An Introduction to Transport Theory. by G. Milton Wing. John Wiley and Sons, (1962). 169 pages. $7.95.

It is the aim of the author, according to the preface, to give the reader an understanding of transport phenomena. He begins by analyzing some relatively simple mathematical models, ranging from a one-dimensional 'rod-model' to semi-infinite slabs. He derives equations using, in parallel, the classical Boltzmann approach and the relatively recent work of Bellman, Kalaba and Wing on the invariant imbedding method. For the simple models he shows the equivalence between the two approaches. For those familiar with the Boltzmann approach, this serves as an excellent introduction to the invariant imbedding method. This somewhat careful investigation of simple mathematical models, together with other material to be discussed later, makes this a book of considerable interest to the applied mathematician. The physicist or nuclear engineer who is seeking a physical understanding of transport phenomena, or who is looking for methods of actually solving realistic problems will find the book disappointing.

The method of invariant imbedding, as introduced into transport theory by Ambarzumian, is highlighted in the text. No precise statement of the method is given, but sufficient applications of the method to relatively simple problems are presented to give a picture of the ideas involved. On more realistic models, including nonlinear ones, the detail employed in earlier chapters is abandoned for heuristics.

The solutions to only two nontrivial problems are actually outlined in the book. The first, representing the invariant imbedding approach, deals with the problem of reflection from a semi-infinite slab as treated by Chandrasekhar. The second, representing the classical approach, is the solution of Milne's problem using the Wiener-Hopf technique.

The author elected to pay no attention to questions of practical calculations of transport phenomena. In contrast to the classical linear Boltzmann formulation, it is characteristic of the invariant imbedding approach to yield coupled nonlinear initial-value equations. The author states that they may be readily solved using modern computing machines. As with other methods, everything is straightforward for simple models. The application of these simple concepts to the realistic models daily facing the nuclear designer is not so straightforward. It is not at all obvious how the work entailed in solving the resulting equations would compare to that in currently employed numerical methods.

For those with advanced mathematical training, there is a chapter containing a resume of Lehner's and the author's exquisite investigation of the time-dependent transport problem for an infinite slab of finite thickness. This fundamental work, dating from 1955, is an outstanding example of the results which may be obtained by applied mathematicians versed in the techniques gathered under the title of Functional Analysis. Another chapter reviews recent mathematical investigations in transport problems employing similar methods.

In summary, the author has combined, with some extensions, selections of transport-theory investigations in which he has participated. These are of interest in themselves, especially for those similarly motivated in applied mathematics. The book is not, however, suitable as an introduction to transport theory for the nuclear engineer.

George J. Habetler

Department of Mathematics
Rensselaer Polytechnic Institute
Troy, New York

About the Reviewer: George J. Habetler is a professor of Mathematics at Rensselaer Polytechnic Institute. From 1952 to 1963 he was a mathematician at Knolls Atomic Power Laboratory. He received his doctorate in Mathematics from Carnegie Institute of Technology in 1952.

Experimental Nucleonics. By Basil Brown. Iliff Books Ltd., London; Prentice-Hall, Inc. Englewood Cliffs, N. J., (1963), 245 pages. $8.95.

This text is one of a series used in post-graduate nuclear reactor courses in the United Kingdom. Students with a variety of backgrounds in science and engineering are given an introduction to the measurement of radiations.

The first third of the book reviews the fundamentals of radioactivity, attenuation and detection of radiation, and electronic circuits. This presentation is almost entirely descriptive and qualitative. The last two-thirds consists of fifty laboratory experiments, with listings of apparatus, theory, and procedure. The bulk of the experiments deals with electronics, counting systems, and radioactivity, with the rest on physical constants, neutron detection, and health physics. Most of these are based on conventional detection methods and little of recent developments appears.

It is clear that the author tried to include a large number of experiments to allow the instructor of a particular course to make his own selection. The descriptions are very brief, averaging less than three small pages. One has the