culation is carried out in some detail, and other potentials are mentioned in passing. The natural extension of the shell model is done by time-dependent Hartree-Fock and by linearization of the equations of motion in the spirit of many-body calculations. Departures from spherically symmetric closed shells occupy a chapter. The Elliot model is done here.

Pairing and associated collective motions occupy considerable space. The degenerate model is solved, and the treatment of the two-level problem is given in the framework of the Bogolyubov-Valatin quasiparticle method. The last chapters deal with the optical model, and very nicely, carried to the great resonances in neutron scattering and the Green's-function formalism.

The title does not mislead: the treatment is indeed unified, mostly by the common use of many-body language and approximations. This makes for a readable book. One can envisage some "standard treatment" of the future organized on these lines.

Electrons and Waves. By John R. Pierce. 226 pp. Doubleday, Garden City, N. Y., 1964. Paper $1.25.
Reviewed by L. Marton, National Bureau of Standards.

Both the title page and the introductory statement preceding the title page state that the book is a revised and enlarged edition of the first eight chapters of *Electrons, Waves and Messages* by the same author, which was published in 1956 by Doubleday and Co., Inc. I happened to have missed the first edition, and to my surprise, I have not found any review in *Physics Today* of the first edition either. This is an added reason for my pleasure in looking over this delightful book and to report on it to the readers of *Physics Today*.

The new paperback edition of this book is part of the Science Study Series, and as such it should provide a survey within the grasp of the young student or layman. Dr. Pierce has used all his ability, demonstrated during the years when he was writing his science fantasy stories, to introduce the young readers or laymen into the world of electrons and of waves. This introduction goes by easy steps. The first chapters discuss generally the scope of the book and the laws of motion, essentially Newtonian mechanics. After discussion of the different fields, electrostatic and magnetic, and their action on the electron, there is a short chapter on waves.

The introduction to Maxwell's equations takes up 30 pages of the 200 odd pages of the whole volume, after which the author goes on to some applications of Maxwell's equations, including electromagnetic devices, vacuum-tube amplifiers, signal propagation, and similar things.

While the book on the whole is an excellent introduction to the subject, I am not entirely clear for whom it is written. The first chapters entice the reader with a very, very easy introduction into the most elementary notions of physics. There is an excellent introduction into vector notation, but then, later on, vectors disappear completely from the volume and are not used again. The treatment of Maxwell's equations uses an integro-differential representation and is much heavier going than the beginning of the book makes the reader believe. I had to reread some sentences three or four times until I was sure of the author's meaning or at least believed myself sure of it. Summarizing, I would say that while the second part of the book is definitely at the lower college level, the beginning is at the secondary-school level. The danger is that the first part may discourage the more advanced student, whereas the less advanced may find the latter part too heavy going for his taste.

The book shows every indication of having been written by one of the best authorities in the field. I could find but one misleading statement. I deliberately say misleading because what appears to be an error at first is repeated on page 113. The author states that, "for a 50 000-volt accelerating voltage, which is common in electron microscopy, the electron wavelength is about 2×10^{-9} inch", instead of the correct value of 2×10^{-10} inch. That this statement is not a typographical error, is manifested by the following sentence: "This is roughly a ten-thousandth the wavelength of visible light." It should be one hundred thousandth. Likewise, in the following paragraph, the resolution of the electron microscope is given theoretically as ten thousand times as good as a light microscope; instead of one hundred thousand times.

These are minor details perhaps and generally the statements are so correct and so well presented, that the book should be recommended warmly to all readers for whom the Science Study Series is intended. In particular, it should be very useful to science teachers, who may want to use Pierce's methods of presentation of a difficult subject.

Science and the Future of Mankind. Hugo Boyko, ed. 380 pp. Indiana University Press, Bloomington, 1964. $6.95.
Reviewed by R. B. Lindsay, Brown University.

Concern over the role of science in the progress of civilization continues unabated. Will the scientific method, already proved so powerful in mastering our natural environment, ultimately succeed in solving *all* the problems of mankind, or will science, by providing human beings means too powerful for their control, in the end pave the way for our complete destruction? These are questions one encounters in various forms on all sides, and innumerable are the pundits who arise to try to answer them. The present book consists of a series of twenty-one articles, long and short, on various phases of the relation between science and mankind, contributed by eminent authorities in science and the social studies. The volume is announced as the first in a series of publications to be sponsored by a new organization called the World Academy of Art and Science, founded in 1960 with the purpose of serving as a kind of "World University" for the discussion of the "vital problems of mankind . . . from an objective, scientific and global point of view", hopefully without the natural prejudices normally associated with national groups. The present president of the Academy is Lord Boyd Orr of Britain and the Secretary General is Hugo Boyko of Rehovoth, Israel, the editor of this volume.

Though there is a thread of common interest running through the volume, it is a thin one and the reader will not find much coherence among the various essays. Physicists will naturally be interested in what Robert Oppenheimer has to say of "Prospects in the Arts and Sciences" and the views of the late W. F. G. Swann on "Science and Our Future". In biology the noted geneticist Hermann J. Muller discusses "The Prospects of Genetic Progress" and betrays a cautious optimism, though he is obviously worried over the population explosion problem, as are other essayists in the series. These include geologists, botanists, an ecologist, a sociologist, a political scientist, as well as a representative of the fine arts. All of the articles are worth reading though their relevance to the main theme does not appear to be equally great throughout. Most of them are rather factual though a few wax somewhat lyrical. A good example of the former is the essay by the distinguished botanist M. J. Sirks of Groningen on "Food Supply and Increase of Population". An illustration of the latter is provided by Bertrand Russell's "Per Aspera ad Astra", in which the well-known philosopher bids mankind give up being "miserable sinners" and "choose joy rather than sorrow." If only the noble lord had divulged to us what he means by joy!

Electronic Methods. E. Bleuler and R. O. Haxby, eds. Vol. 2 of Methods of Experimental Physics, edited by L. Marton and Claire Marton. 839 pp. Academic Press, New York, 1964. $24.50.

Reviewed by R. R. Borchers, University of Wisconsin.

Electronics forms a necessary part of many of the experiments currently done in physics, and the experimenter would often like to have an up-to-date reference book which discusses electronic circuitry with emphasis on the problems encountered in physical measurements. Volume 2 of the series "Methods of Experimental Physics" entitled *Electronic Methods* is intended to be such a reference. Some twenty-six authors have cooperated with the editors to produce this volume which is the fifth of the series to appear. Most of the authors are either associated with physics laboratories or with companies which supply equipment for scientific work and should therefore be familiar with the instrumentation needed in physics experiments.

The first 8 chapters, about two-thirds of the book, cover approximately the topics found in most textbooks on electronics, but with greater emphasis on measurement and instrumentation. The first chapter is a short discussion of the evaluation of measurements and the following chapters discuss dc and ac circuits, vacuum tubes, semiconductor devices, linear circuits, nonlinear and switching circuits, and feedback. These chapters start at a basic level but progress quickly to discussions of circuit design and the properties of standard circuit types. The last part of the book contains sections on measurement (time, frequency, pulse height, NMR, etc.), microwaves, miscellaneous topics (photoelectric and cathode-ray devices, and magnetic amplifiers), and noise. The level of these sections varies from general discussions of principles and methods, as found in the section on frequency and time measurement, to quite specialized and detailed treatment of specific techniques in the section on equipment testing. Most of the chapters, however, seem to be written for the reader who is interested in a general discussion of the topic and the techniques which are commonly used.

Unfortunately for the many people interested in acquiring more experience with solid-state circuitry and techniques, the discussion of transistor circuits is very limited. There is a good chapter on semiconductor devices, which is up to date and which describes some of the more interesting new developments, as well as diodes and transistors. Essentially, the only other references to transistor circuitry, however, are two short sections comprising about the last quarter of the chapters on linear and nonlinear circuits. In the later sections of the book, when an example of a typical circuit is given, it is invariably shown with vacuum tubes, even in cases where vacuum-tube circuits are now almost outmoded. A discussion of sensitive discriminators, for example, does not even mention the tunnel diode. Admittedly it is not possible or even desirable to include every innovation, but the present state of development of solid-state devices should warrant their inclusion on a competitive basis with tubes by even the most conservative authors.

The editors state in the foreword that the production of a book in a fast-changing field like electronics was very difficult. The difficulty was certainly increased by the long delay which apparently existed between writing and publication of some of the articles. A few have no references later than 1959 while others refer to literature published as late as 1962. Thus while much of the material will remain valuable for some time, other sections are already outdated. Even though it might be a useful reference in many cases, this book is not recommended as a handy source of solutions to your electronics problems, especially if they involve solid-state circuitry.

Thermodynamics. By I. P. Bazarov. Transl. by F. Immirzi. Transl. edited by A. E. J. Hayes. 287 pp. (Pergamon, Oxford) Macmillan, New York, 1964. $7.50.

Reviewed by Stuart A. Rice, University of Chicago.

Some books ought not to be translated. There exist in English a number of texts and monographs treating the general subject of thermodynamics which, in my opinion, are superior to the text by Bazarov. For this reason, I feel that this translation is unnecessary. Since it has been made, however, it is pertinent to examine the text with reference to its aims and accomplishments.

It should be noted that although this book was written in 1961, it is a throwback to the older form of Russian literature in the sense that there are many political credits, especially to Engels. This leads to some rather amusing discussions, especially with reference to the "heat death" of the universe which, it is claimed, leads to religious superstition and a proof of the existence of God, and all this is footnoted with a reference to Pope Pius XII. Despite the statement of the