologist to know in some detail about the changes and disturbances that have occurred in archeological sites as the result of weathering and other natural causes. This volume reports an ambitious and comprehensive experiment by a committee of Section H (Anthropology) of the British Association for the Advancement of Science, in which a simulated prehistoric earthwork was built under precise controls, with observation of changes to be made by periodic excavation at intervals of 2, 4, 8, 16, 32, and 100 years after its construction. Archeologists of the future will have reason to thank the committee for this 100-year experiment which will yield precise data on weathering phenomena.

One aspect of weathering of great importance in archeology is internal disturbance and mixing of archeological deposits, with consequent confusion about the true relationships of the layers and objects found. With the current interest in statistical analysis of archeological collections, the question of disturbance is a vital one in evaluating the samples (of potsherds, shells, or whatever) taken for statistical study. The dispersal or movement of buried objects is little understood, although it is apparent that rodents, plant roots, freezing and thawing, and even earthworms, can transport buried objects from their original location in the ground. The experimental earthwork will provide precise data on such movements of buried materials.

Aside from the detailed care in construction of the earthwork itself, a number of material objects were buried in exact locations to check the weathering action. These included six types of textiles, leather, burned and unburned wood, cooked and uncooked animal bones, human bone of known blood group, and cremated human bone. Also buried was a series of numbered potsherds.

A by-product of the experiment was the collection of data on the amount of work possible with ancient implements as well as modern ones. Since estimates of the man-hours required to construct ancient monuments vary tremendously, experimental data of this kind have considerable interest. The worker with modern hand tools averaged 3.58 cubic feet of earth per man hour, the worker with primitive tools 3 cubic feet per man hour.

The answers to be provided by the experimental earthwork should provide valuable correction factors in many archeological interpretations.

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Clinical Medicine

The Biochemistry of Clinical Medicine. William S. Hoffman. Yearbook Medical Publishers. Chicago, ed. 3, 1964. xii + 802 pp. Illus. $12.50.

The task of keeping abreast of the increasing torrent of developments in clinical medicine—developments that are now primarily biochemical in nature—has increasingly led to multiple-author texts. Hoffman has, however, valiantly put out again in his one-man book (with the exception of a chapter on gastric and pancreatic secretion by A. Littman) to cover the waterfront of medicine. The effort is eased and the goal narrowed by the author's avowed didactic approach, which also minimizes chemical reactions and formulas and which is directed toward helping "the physician who has no more than the usual training in chemistry and physiologic sciences to understand and apply the available information for diagnosis, prognosis and treatment." The metabolism and role of the various tissue and dietary constituents and the anatomy and function of various organs in health and disease are discussed with particular reference to biochemical changes and the application and results of various diagnostic procedures. The author's background in clinical chemistry and medicine contributes to a solid achievement of the stated goals.

In a book of this scope and type, inaccuracies, outdated material, and omissions are inevitable; and the recommendations for treating certain disease states will meet with some disagreement. However, practicing physicians, residents, internes, and medical students, will find this volume a very useful and readable reference source.

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Research in Entomology

Radiation, Radioactivity, and Insects. R. D. O'Brien and L. S. Wolfe. Academic Press, New York, 1964. xv + 211 pp. Illus. Paper, $3.45; cloth, $5.95.

This volume, with its improbable title, was prepared under the auspices of the American Institute of Biological Sciences for the U.S. Atomic Energy Commission. The authors, R. D. O'Brien and L. S. Wolfe, set out to provide an introduction for "entomologists and other biologists who want to know the way in which research with radiation and radioisotopes has advanced our understanding of insects . . . [and for] those knowledgeable in work with irradiation and radioisotopes who would like a comprehensive account of what has been done with insects." To accomplish this dual objective, they begin with a chapter on elementary entomology and continue with chapters entitled "Nongenetic effects of radiation," "Tagging" (marking individuals so that they can be recognized when captured later), "Insect control by irradiation" (a way to control pests of stored grain products and timber, and a way of sterilizing males for field release so that they will satiate but not fecundate females), "Biochemistry," and "Physiology" as well as chapters on light responses and the use of tracers in studies of in-