one is impressed by the great progress made in recent years in understanding various aspects of wave propagation in the upper and lower regions of the atmosphere and of radio communication in particular. For this reason, every person engaged in this field will find valuable material in this volume which should be of great help in carrying out further studies on various aspects of wave-propagation phenomena.

Atomic and Nuclear Physics (2nd ed.). By Robert S. Shankland. 665 pp. The Macmillan Co., New York, 1960. $8.75. *Reviewed by Norman Feather, University of Edinburgh.*

EXACTLY five years, to the day, separate the dates appended to the prefaces of the first and second editions of this book. That of the second preface is 28th March 1960, and the book was on sale in the summer of that year. This review, then, is sadly overdue—appropriate rather for *Physics Yesterday* than for *Physics Today*, as a colleague of mine expressed the matter. But it may not be altogether out of due time, particularly if a third edition is ever contemplated, as the reader will discover.

The reader of this review will probably be aware, vaguely, or more directly from personal experience, of the considerable differences in structure between undergraduate and graduate courses in physics in the US and university courses in that subject in Britain. He will know that American graduate courses are the frequent envy of British educationalists, and are likely, by slow degrees, to become the model for something similar in the postgraduate training of physicists in the UK. He will not need a Briton to tell him whether or not this book, which since 1955 has been aimed at the American student in his senior undergraduate and first graduate years, finds its target squarely. That it should have appeared in a second edition in a competitive market is evidence enough that many believe that it does. If he is interested in the book, he will already have formed his own opinion of it. In that case, all that a British reviewer can usefully do is to comment briefly on its revision, as seen through British eyes.

In this connection my main criticism relates rather to what has not been revised, than to what has been. I have no real quarrel with the fact that the main additions to the text (some sixty pages) occur in the six chapters dealing with nuclear and high-energy particle physics, though the disparity need not have been so overwhelming as it is (the first six chapters, dealing with atomic physics, occupy precisely the same number of pages as in the first edition). I am much more concerned that so many blemishes remain uncorrected. In Britain, the first-year undergraduate should know (he will at least have been taught) that to quote Reynolds' number as 10^3 cgs units is a heinous crime (p. 13) — and that Poiseuille's equation for an incompressible fluid is inapplicable to "the lamellar flow . . . of gas through a tube", in spite of a 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,