

## Scientific Visionaries versus Practical Men of Affairs

Robert Gilpin

Unless an author is a thoroughgoing misanthrope, he writes on nuclear weaponry because there is in him some spark, however faint, of hope for the survival of the human species. However, the foundations on which such optimism is based, and the proposals for man's salvation, are indeed varied and contradictory.

This situation is confirmed once again in Eugene Rabinowitch's **The Dawn of a New Age** (University of Chicago Press, 1963. 400 pp. \$6.95) and David Lilienthal's **Change, Hope, and the Bomb** (Princeton University Press, 1963. 168 pp. \$3.50). Rabinowitch, invoking the "method of science," and Lilienthal, the "common sense of the practical man of affairs," come to quite opposite conclusions about the sources of and solutions to our nuclear problems. For this reason each author—Rabinowitch, the editor of the *Bulletin of the Atomic Scientists*, and Lilienthal, a former chairman of the Atomic Energy Commission (1946–1950)—provides a valuable counterbalance to the other.

The thesis of Rabinowitch's book is that modern science and, in particular, nuclear weapons have resulted in a grave contradiction between man's destructive capabilities and man's political organization. Man cannot long survive unless his political behavior and consciousness catch up with the world modern technology has created. In this book, therefore, Rabinowitch has brought together his writings on this theme, beginning with the Franck Report in 1944.

His purpose is to show that science and scientists can and do contribute much to the resolution of the conflict between man's political and physical existence. Science itself, he reasons, is

a force that unites men in a common pursuit; by exploiting it rather than each other men increase the bases of peace. Scientists themselves contribute, in his view, a dispassionate approach to human problems. In keeping with C. P. Snow's theme in his *Science and Government*, Rabinowitch feels that scientists do have "the future in their bones" and the gift of prescience.

The articles in the first part of the book "have in common the interest of looking into the future to foresee the shape of things to come." By revealing a never-before-published prediction, written in 1939, on the course of World War II, Rabinowitch seeks to establish his credentials for making current predictions on the future of mankind. Although it is difficult to assess the significance for today of Rabinowitch's prophetic prowess, as revealed by his 1939 article, at least the latter performance is impressive. In addition, Rabinowitch has to his credit many perceptive writings on the political analysis of nuclear weaponry. In the aftermath of the Korean War he was among the first to recognize the need of the West for a capability to wage limited war. On the debit side, he has experienced some serious failures in prediction—for example, about the utility of continental air defense. Nevertheless, one hopes that the optimistic future he foresees is a correct reading of the signs.

The method and approach exemplified by Rabinowitch are anathema to David Lilienthal. In fact, one gathers Lilienthal wrote his book to tell Rabinowitch and like-minded scientists how strongly he feels on the subject. For this is in many ways a biting book, one that is hostile to the attempts of natural scientists—and, I should add, of social scientists—to solve the problems of nuclear weapons.

What disturbs Lilienthal, and it is a concern I share, is the propounding

of "Grand Solutions" to the nuclear arms race. Such an approach, he argues, distorts our perspective and may even be dangerous, through the creation of sources of distrust. One would gather, for example, that Lilienthal regards the nuclear test-ban agreement as one that must sow seeds of future distrust among the nuclear powers.

We have listened too long, Lilienthal believes, to the experts—the atomic experts with their grand solutions of disarmament and deterrence. What we need to do, he says, is to rely upon the good sense of practical men who can solve the nuclear problem as such men have always solved problems. In place of "the theories and abstractions that are found in books," Lilienthal draws upon his own experiences and observations in order to come forth with guides to political action. What he suggests is "the technique of the manageable job, in short the art of achieving the possible, and thereby of bringing the impossible progressively closer to our grasp" (p. 7). Such has always been the way, he argues, by which practical men, in contrast to visionaries, have solved the world's problems.

Lilienthal's prescription is that work should be done on the surmountable underlying problems which are the true causes of war. In this effort, time and the changes it brings are our main allies. But they are allies only if we use them to solve the problems of economic growth in the underdeveloped world, to encourage the development of an affluent and conservative Soviet society, and to soften the national antagonisms of the world's peoples. Lilienthal, to his credit, has put this faith into practice since leaving the AEC by devoting his energies to the economic and social development of underdeveloped lands; in particular, he has been closely associated with the social "revolution from the top" currently being attempted in Iran.

Rabinowitch and Lilienthal thus take opposing positions on three crucial issues. First, they disagree on the priority that the U.S. should give to resolving the nuclear arms race: whereas Rabinowitch considers this primary, Lilienthal feels that the direct approach to the problem is actually dangerous. Lilienthal, and this is the second difference between the two, favors limited steps to remove the underlying causes; Rabinowitch is

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prone to seek the "Grand Solution." And, with respect to the third issue, Lilienthal scorns the claims made by such scientists as Rabinowitch that science has some special role to play in the search for international political stability.

Lilienthal's criticism that scientists get carried away in their search for Grand Solutions is frequently too true, but as a criticism that might be directed at Rabinowitch, it is far less applicable. Although it is true that Rabinowitch sees hope only in some Grand Solution to the nuclear arms race and continually calls upon his fellow scientists to join in the search for one, he himself, at least since the collapse of the Baruch Plan, has never claimed to have found such a solution. His writings reveal instead an acute awareness that there are political limitations within which one must operate. Though I disagree with Rabinowitch's stand on many issues, the political insights of this scientific visionary far exceed those of many practical men of affairs.

Only time can tell whether Rabinowitch, the scientist, or Lilienthal, the practical man of affairs, is the wiser with respect to the nuclear arms race. I believe that Rabinowitch is correct in emphasizing the need to deal directly with the problems presented by nuclear weapons. In addition, Rabinowitch's book has something vital which Lilienthal's does not; it has a political dimension. On concrete issues, such as that of Germany, over which war could come and upon which time and change must work if peace is to be secured, Lilienthal has little or nothing to say, and this is a serious flaw in his attempt to establish the beneficence of change; change has done little to make the German problem more manageable.

Far more disconcerting, however, is the fact that, though Lilienthal undertakes to excoriate both natural and social scientists for their advice on nuclear affairs, he himself appears very uninformed on the many ideas they have put forth on such questions as nuclear deterrence, arms control, and civil defense. Nor does he appear to appreciate the changes that are currently being made in our national security policy, largely as a result of advice given by these scientists. It is precisely because of the influence of the individuals he criticizes that the United States is shifting from a policy of massive retaliation to a more flex-

ible response to aggression. As a consequence, many of his criticisms are far less relevant today, if they are relevant at all, than they would have been 2 or 3 years ago.

The value of Lilienthal's book is that he reminds us how frequently we have deceived ourselves about the political and economic atom. He correctly warns us against the "false peace" a nuclear test-ban agreement may bring. He points out how often we have placed our faith in panaceas, such as the peaceful exploitation of atomic energy, only to come slowly to the realization that our hopes were very much exaggerated. Science will not save us, he argues; the problem we face lies within ourselves.

Rabinowitch agrees that the problem of war and peace lies within man. Yet he has a faith that science is bringing about human unification and that scientists working in such organizations as COSWA can speed that unification. To the accomplishment of this goal, a "world order of law," Rabinowitch has given much of his life since the dawn of our new age. In so doing, he has said well what many natural scientists have thought; and he has deservedly come to represent, perhaps more than any other individual, the political conscience of the American scientific community.

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## The Cell Surface

### The Structure and Function of the Membranes and Surfaces of Cells.

The Biochemical Society symposium held in London, March 1962. D. J. Bell and J. K. Grant, Eds. Cambridge University Press, New York, 1963. vi + 172 pp. Illus. \$6.50.

Three points about this brief volume may be noted at the outset. (i) The content is instructive, interesting, and sometimes provocative. Detailed treatment of material repeatedly reviewed elsewhere is avoided except when it is relevant for the general structural-functional complex, the whole cell surface. In several chapters the chemical composition of cell surface structures is emphasized, and the problem of how the chemical units may be put together is considered. Only in this way will we eventually obtain the chemical names, so to speak, for the functional properties

of the cell surface. (ii) The six chapters deal with microsomal membranes, with mammalian, bacterial, and plant cell surfaces, and with so-called vectorial metabolism in trans-surface processes. (iii) Because of the juxtaposition of data from sources often widely separated in the literature, and because most of the comfortably familiar material in the general area of cell-membrane physiology, although used, is not overly stressed or belabored, some readers may find the material difficult to fit into existing patterns of thinking. This could be the book's major value.

The chapter on microsomal membranes is a critical discussion of the powerful centrifugation and density-gradient methods for separating subcellular components, and it summarizes their use in resolving microsomal material into functionally differentiable fractions. It will be helpful to those who consider using these techniques.

In chapter 2 the question of how protein may be bound to cell-membrane lipid is considered. Several omissions are noteworthy. (i) An important paper by Salem [*Canad. J. Biochem. Physiol.* **40**, 1287 (1962)] is not mentioned. (ii) It is postulated that protein bound to lamellar lipid may be denatured, but not that such attachment might also prevent complete extension. (iii) The improbability of hydrogen bonding between cholesterol hydroxyl and membrane phospholipid polar groups in the geometry proposed by Finean is neglected.

Discussions of reaggregation of separated cells, and of pH at interfaces, are interesting.

In the valuable chapter on bacterial cell walls much analytical information is conveniently tabulated. The presence, probable arrangement, and possible functional roles of polymerized mucopeptides are considered in some detail. The chapter on plant cell walls is largely nonspeculative, but it contains worthwhile chemical tabulations.

Challenging problems associated with transmembrane movement of large molecules and particles are considered in detail. Discussion of stimuli and possible mechanisms underlying pinocytosis and phagocytosis emphasize how little we know these phenomena in molecular terms.

The final chapter deals with so-called vectorial metabolism and its possible meaning for transmembrane movement of molecules, groups, and