The treatment in general is adequate for a graduate student of mathematics, and is accessible on a rather elementary level, in principle. In fact the author does not cater to everyone who might use functional equations. His applications are not to kinematics, to economics, to computing, and to logic, but to mathematical analysis. From the standpoint of the research mathematician, the book is a compendium of useful techniques, results, and references. For undergraduate study it needs additional motivation and exercises.

Finally, I consider from my limited viewpoint the question of coverage. It seems to me that inequalities might have been used to better advantage. For example, subadditive functions satisfy a functional inequality. So do convex functions. Embedding the equalities deliberately in inequalities even when emphasizing the former would have definite advantages in techniques, proofs, and generality.

Next, the general principles are often obscured in techniques. I hold to the opinion that a theorem or result is best presented in the most general fashion available, provided this does not generate an unbearable degree of complexity in the conditions. Much of the theory presented holds in a context of partially ordered semigroups or groups. I have discussed several Boolean functional equations which are analogous to certain ones considered here. Such functional equations, implicit in definitions of topology, for example, are not discussed. However, on the grounds he has chosen, those of classical analysis, the author has done a thorough job.

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Elemental Concepts of Science

Philosophical Foundations of Physics. An Introduction to the Philosophy of Science. RUDOLF CARNAP. Martin Gardner, Ed. Basic Books, New York, 1966. 310 pp., illus. $6.50.

Rudolf Carnap is the greatest living philosopher of science in America. He is justly famous for fundamental contributions to formal logic and semantics, the theory of scientific meaning and explanation, inductive logic and probability, and the philosophy of physics. His work is unmatched in scope and significance. It embodies the highest degree of technical precision and has been widely influential in setting standards of exactness in contemporary philosophy of science. His writings, although always models of clarity and thoroughness and much prized by professional philosophers of science, have not often been easily accessible to the general reader.

The present book is a very different sort of work. It is a sustained exhibition of Carnap's talent as an inspired teacher who can make the most abstract technicalities intelligible to the uninitiated. It is the remarkable fruit of collaboration with Martin Gardner, a well-known science writer. Using transcriptions of Carnap's seminar talks on philosophy of physics, Gardner, who had earlier attended a similar course by Carnap, composed the book. Carnap made revisions and checked the accuracy of the manuscript. One has the feeling that the outcome is distinctively Carnap in content and tone. This is a tribute to Gardner's skill and sensitivity. The result is an extremely readable and relatively nontechnical presentation of a wide range of fundamental material in philosophy of science.

The book is actually much broader in scope than its title may suggest. The illustrations are usually drawn from physics, but most of the issues discussed have applicability to all of the empirical sciences—physical, biological, or social. It is mainly concerned with the nature of laws, theories, explanation, confirmation, probability, measurement, and causation. In addition, there are discussions of space, time, and indeterminism in modern physics.

It is a rare and delightful occasion when a great man produces a well-constructed introduction to his field. Until now, we have not had such a book in recent philosophy of science. There have been popularizations and introductory textbooks, but the popularizations have often been contentious and the textbooks have often failed to be elementary. Books of each type have frequently bought simplicity at the price of inaccuracy. The present book does not share these disadvantages. Carnap's views are set forth in clear, intelligible, undogmatic terms; though many may disagree with them, they are serious theses soberly presented. Technical details are often omitted, but supplementation rather than correction is needed to provide the full account. The simplicity has been achieved, moreover, without sacrificing the basic issues. Carnap constantly has his finger upon the essentials, and for this reason the book is elementary in all of the best senses of that term. It is, in my opinion, by far the best book available for the intelligent reader who wants to gain some insight into the nature of contemporary philosophy of science. By virtue of its scope, its accuracy, its penetration, and its stylistic excellence, this book seems likely to achieve recognition as the classic introduction to mid-20th-century philosophy of science.

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Studying Animal Populations

Ecological Methods. With Particular Reference to the Study of Insect Populations. T. R. E. SOUTHWOOD. Methuen, London; Barnes and Noble, New York, 1966. 409 pp., illus. $13.50.

Southwood, who is reader in insect ecology at the University of London, has given us an excellent book, one which should be of lasting value to ecologists. One of its important features is that the large and scattered literature in this field has been gathered and analyzed critically. There are 14 chapters. Following an introduction, the sampling program and measurement and description of dispersion are considered. This is followed by a series of chapters dealing with absolute population estimates: by use of marking techniques, and by sampling a unit of habitat (air, air plants, plant products and vertebrate hosts, soil and litter, fresh water). Then comes a chapter on methods for relative population measurement and for derivation of absolute estimates. Estimates based on products and effects of insects are considered. Both observational and experimental methods for estimating natality, mortality, and dispersal are examined. Construction, description, and analysis of age-specific and time-specific life tables occupy two chapters. The construction of life tables is done in such a manner that only a modicum of background experience is needed to understand the procedures. These chapters are followed by a short one on the experimental component analysis of population processes. Then a much longer chapter on