

## Essays for Scientist and Citizen

**Science and Imagination.** Selected Papers of WARREN WEAVER. Basic Books, New York, 1967. xvi + 295 pp. \$5.95.

For those of the younger generation who do not know who Warren Weaver is, and for those of the older who do not know him personally, this book is an appropriate introduction to him. Most of my generation knew Weaver as an officer of the Rockefeller Foundation. The story of the wise decisions he made there will never, I am sure, be completely told. I have known him best in his capacity as a trustee of the Memorial Sloan-Kettering Cancer Center, where some of the most effective work of his later years has been accomplished.

The papers he has collected here are from many sources and on many subjects. For the most part they are addresses or articles originally prepared for publication in various periodicals. Related ones have been grouped together into chapters, with each group preceded by an orienting introduction and interwoven with a thread of explanation. Altogether the fragments have become a coherent fabric. An additional attractive feature is a warmly appreciative foreword by George Beadle.

The chapters begin with Science and end with Lewis Carroll and Alice in Wonderland. In the first chapter Weaver discusses the nature of science; its relation to technology; its support, especially with reference to its freedom; and its imperfections. The sections on the nature of scientific explanation and on the "pageant of size" should help to resolve some of the difficulties that beginners in science and some more sophisticated scientists face in their thinking about science. The chapter "Science and the citizen" is constructed about the theme that it is necessary today for the scientist to do his best to explain science to the citizen and for the citizen to make the effort necessary to understand. Weaver's treatment of this subject is good reading for both the scientist and the citizen. The chapter on science and religion is by no means an emotional one. It is gratifying to learn how a man whose thinking is predominantly rational has solved a problem that confronts all of us.

Two chapters, "The theory of probability" and "Communication," deal with matters which may be unfamiliar to the general reader. The subjects are discussed with such lucidity, however, that anyone already familiar with them must

constantly think, "I wish I had been able to say that." It seems that probability and statistics have always been one of Weaver's hobbies. He begins the discussion of probability by announcing to the reader that "the odds are high that it affects you." "Life is the art of drawing sufficient conclusions from insufficient premises." The section on statistics is primarily addressed to those who, having once been befuddled by the use of statistics, are as a consequence suspicious of all use of them. The next section explains why some events the probability of which is very low do occur and why we react to such events sometimes quite casually, sometimes with interest, and at other times with surprise. The discussion of the freedom of the will which concludes the chapter on probability calls to mind Woodger's statement that the role of science is to reduce the alogical core of the universe.

The chapter on communication begins with a two-page comment on "communicative accuracy" which might well be taken to heart by everyone who lectures on or writes about science. The clue, of course, is to take the audience into account. Weaver devotes a section to machine translation, a problem which is still incompletely solved, but about which most of us must be surprised that so much can be said. Finally, there is a nontechnical review of information theory, in which the applicability of scientific information theory to communication theory is discussed.

With "Peace of mind and other semantic problems" a more whimsical aspect of Weaver's thinking appears. "This 'How to Be at Peace' gimmick seems to me part of a general lazy movement which we find urged on us from all sides." He proposes a book entitled "Twenty Sure-Fire Rules for Being Happy," which without doubt would be effective but which I suspect would have very little sale. In the section on "Words" we meet another of his hobbies—words, their origins, their histories, and their meanings. This essay is entertaining as well as instructive. "The confession of a scientist-humanist" is a bit of soul searching against a background of the history of science, which Weaver sees as a process of discovery of unifying relations that underlie and embrace all the complexity science has revealed to us. While this kind of unification is a source of great satisfaction to us, "we should take still greater satisfaction in the evidence of the growing unification of the humane aspects of

life." Finally, the chapter on Weaver's Lewis Carroll collection gives us a delightful and refreshing glimpse of a man in pursuit of his major hobby. With the thoroughness with which he apparently attacks everything he does, he has pursued his interest in *Alice in Wonderland* and in its author in all its possible ramifications. He gives us an attractive and entertaining account of the quest.

The whole collection is written in clear and enjoyable prose, which makes it easy to understand why its author was given the UNESCO Kalinga Prize for popularization of science and the Arches of Science award for "contribution to the better understanding of the meaning of science by contemporary man." His many friends who have known these papers as fragments will be grateful to him for having put them together in one volume, carefully edited and in some cases brought up to date. Weaver has faced important problems, come to grips with them, and, if he has not solved them with finality, has made his peace with them and arrived at a state of serenity that he passes on to us.

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## Books Received

**Advances in Lipid Research.** Vol. 5. Rodolfo Paoletti and David Kritchevsky, Eds. Academic Press, New York, 1967. xvi + 432 pp., illus. \$17.50.

**Advances in Marine Biology.** Frederick S. Russell, Ed. Vol. 5, Marine Molluscs as Hosts for Symbioses with a Review of Known Parasites of Commercially Important Species. Thomas C. Cheng. Academic Press, New York, 1967. xiv + 424 pp., illus. \$17.50.

**Advances in Nuclear Physics.** Vol. 1. Michel Baranger and Erich Vogt, Eds. Plenum, New York, 1968. xiv + 416 pp., illus. \$18.50.

**Advances in Space Science and Technology.** Vol. 9. Frederick I. Ordway, III, Ed. Academic Press, New York, 1967. xviii + 466 pp., illus. \$21.

**Antimicrobial Agents.** Loyd W. Hedgecock. Lea and Febiger, Philadelphia, 1967. xii + 232 pp., illus. \$7.50. Medical Technology, No. 3, 1967.

**The Antecedents of Self-Esteem.** Stanley Coppersmith. Freeman, San Francisco, 1967. xii + 283 pp. \$6. Behavioral Science Series.

**Atlas of Oral Histology and Embryology.** Gerrit Bevelander. Lea and Febiger, Philadelphia, 1967. viii + 242 pp., illus. \$9.75.

**Autoclaved Calcium Silicate Building Products.** Papers read at a symposium,

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