categorical assertion to the contrary (ibid.) Here are two serious errors on the same early page. Again, reading at random ten pages in sequence later in the book (pp. 347–357), a final-year undergraduate should surely demur at each of the following "This [Rutherford and Geiger's 1908 experiment with an electrical counter] was the first experiment ever performed in which individual atomic particles were observed" (p. 347); "when a spread of [α particle] range (straggling) is observed, it is usually due to energy loss in escaping from the source" (p. 350); "all [β-ray spectrometers] depend on the action of magnetic fields to separate beta rays of various energies" (p. 354); "the fact that [the neutrino] produces no recoil particles, proves that its mass is negligible" (p. 355). These statements are reproduced without change from the first edition—and the book abounds in similar half-truths. The new matter, in spite of its topical interest, adds more. Let one example suffice: "Another striking fact . . . is the extreme rarity of adjacent stable isobars with A even, and their very frequent occurrence when A is odd" (p. 358). One does not expect errors to be double-barrelled, but this one, and that from p. 354 already quoted, certainly are.

These are blemishes, assuredly, but the book is so packed with information that they should not be seen out of perspective. The concentration of sheer information is another matter. No space has been saved for the development of a coherent theoretical background, at any level of sophistication, even the "classical". For the student it appears almost to be a case of memory—or nothing. As for experiment, pressure of space is also disastrous. Too often "laws" are presented as confirmed by subsequent experiment, rather than as built up on the basis of prior investigation.

The book has one great merit: it is replete with references to the literature—ancient and modern. Would that the undergraduate or graduate student had time to consult them all! Personally, I am grateful to the author for one real discovery—I did not know that Hamilton had come upon the notion of group velocity, and recognized its novelty, in 1839. Through reading the book I have rediscovered in my bookcase a copy of Hamilton's *Works* in which his original treatment of the matter is given in great detail.

Basic Concepts of Physics. By Chalmers W. Sherwin. 410 pp. Holt, Rinehart and Winston, Inc., New York, 1961. *Reviewed by T. Teichmann, General Atomic Division, General Dynamics Corporation.*

THERE has been a tendency during the last several years to consider physics not simply in terms of the classical divisions of heat, light, sound, etc., but rather, as in this book, in terms of some other unifying principles. The unusual feature here is not the division, but the attempt, generally successful, to make such a presentation, which includes relativity,

quantum mechanics, and statistical mechanics, at the intermediate undergraduate level.

Among the techniques used to this end are the consistent application of vectors (though in a relatively elementary way), and a very strong numerical approach throughout, buttressed by a large number of figures illustrative of the geometric and numerical aspects of the problems discussed. Every concept discussed is accompanied by a number of examples to show the numerical values and relations of the quantities involved, and each chapter is followed by a number of relevant problems, generally including hints for solution. In general this approach proves perspicuous, though in some of the discussion on the purely mathematical side, (e.g., dealing with differential equations and statistics), the reader may feel that a little less numerics and a little more elementary analysis would have been appropriate.

In a work of this size and at this level, it is of course not possible to cover everything, and in this case the content is somewhat more restricted by the author's evident desire to lay the groundwork for modern physics. Thus the main topics discussed are vectors and differential equations, Newton's laws, special relativity, electricity, quantum mechanics and statistical mechanics. Essentially all of classical continuum mechanics is omitted, perhaps unavoidably, but it is regrettable that not even a short discussion could be given of hydrodynamics in which interest has greatly revived recently. On the other hand, those topics that are included are handled with insight and clarity, and special reference must be made in this regard to the sections on relativity and electricity, which are worthy of study even by those already familiar with these disciplines.

Stability in Nonlinear Control Systems. By Alexander M. Letov. Transl. from Russian by J. George Adashko. 316 pp. Princeton U. Press, Princeton, N. J., 1961. $8.50. *Reviewed by Peter L. Balise, University of Washington.*

MOST of the work in control systems, until very recently, has been based on linear approximations, with notable success even though all physical systems are nonlinear. However, as stringent performance requirements make more accurate analyses necessary, and as it is recognized that the deliberate introduction of nonlinearities can be advantageous in control, nonlinear theory is becoming of major importance, as evidenced by the space being given it in the newer servomechanism books. However, there are probably less than a half dozen American texts devoted primarily to the general subject of nonlinear systems.

Stability in Nonlinear Control Systems is not such a text, but is concerned entirely with a particular method, Liapounoff's stability theorem. This powerful approach has received surprisingly little attention in this country, although its use will certainly increase as it becomes better understood. Also, the few texts