

## In the words of the good and the great

A. P. French

**The World of Physics: A Small Library of the Literature of Physics from Antiquity to the Present, Vols I-III.** By Jefferson Hane Weaver with commentaries and notes by Lloyd Motz and Dale McAdoo. *Simon & Schuster: 1987-1988. Each volume about 1,000 pages, \$29.95, £25.*

As THE compiler of this far-from-small collection says in his preface, "An anthology is a work of prejudice". So too, of course, is any review of such an enterprise: one is bound to measure its success in terms of one's own ideas of what should or should not have been included. By any standard, however, this set of volumes is an impressive accomplishment, both for its sheer magnitude and for the care with which it has been put together and edited.

The subtitles of the separate volumes that make up the work are I: *The Aristotelian Cosmos and the Newtonian System*; II: *The Einstein Universe and the Bohr Atom*; III: *The Evolutionary Cosmos and the Limits of Science*. These titles in themselves are indicative of two things: the

scope of the collection goes beyond what would normally be understood by the word 'physics', and there is a very strong emphasis on the twentieth century. The anthology is explicitly described as "a library of the literature of physics from antiquity to the present", and it seems clear that the intention has been to depict the historical growth of the subject, not just to provide a survey of our present knowledge. But even before exploring the books in detail, one is bound to wonder if justice has been done to physics before 1900. This doubt is reinforced when one looks at the actual contents of Vol. I, and my chief criticism of the anthology is concentrated in this area.

Volume I begins enticingly with a section entitled "What is Physics?", containing essays bearing on this theme by four great physicists — Feynman, Born, Einstein and Planck. But the next 300 pages are devoted to what at best can be described as pre-physics, ranging from ancient mythology and astronomy up to Copernicus. Appropriate extracts from Aristotle and Lucretius are included, but so, too, are various poetical, mystical or simply mystifying excerpts from such sources as the Bhagavadgita, Maimonides and Paracelsus. These are interesting in themselves, perhaps, but of negligible relevance to the growth of physical thought.

What is troublesome is not so much the inclusion of this material, but the fact that all of classical physics, from Galileo to Maxwell, is then compressed within the remaining half of the first volume. Particularly hard to understand are the cavalier treatment of optics (limited to brief excerpts from Huygens and Young) and even more the dismissal of electromagnetism through a ten-page extract from Faraday's *Experimental Researches* (his discovery of induction, of course) and a similarly brief excerpt from Maxwell's "Dynamical Theory of the Electromagnetic Field".

It is a relief to turn to Vol. II, which contains a splendid presentation of topics in twentieth-century physics through the words of many of its principal contributors. Almost half of the 60 or so pieces in this volume are excerpts from Nobel lectures, providing a vivid picture of the development of radioactivity, relativity, quantum theory and particle physics. There is even an excursion into the contributions of physics to fundamental biology, with passages from such figures as Schrödinger, Crick and Delbrück. (It was, however, surprising to find no selection devoted to the discovery of X rays, surely one of the most exciting and influential events at the beginning of the modern era.)

The third volume begins, rather arbitrarily, with a section on mathematics; perhaps the most interesting of the four

selections here is Eugene Wigner's famous essay "The Unreasonable Effectiveness of Mathematics in the Natural Sciences". But most of Vol. III is devoted to astrophysics and modern cosmology, and to a collection of 18 articles concerned with the relation of physics and philosophy. Included in this volume are sections on black holes, on theories of the origin of the Universe and on unification theories of the forces of nature. Here are to be found excerpts from three more Nobel lectures, by Weinberg, Salam and Glashow. Many other distinguished names are also represented, including Bethe, von Weizsäcker, Hubble, Bondi, Weisskopf, Eddington, Wheeler and Hawking.

The compiler says in his preface that, in making his selections, he had in mind the educated novice, not the specialist, and to this end he chose writings that were mostly free of equations and technical jargon. His aim is a laudable one, but I think that there are many cases where the mere absence of formalism does not make the subject matter easily accessible.

Very few people, I suspect, will have the stamina to work systematically through this collection, but there is certainly a great deal to reward a more selective approach. The compiler states that his aim was "to strike a pleasing balance between an encyclopedia, a sourcebook, a textbook and a history". I rather question the textbook role, but I think that there is some validity to the claim for the other three. Almost every individual selection is preceded by short introductory comments — often biographical, and generally helpful and informative (though those about energy and entropy are extraordinarily confusing). The anthology is further enhanced by an abundance of apposite quotations heading the individual selections.

I must register one general criticism. The title, *The World of Physics*, is not really justified. Quite apart from the inexcusably short shrift given to the nineteenth century, the emphasis with respect to recent developments is heavily on elementary particles and cosmology, which engage only a small fraction of the world's physicists today. One looks in vain for any significant discussion of nuclear structure, modern optics (including lasers) or the physics of condensed matter (except for Bardeen and Shockley on the transistor). Overwhelmingly, too, the authors quoted are theorists. This is, indeed, predominantly an anthology about fundamental theory. Within that limitation, however, it is a praiseworthy production, for which the self-effacing compiler (about whom we are told nothing) is to be commended. □

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