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not assume that the reader has seen the introductory chapters on background. This results in numerous repetitions in the text and figures, and one asks whether it was really necessary to include the background chapters.

The book is made up primarily of lectures given during evening courses. It is unfortunate that most of the lectures were not sufficiently revised to contain more scientific information and less prolixity. An example: one paragraph (p. 28) is devoted to a description of fatigue of the technician doing fluoroscopic inspections. This situation "induces carelessness and inattention which results in inspectional inaccuracies. A satisfactory method of working that overcomes this difficulty is to employ a team of two operators who interchange duties. . . ." The other operator, in case the reader should wonder, may do something less fatiguing "such as sorting specimens".

Some puzzling statements are found in the book, e.g., we read about "mechanical vibration at frequencies beyond the speed of sound" (p. 190). At another point (p. 90) the reader might get the impression that light is a longitudinal wave. In summary, a great deal of editorial work might have made this book into a short but acceptable review of the subject.

An Introduction to Linear Programming and the Theory of Games. By S. Vajda. 76 pp. (Methuen, London) John Wiley & Sons, Inc., New York, 1960. \$2.25. *Reviewed by George W. Evans, II, Stanford Research Institute.*

THE following two statements are found in the preface: (1) "No mathematics beyond secondary level is required and very little of that. All that is needed is the ability to concentrate on the matter read, and the will to correlate it with the experience from the reader's own field." (2) "The purpose of this book will be fully achieved if it leads to an understanding of the place of Linear Programming and of the Theory of Games in modern Operational Research, and if it stimulates further reading." These statements have a contradictory ring since a deeper grasp of mathematics is necessary both for an understanding of the place of linear programming and theory of games in modern operational research (where most analytic techniques are mathematical) and for the stimulated reader to proceed to the further readings suggested in the preface or by the footnotes. Thus, the self-imposed mathematical restriction more accurately represents an interesting literary exercise than a useful definition of the educational qualifications demanded of readers.

The organization of the book is interesting. In Part 1, it exhibits a simple Hitchcock-Koopmans transportation problem and discusses its solution. The simplex method of Dantzig is introduced for solving programming problems. Examples are given of the solution of problems restated as transportation problems. The dual problem for a given problem and the use of this concept is presented. In Part 2, one is introduced to some of the fundamental concepts of the theory of games. This is

followed by problems which can be solved by linear programming techniques. Other methods are suggested, and non-zero-sum and infinite games are described. Thus, a narrow but straightforward development of the subject matter is contained in a few pages.

It would have been nice to have the tie between the simplex method and linear algebra. In compensation, however, there are two appendices: proof of the fundamental theorem of duality and proof of the so-called main theorem of the theory of games.

Advances in Space Science, Volume 2. Frederick I. Ordway, III, ed. 450 pp. Academic Press Inc., New York, 1960. \$13.00. *Reviewed by S. F. Singer, University of Maryland.*

THE wide scope of space science is illustrated best by the subjects of the six review chapters in this book. They range from space physics to satellite tracking, materials, electrical propulsion systems, and attitude control. The first chapter by Charles P. Sonett on experimental physics using space vehicles is unusually comprehensive (115 pages) and covers the subject matter as well as the techniques in an authoritative and detailed way. There is much important information on instrumentation and detectors for various types of radiations, as well as on the problems of telemetering, and on construction and environmental testing of instrumentation. In all cases, the background is well described; an example is the operation of various types of magnetometers and the discussion of precision and errors associated with them. One suspects that this chapter will prove most useful to any prospective satellite experimenter since it carries the process from design of experiment to environmental testing of the equipment.

The next chapter, by Karl G. Henize, deals with tracking artificial satellites and space vehicles and discusses both radio and optical tracking, with heavy emphasis on optical photographic systems such as have been used at the Smithsonian Astrophysical Observatory. A subject of greater interest to engineers, materials in space, is discussed in the next chapter by Frederick L. Bagby (Batelle Institute).

The two chapters that follow deal with electric propulsion devices. Morton Camac (AVCO) describes plasma propulsion devices, including arc-heated jets, magnetohydrodynamic accelerators, and similar devices. The underlying theory is briefly described and its realization to propulsion hardware is indicated. Ernst Stuhlinger and Robert N. Seitz (Marshall Space Flight Center) discuss electrostatic propulsion systems for space vehicles, dealing, of course, with ion propulsion. This subject is developed in great detail, including the optimization of an ion-propulsion system for various types of missions.

The book concludes with a chapter by Robert E. Roberson (Systems Corporation of America), on attitude control of satellites and space vehicles. The treatment deals mainly with the dynamics aspects of the

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