The book is well illustrated and indexed. The references are generally up to date although the writers did not attempt to emphasize the very latest findings in their fields; instead, they have presented a well-balanced and comprehensive survey of five important branches of acoustics.

Statistical Strength Theory. By S. D. Volkov. Vol. 11 of Russian Monographs and Texts on Advanced Mathematics and Physics. Transl. from Russian by Royer and Roger. 267 pp. Gordon & Breach, New York, 1962. $11.50. *Reviewed by George H. Weiss, University of Maryland.*

A SUCCESSFUL theory of the weakening and failure of metals would have too many applications to bear detailed listing. The present monograph presents a theory of material strength which may indeed be applicable to many situations; however, the theory is ad hoc, and one cannot be completely convinced that Volkov's approach is a valid one on the evidence of this book alone. No attempt is made in it to indicate the possible limitations of the theory although their existence is certain.

The problem to which the author addresses himself is the elucidation of the properties of metals with microscopic inhomogeneities. The assumption made is that the inhomogeneities can be described statistically. If one then writes down the stress-strain equations, relations between moments may be obtained in a straightforward manner. The author then goes on to study media which have normally distributed stresses and elastic deformations. With this approximation, various averages can be taken and different physical properties calculated. It is at this point that the reader would require a more detailed idea of the limitations of Volkov's methods. But such information is not to be found. Some of the topics which are treated in detail are limiting surfaces of plasticity, fracture, and fatigue under cyclic load. There are many sample calculations, and there are references to detailed comparison with experimental data. Although I could not check this literature, I would presume that the theory is successful in many specific situations. A convincing exposition of a new theory does require a careful discussion of its boundaries. It is tempting to compare the statistical theory of elasticity with the statistical theory of turbulence. But the evidence for the validity of the former theory is not as well delineated as that for the latter, so that a final verdict will have to wait upon further work.

Basic Concepts of Physics. By Arthur Beiser. 341 pp. Addison-Wesley Publishing Co., Inc., Reading, Mass., 1961. $7.75. *Reviewed by Horace M. Trent, US Naval Research Laboratory.*

WE have here not a philosophical discussion of the foundations of physics but rather a simple and readable textbook for a one-semester college survey course intended for students not majoring in a natural

science (this by virtue of the author's studious avoidance of the use of the calculus). Bearing in mind that Professor Beiser has set himself the task of covering the subject from Newtonian mechanics to nuclear reactions, his selections and, in the opinion of this reviewer, his list of "basic concepts" are good.

Regarding the level of the mathematical sophistication that he has assumed on the part of his reader—the author has adopted the point of view that his students need to know some algebra, a smattering of trigonometry, and no calculus. He purports to assemble all of the mathematical notions a reader will need in Appendix I. This is a readable section, but, perhaps because of its brevity, the author has included a few sentences which, if taken literally, could lead to sloppy concepts. Two such examples are: "Algebra is arithmetic with symbols used in place of specified numbers" and "Parentheses and brackets are used to show the order in which various operations are to be performed".

Professor Beiser has elected to omit both historical and philosophical material, explaining in his foreword, "However, while the study of physics cannot realistically exclude its philosophical and cultural aspects, I do not believe that a discussion of these aspects can make much sense to a reader who does not first know just what it is that they concern." He does suggest some supplementary reading.

A list of "important terms" and an extensive list of problems are given at the end of each chapter. Answers to the odd-numbered problems are given in an appendix.

This book, like most elementary textbooks in physics, suffers by virtue of the fact that relative motions are completely ignored in the early chapters where the subject should be introduced. It is not proper, in this reviewer's estimation, to await a chapter on the special theory of relativity to introduce this most basic concept.

It is not hard to find sentences in almost any new textbook which can lead to faulty notions on the part of a reader. Professor Beiser does not have many of these but some that are included in the book are the following:

"When a graph of one quantity versus another results in a straight line, each quantity is *directly proportional* to the other" (The italics are the author's).

"Before we can compute the acceleration involved in going from 10 to 50 mi/hr in 9 sec we must convert the speeds from mi/hr to ft/sec."

"The car's acceleration in the *proper units* of ft/sec^2 . . . "(The italics are the reviewer's).

"The wave speed depends upon the properties of the pond water, varying with temperature, impurity content, and so on, but is independent of the wave amplitude."

As said before, most books tend to have a few sentences, like the foregoing one, which represent, in all probability, momentary lapses on the part of the author. If kept to a minimum they do not really impair the value of the book. This is certainly true of Professor Beiser's text for it does a good job of presenting a set of core concepts to readers who are meeting physics for the first time.