

of the questions that inevitably will loom larger as the pace of the federal effort quickens and new programs evolve to meet new national needs.

What is required above all else in facing these problems is for the colleges and universities to understand that, like it or not, they are deeply and irrevocably engaged in the business of politics. In the politics of higher education, there is no place for the amateur and the incompetent. As Homer Babbidge and his colleague note, "Those who believe that the business of making things happen in politics is beneath their dignity or not worth their time are likely to be hurt." Free universities can help shape the public policy in the national interest, but only if they know what they believe and are willing to do battle in the public forum.

Animal Cells and Tissues

Electron Microscopy. A textbook for students of medicine and biology. Gilbert Causey. Williams and Wilkins, Baltimore, Md., 1962. vii + 239 pp. Illus. \$9.50.

Gilbert Causey has undertaken the commendable task of preparing a comprehensive, though not complete, description of mammalian animal cells and tissues as they are revealed by electron microscopy. The chapter headings include: "The electron microscope," "Specimen preparation," "The cell," "Bone, muscle, and fascia," "The cardiovascular system and blood," "Skin," "The digestive system," "The respiratory system," "The urogenital system," "The ductless glands," "The nervous system," and "Special senses."

Such a brief textbook with numerous illustrations would fill a void that currently exists in this area, if it were a scholarly effort, carefully produced. In my opinion that goal, unfortunately, has not been achieved. This book, which is intended as a textbook for students of medicine and biology, both undergraduate and postgraduate, is plagued with an insufficient bibliography (a total of 78 references). Approximately 200 author citations appear within the text. Although Causey states in the preface that he has reluctantly left out specific references to each original investigation, he has not cited in the bibliography most of

the authors referred to within the text. This is most troublesome, since several author citations are erroneous. The uninitiated undergraduate and postgraduate will really have to scratch if their interest is aroused by particular points raised in the text. In addition, the alternate usage of Palade granule, ribonucleoprotein granule, and ribonucleic acid is bound to be troublesome.

The book has an adequate number of electron micrographs. But in addition to unnecessary duplication (one appears three times), some of the figures are not informative, and many are inadequate. Once again, if the author citations were given in the bibliography, the student would have ready access to numerous electron micrographs, many infinitely more useful than those in the book.

It is only natural that the interpretation of experimental material will encourage controversy and stimulate discussion and research. The student, however inexperienced, should be encouraged (by easy access) to examine the original work, which forms the basis of the textbook writer's interpretation. This is of special importance in the rapidly developing research technique of electron microscopy as applied to cells and tissues.

It is to be hoped that a subsequent edition will be more satisfying than this first effort.

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Advanced Textbook

Atomic Spectra. H. G. Kuhn. Academic Press, New York, 1962. xvi + 436 pp. Illus. Plates. \$13.

Kuhn's very good *Atomic Spectra* is the first new English-language book on the subject, suitable for advanced undergraduate or beginning graduate study, to appear in a quarter century, except for the recent, less descriptive but theoretically much more ambitious *Quantum Theory of Atomic Structure* by Slater.

In the earlier books special theoretical background material has usually been developed as needed, but Kuhn has gathered into the second chapter an appropriate brief outline of theoretical methods, upon which he later draws freely, as needed, without break-

ing continuity. The compilation of quantum mechanical methods is a competent review outline but not an adequate substitute for a more thorough introductory study of quantum mechanics. The remainder of the body of the volume consists of five chapters on simple spectra (136 pages), periodic table and x-ray spectra (27 pages), complex spectra (75 pages), hyperfine structure and isotope shift (59 pages), and width and shape of spectral lines (23 pages). Experimental methods are not considered. Unfortunately the manuscript was finished too soon to derive any material from Edlén's great monograph in the *Handbuch der Physik* series.

Instead of discussing alkali metal atoms immediately after treating hydrogen (the usual sequence), Kuhn considers the light atoms in order, according to atomic number, and succeeds in giving the reader a feeling for the electron core before he describes lithium. The chapter on complex spectra contains an introduction to the Slater integrals and mention of Racah's methods. The omission of more than a brief reference to *f*-electrons can be considered pedagogically as an element of strength, but the lack of a comprehensive table of ground configurations of the elements is a weakness.

In my opinion the best chapter is the one on hyperfine structure and isotope shift, one of the fields in which the author has made significant contributions. An unexcelled compact exposition covers the general features of nuclear magnetic dipole and electric quadrupole interactions in one- and several-electron atoms and the isotopic mass effect and field (called "volume" effect).

The exposition is generally clear, but there is throughout an informality in the introduction of terms that, while it need not disturb the advanced reader, may sometimes confuse the beginning student. Items in point are *core* (pages 11 and 150), *vector model* (page 27), *state* (page 33), *statistical weight* (pages 66 and 118), *resonance line* (page 156), and *center of gravity* (page 170). The subject index is rather sparse.

The volume is well illustrated, with 114 figures as well as four glossy sheets of plates that include fine reproductions of classic spectograms produced by such old masters as Back, Foster, Siegbahn, and Jackson and Kuhn. In comparison, White's text has 263 fig-