elimination of the longitudinal field is performed. It is shown how the vacuum fluctuations lead to infinities in the theory. There is a passing reference to renormalization theory but the author does not consider that this provides a satisfactory solution of the difficulty. Most physicists would assent to his conclusion that "It would seem that we have followed as far as possible the path of logical development of the ideas of quantum mechanics as they are at present understood. The difficulties, being of a profound character, can only be removed by some drastic change in the foundations of the theory, probably a change as drastic as the passage from Bohr's orbit theory to the present quantum mechanics."

Queues, Inventories, and Maintenance: The Analysis of Operational Systems with Variable Demand and Supply. Vol. 1 of ORSA Publications in Operations Research. By Philip M. Morse. 202 pp. John Wiley & Sons, Inc., New York, 1958. $6.50. *Reviewed by T. Teichmann, Lockheed Aircraft Corp.*

Several areas of industrial and military operations research have proved particularly amenable to reasonably complete mathematical treatment, in particular problems involving sampling, allocation, and waiting times. The first two of these received their main stimuli from the analysis of industrial and military operations and as a result a very complete description is available in the relevant mathematical areas; that is to say, statistics and game theory. This includes not only the underlying analysis but also a large amount of quite sophisticated algorithms for the determination of numerical solutions.

The situation in the case of waiting-time problems has been a little different since their underlying structure is closely intertwined with many basic problems of stochastic processes. As a result, the mathematical literature contains many fundamental papers on the underlying structure but until recently not too much discussion aimed at the solution of problems, except possibly in the field of telephone operation. This brief work by Professor Morse aims at bridging this gap to some extent by presenting the algorithms for a number of basic but also flexible models and also by presenting some of the underlying mathematical concepts and techniques.

The book begins by describing the notions of arrival and service time distributions and then goes on to a discussion of single- and multiple-exponential channels, the simulation of nonexponential and other distributions, and of the transient behavior of such solutions. An extended discussion is then given of the single-channel problem with infinite queues including the effect of nonexponential distributions and these results are also extended to multiple channels. The effect of priorities and queue discipline is also dealt with in connection with service problems. The last two chapters of the book deal with problems of inventory control and equipment maintenance.

The appendices include a glossary of symbols used,

some basic analytic and asymptotic properties of the Erlang functions and a number of tables of these functions together with a few other useful tables.

This volume does not pretend to be either a complete or a basic exposition of queuing theory but it does provide a very useful steppingstone to the application of the fundamental principles in this field to a number of practical examples. The treatment is kept alive by frequent review of the appropriate Kolmogoroff equations which govern the underlying probabilities and the presentation therefore has intrinsic interest apart from its usefulness as a practical handbook.

Satellites and Spaceflight. By Eric Burgess. 159 pp. The Macmillan Co., New York, 1958. $3.95. *Reviewed by J. R. Pierce, Bell Telephone Laboratories.*

This modest book of 159 pages has a very special value. It is not wordy, watered down, and gee whizz, as books intended for the complete novice tend to be. On the other hand, it does not try to present all the details of every aspect of a hopelessly broad subject. Instead, it summarizes results and cites sources.

In this way, a surprising number of points concerning space flight are brought to the reader's attention. These include not only space medicine but human reaction time as its limit on the performance of space pilots, temperature on reentry, telescopic resolution on earth and in space, satellites as radio repeaters, accuracy of velocity required for moon-circling orbits, various orbits for a probe vehicle to Mars, berthing at a space station, ion rockets, and a great deal more. In fact, the book calls to the attention of the reader about all of the sensible ideas connected with space travel that anyone has expressed. In doing this, difficulties, and especially the difficulties of manned lunar and planetary flights, are adequately stressed.

This does not necessarily mean that every statement in the book is absolutely correct. On many points Mr. Burgess has to take the word of the authors of more technical material. In a few cases he cites references and makes statements which seem dubious to me. This is unlikely to mislead any competent person who pursues seriously the various matters introduced in a book which is less of a final authority than a sensible and valuable introduction and guide.

Radiological Physics. By M. E. J. Young. 365 pp. Academic Press Inc., New York, 1957. $7.50. *Reviewed by Joseph G. Hoffman, University of Buffalo.*

In fourteen brief chapters the author has sketched the physical aspects of clinical applications of penetrating radiations. Although written as a short textbook for prospective clinicians, it serves also to introduce the physicist to the practical business of using radiations in therapy. The first eight chapters deal with the basic physics and engineering of production and measurement of radiations. X-ray apparatus and its circuitry are described along with high-energy devices such as