waves, light, x-rays or gamma rays—is absorbed, its energy appears as heat, leaving nothing behind."

Other misleading statements are:

"Helium would be a good moderator if pressurized, but has not yet been used."

"Relatively little has been published about the technology of fuel elements, but one design has been described in detail."

"Both [West Stands and Calder Hall] had to utilize natural uranium, which, as we have remarked, is basic to all nuclear energy programmes depending on fission."

"The neutrons and gamma rays which escape from the core carry quite a lot of heat with them which is wasted. . . ."

"We see that oxygen and carbon are the only two freely available elements that can be incorporated in a reactor core while keeping neutron wastage to a minimum."

"The latter [leakage] is very important because neutrons go through solid matter like water through a sieve."

"The dimensions of the array are so chosen that a (fast) fission neutron from ^{235}U has a good chance of escaping from the rod in which it is liberated before being captured by ^{238}U: the rods must not be too thick."

"The smallest unit of length used by the engineer is a microinch,"

With these quotations, I leave you to your own conclusions.

KARL H. PUECHL
Nuclear Materials and Equipment Corp.
Apollo, Pennsylvania

(Editor's Note: Karl H. Puechl is Deputy Director of the Plutonium Program, Nuclear Materials and Equipment Corporation, Apollo, Pennsylvania. For the seven years prior to joining NUMEC in 1959, Mr. Puechl was Manager of the Theoretical Department at Walter Kidde Nuclear Laboratories and the successor corporation, Associated Nucleonics.)

Elementary Nuclear Physics. By W. K. MANSFIELD. Temple Press, London, 1959. 60 pp., 38 illustrations $1.75.

The book is one of a monograph series in Nuclear Engineering designed for undergraduate college students. Although limited to the aspects of nuclear physics of utility in the nuclear reactor field, the selection of material is good. The major sections deal with basic ideas of atoms and nuclei, radioactivity, neutron reactions, radiation attenuation, and particle detection. In order to compress a large amount of information in a few pages, the author restricted himself to factual statements, with little explanatory material. One often wonders how well a student having only one year of college physics, primarily classical in nature, is able to assimilate condensed versions of nuclear physics.

With its admitted goal of producing an inexpensive volume, the publisher has employed many rough or qualitative graphs. For example, the Maxwellian speed distribution curve does not identify the value of the most probable speed; no indication is given of voltages in the geiger counter characteristics. The lack of grid work prevents a student from picking off corresponding numbers with any accuracy. Also, some of the diagrams are hard to understand, even if the reader knows the subject matter, for example, neutron absorption Fig. 21, and the neutron chain reaction Fig. 24.

As for emphasis, the author would have done well to place the magnitude of the energy release from fission and fusion in context with energy from common fuels. Similarly, a fine opportunity to summarize the roles of hydrogen, lead, and boron in a reactor shield was missed.

For the reader who cannot or does not wish to invest enough to obtain a more thorough background in nuclear physics, the book is useful.

RAYMOND L. MURRAY
North Carolina State College
Raleigh, North Carolina

(Editor's Note: Raymond L. Murray is Burlington Professor and Head of the Department of Physics at North Carolina State College. He was with the Manhattan Project in Berkeley and Oak Ridge from 1943 to 1946, with Oak Ridge National Laboratory from 1947 to 1950, and has been at North Carolina State since that time. He obtained the Ph.D. degree from the University of Tennessee. He is author of "Introduction to Nuclear Engineering" and "Nuclear Reactor Physics." He has been a member of the ANS Board of Directors from 1958 to the present and is currently the chairman of our Education Committee.)

Materials for Nuclear Engineers. Edited by A. B. MCINTOSH AND T. J. HEAL. Interscience, New York, 1960. 373 pp. $11.85.

This book is a collection of articles on some possible reactor materials, namely: uranium, plutonium, thorium, uranium dioxide, uranium mono-carbide, uranium silicides, thorium oxide, graphite, magnesium, beryllium, and zirconium.

Dr. McIntosh, Development Director of the United Kingdom Atomic Energy Authority Production Group, has understandably chosen all authors from the UKAEA and these authors have understandably stressed materials and information of particular interest to the British reactors. Thus, there are almost as many pages on magnesium as there are on uranium, while there are none at all on beryllium oxide, nor in fact any on ceramic fuels diluted with ceramics or metals.

Most sections contain information on occurrence, extraction, preparation, physical properties, mechanical properties, creep properties, nuclear properties, compatibility, fabrication, and effect of reactor conditions on the material in question. There are numerous tables and curves which collect information in a readily visible and useable form.

There are some tantalizing lacks of information. For example, the editor says "only properly planned irradiation experiments can provide reliable data", but there is no suggestion throughout the book on how to properly plan such experiments.

There are relatively few misprints. These include some careless ones. On page 81 it states that PuO_2 is obtained by heating Pu metal in ammonia. On page 177 there is a confusion between temperature and density in the text and caption of the figure. On page 216 the half-life of C^{14} is given as 10^3 yr while actually it is about six and one-half times this long. On page 273 ammonium fluoride is written instead of beryllium fluoride. On page 305 it is stated that there is no evidence for a beryllium hydride. Actually there are a number of articles in the literature on this material.[1]

[1] See for example: *J. Am. Chem. Soc.* **79**, 3687–89 (1957).