Scientists and the Making of National Policy

Alan T. Waterman

The general aim of this book is simply stated in the preface written by one of the editors, Christopher Wright, executive director of the Columbia University Council for Atomic Age Studies. Wright reminds us that "in the increasing number and variety of interactions between social affairs and science and technology, two constant features stand out: the clear need to establish policies for many of these interactions on a national basis and the involvement of natural scientists in this process. To understand the activities of natural scientists in the development of national policies is both an intellectual challenge and a practical necessity. . . . Nothing approaching a comprehensive social science of science or, more exactly, science affairs now exists." Manifestly, then, the intent is to encourage and stimulate scholarly research on the subject.

The topic, science and national policy making, forms an important and engrossing theme of increasing urgency, one that is receiving increasing attention, among participants and observers alike. Its constructive evolution is of immediate concern to the federal government, in both the executive and legislative branches. This concern is matched by an interest comparable in degree but differing somewhat in kind on the part of many among the scientific community.

By using the word "scientists" rather than the more commonly used "science" in its title, this book provides a special approach to the subject which removes its treatment from both the abstract and the practical into more subjective channels. For, this usage frees the authors from the obligation to define science and much of their attention is focused on the scientist, not so much as a professional expert in his specialty, but as a person and as a contributor to policy discussion and decisions. This is borne out by the chapter headings, which cover scientists as advisers in politics, policy, foreign affairs, and strategy as well as the establishment of science affairs. The topic is indeed important, and **Scientists and National Policy-Making** (Columbia University Press, New York, 1964. 315 pp. $7.50), edited by Robert Gilpin and Christopher Wright, is a welcome addition to the literature.

At this point a meticulous critic might remark that, with one exception, the contributors are not natural scientists, the group who are by general agreement under observation. Thus, their characterization of scientists is subject to a limitation pointed out in general terms by Oliver Wendell Holmes, which, in the present application, is as follows. There are three different characterizations of a scientist (the modern idiom would be "images"): the scientist's view of himself, his characterization by others, and the real scientist. Presumably the last eludes us; perhaps the most we can say is that the scientist is some sort of composite of the other two. In this volume, however, we are only given the second, the view of scientists as seen by administrative and policy specialists outside of science. This raises a logical and intriguing question—what would be the opinions expressed on the same subject by nine natural scientists and one policy specialist? Perhaps a revealing answer to this question may be that most natural scientists, with their usual predilection for objectivity, would much prefer to write on the topic, "*Science* and Policy Making."

Lest the reader suspect that by this observation I am trying to perpetuate the "Snow" controversy, to which, as expected, reference is made in the text, let me say at once that the authors are well chosen and have made thoughtful and considered presentations of the problems inherent in policy making. All are accomplished and experienced in their fields. All have participated to varying degree in deliberations of advisory committees, conferences, and studies concerned with national policy in which science and technology were involved. Hence, their views and criticisms are constructive and timely. Three of them have since the war occupied full-time administrative positions in government, two in research and development, and one in budget affairs. Several others have been closely connected with research or study centers on planning and policy involving science and technology. All are now connected with academic or other nonprofit institutions. The editors, Gilpin and Wright, have written the opening and the final chapters, respectively, and have given the contributors prior opportunity to read one another's papers. Accordingly, the assembled chapters, three of which are reprinted from previous publication, offer the reader a variety of viewpoints with respect to the nature and formation of national policy by authoritative observers of the scene.

The setting is provided by Gilpin's introductory chapter. It is amplified in historical and analytic perspective by Don K. Price who, as a distinguished authority on public administration, adds a clear and absorbing account of "The Scientific Establishment," and its problems. One may single out two highly significant points: (i) the acceptance of scientists into policy councils, with their tenet of denying the distinction between ends and means; (ii) the avoidance of centralization of authority and policy control by participation of academic institutions and private foundations through grants, contracts, and consultantships. Robert C. Wood, in "Scientists and Politics," concentrates attention on the origin and characteristics of the scientists who actively participate in policy councils—the evolution of a scientific *elite*, apolitical in nature. An authentic and illuminating picture of the role played by scientists in top-level policy guidance is portrayed by Harvey Brooks, a distinguished physicist and administrator who has played a leading part in several such groups—the Naval Research Advisory Committee, the National Science Board, and the President's Science Advisory Committee—and who has performed particular service for the President's Special Assistant for Science and Technology. Especially interesting is his account of the

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problems and responsibilities encountered in critical issues of policy and planning. Robert Kreidler supplements this from his direct experience on the staff of the President's Special Assistant for Science and Technology, now the Office of Science and Technology, with a lucid and thoughtful exposition of the work of that office and its relations with other offices and agencies of government which are concerned with administration, coordination, and program formation.

A more general view of the role of American scientists in policy making is given by Wallace S. Sayre, who points out that the role of scientists in governmental policy is, in principle, no different than that of other specialists. He then pursues this question: Who are the scientists and who speaks for them? Among scientists influential in governmental policy discussions, he finds particular individuals, high ranking government officials, and representatives of scientific and academic organizations. In this he is evidently thinking of testimony before congressional committees, because, with the exception of the National Academy of Sciences, this kind of representation is not as a rule recognized in deliberations of the executive branch; neither is it recognized as authoritative by the scientists themselves. The representative of an organization may speak authoritatively for the aims and activities of his organization, but on science policy matters he may speak only as an individual, unless he is spokesman for a group explicitly formed for dealing with science policy.

After outlining the requirements for a fully developed science policy, Sayre is inclined to think that no such formal program is feasible, and he is reasonably sure that such is not desired by the scientists themselves. In his opinion this leaves science policy with a "fictional" quality and confronts us with a number of difficult questions. Are we to depend upon a full complement of science advisers or should some formal organization be evolved for the purpose? According to views expressed by the Executive Branch and by the scientists, a department of science is not the answer. However, if we accept Sayre's initial thesis that the problem of the scientists is no different from that of other experts, then there is no more reason for formal government organization of natural science than there is for economics or political science.

In his observations, "Scientists, Foreign Policy and Politics," Warner R. Schilling discusses the characteristics of scientists and their biases, among which he lists a conviction that science and technology are justifiable ends in themselves, a sense of service to mankind, a naive Utopianism, and an urge to make their own independent analyses. He agrees that stronger organization of the government may make for increased efficiency but points out that this will not solve the problem of the relation of science to policy. One senses his feeling that the moves to incorporate science and technology into the highest councils have come too rapidly. Perhaps policy should originate at lower levels and be transmitted upward, if only to give play to multiple sources of advice. Schilling voices the thought that the United States already has stronger advisory representation at top levels of government than other countries, including the U.S.S.R.

In the chapters "Strategy and the Natural Scientists" and "The Scientific Strategists," Albert Wohlstetter and Bernard Brodie trace the evolution of the part played by scientists in councils on strategy, a role which had its origins in military technology but which has since been broadened and strengthened. An important prerequisite to this role, also mentioned by Price, has been the increasing degree to which on such occasions scientists are given the complete picture, instead of merely being asked to provide expert advice on technical questions. This has led to the formation and support by the government of special groups or centers for the express purpose of making continued studies of the strategic implications of science and technology. These, in turn, have made considerable progress, as Brodie relates, in the systematic development of strategy where science and technology are involved, and in valuable techniques to improve forecast and decision making, which are themselves based upon such scientific and engineering analysis as operations research, systems engineering, and game theory. The reader interested in this subject will find Wohlstetter's detailed discussion of numerous examples instructive. As the latter points out, by far the most difficult analysis concerns the "conflict" type of problem where one is matching wits with an intelligent opponent who is playing the same game and may be expected to devise countermeasures.

In the concluding chapter "Scientists and the Establishment of Science Affairs," Wright adds his emphasis to that of the preceding authors with respect to the critical importance of collaboration between scientists and nonscientists on policy making. Among scientists the broader role is still comparatively new and is entered by only a relatively small and select group. Although in his view both scientists and nonscientists are laymen in understanding one another, it is urgent that they find a mutually constructive approach to policy problems. Undoubtedly this will require some adaptation on the part of both. Moreover, the number and variety of functions which scientists have been called upon to perform raises the question whether these functions may at some point be assumed by others or whether this presages the growth of a new professional category for scientists —that of scientific affairs. In this connection it may be pertinent to remark that, in contrast to the arts and humanities, there has developed no professional class of critics of science. Expositors there are, but by and large the only valid critics are themselves recognized contributors to progress in science. This is doubtless due to the nature of the subject, in which opinion as such is discounted unless reinforced by active and distinguished research participation.

On the whole, the verdict seems to be that the scientist is indispensable to policy making but that he has much to learn about a game which has so many human and political complexities and so much social tradition behind it. At the same time, those who have studied the subject at close hand concede that the point of view of scientists is valuable, even apart from their technical knowledge, and that the nonscientist should make a more determined effort to meet the scientist half way.

Ecology

Patterns in the Balance of Nature. And related problems in quantitative ecology. C. B. Williams. Academic Press, New York, 1964. viii + 324 pp. Illus. $9.50.

"Some Biological Applications of the Logarithmic Series" would have been a far more descriptive title for this book. Far from being an introduction to the study of ecosystems or communities, this highly specialized monograph is largely concerned with