

a number of authors will show some lack of uniformity in treatment. The present book would have been improved by more vigorous editing to insure uniform nomenclature practices, to make certain that critical experimental details are not omitted at times, to insure that the basis on which yields are reported is stated, to follow conventional usage of physical chemical symbols, and to avoid a few definite errors in names, formulas, and usage of terms. Yet these items are minor compared to the overall usefulness of the book.

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## Physics for the General Reader

**The Nature of Matter.** Physical Theory from Thales to Fermi. GINESTRA AMALDI. Translated from the Italian edition (1961) by Peter Astbury. University of Chicago Press, Chicago, 1966. 332 pp., illus. \$5.95.

Enrico Fermi had unusual ability in attracting first-rate men as co-workers. His group, moreover, seems to have had the ability to attract talented women as their wives. Laura Fermi's biography of her husband and her books on Galileo and Mussolini are well known. Now the wife of Edoardo Amaldi, herself a former physics student in Rome, has written a popular account of particle physics in the 20th century.

As the subtitle indicates, her story begins with the ancient Greek philosophers. The entire period up to the mid-1890's, however, is disposed of quickly in the first chapter. The meat of the book consists of the topics of radioactivity, atomic physics, nuclear physics, and quantum theory. These the author discusses in a manner intended, according to the book jacket, to attract the "cultivated general reader without an understanding of advanced mathematics."

The book is clearly written and reasonably accurate, but not distinctive. There is no theme, argument, quality, or feature that distinguishes it from the many such works which attempt to make modern science comprehensible to the nonscientist. When I first saw the subtitle I hoped that perhaps we might be treated to a discussion of the significance of Fermi's contributions to an understanding of matter. But the author does not thus justify the use of his name; nor, in

fact, does it serve as an end-point, since she includes more recent topics (fusion experiments, fundamental particles, and so on).

The book cannot be considered a history, for no attempt is made to uncover causes, trace trends, and fill in background information. The text tells us nothing about personalities, and the plates are only of cloud chamber tracks and accelerating machines (not even one of Fermi!). The illustration captions, incidentally, merely identify the tracks or machines, without explaining the characteristics or pointing out individual pieces of apparatus. If the layman needs a good-sized text to explain modern physics to him, why is it assumed that he can view technical photographs intelligently without extensive captions?

The book is, in effect, a catalog of discoveries. The "intelligent layman" who reads it must be a determined individual indeed, for it is no mean task to digest such a concentrated dose of information about science. A large part of the market for such a book may, however, consist of scientifically trained people who desire a synthesis or overview of this very important subject, hoping to see the forest instead of the trees. They will be disappointed.

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## An Innovator within Bounds

**Revolutionary Doctor: Benjamin Rush, 1746-1813.** CARL BINGER. Norton, New York, 1966. 326 pp. \$7.95.

Charles Caldwell was no doubt right when he said that the great ambition of his teacher Benjamin Rush was to be an "original." This signified the will to establish in theory and in practice a new, distinctive, individual system, upheld and propagated by a band of loyal pupils but reaching out beyond the profession to the judgment of the enlightened citizenry—the yearning to be a Sydenham, a Cullen, or a Brown. There was also to be a national element in the new medicine; Rush's system was to be the "American System." His success and his failure were intimately bound together. As an apostle of nationalism, as a Signer, as America's first great medical celebrity, he was indeed a "revolutionary doctor." A case can be made out for him also

as an "original" in the more modern sense, particularly in psychiatry. But as the ultimate heir of the 18th-century systematists, as the leading American disciple of those aptly termed by Binger the "metaphysical Scottish physicians," he had turned his face to the past. He was not really behind the times unless one looks to the very greatest or most singular of his contemporaries. He was rather an innovator within the bounds of strict tradition, bounds which he could never transcend, not even in the psychiatric realm. Like the humblest of inventors, he tinkered (although on a large scale) with other men's notions. To many of his countrymen, however, he appeared to be a major prophet, and his influence did not die with him. Nevertheless he was the last of his larger-than-real-life kind. Carrying similar ambitions to the middle of the 19th century, Caldwell became a mere figure of fun.

Binger's very readable biography ("telling comments" from the "glowing mind" of Catherine Drinker Bowen helped to teach him the biographer's art) is an advance over Goodman's hitherto standard work, thanks in part to the aid of Corner and Butterfield with sources, and to the perceptions of Shryock and Carlson in interpreting Rush's many-sided endeavor. It is not the definitive biography, for which we must look to a professional scholar. (One would hardly guess from reading this overall assessment that Rush has for years attracted the special notice of graduate students, and some senior scholars as well, to particular aspects of his work.) Neither is it "psychohistory" or "psychobiography" to the degree that might have been expected. Rush had the misfortune to lose his father when he was eight; as a grown man he had the temerity to write down a little of what he dreamed about at night. Binger bears down on these rather meager materials but has the good sense not to make too much of them. On the whole he succeeds as nobody else has succeeded in making a believable human being of a not very promising candidate. In this achievement there is at least as much of Bowen as of Freud. There remains, however, a flavor to the whole book of the words which conclude the chapters on Rush and diseases of the mind: "he needs no further apology." The setting—in terms of antecedent and contemporary ideas—might well elicit some complaint in detail. Broadly speaking, it is sound but unsurprising. It has the