

the *H* and *K* lines of singly ionized calcium, in which a simple and natural explanation is offered for their remarkable profiles. The book concludes with a clearly reasoned survey of the evidence for and against the supposition of local thermodynamic equilibrium in the solar atmosphere. This is an important question because practically all work on relative abundances assumes a local thermodynamic equilibrium, and also because of the present discrepancy between the supposed photospheric and coronal abundances of iron, which are not at all understood. In all, a timely book on a topic that is scarcely touched upon in any other work.

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All-purpose introductory texts

FOUNDATIONS OF PHYSICS. By Walter C. Michels, Malcolm Correll and A. L. Patterson. 886 pp. D. Van Nostrand, Princeton, N. J., 1968. \$12.95

A CONTEMPORARY VIEW OF ELEMENTARY PHYSICS. By Sidney Borowitz and Lawrence A. Bornstein. 896 pp. McGraw-Hill, New York, 1968. \$12.00

by KENNETH W. FORD

No textbook can be properly reviewed until it has been used. I have made many misjudgments about a book and later had to revise my opinion, upward or downward, after classroom experience. Here, then, is a pair of improper reviews, offered without classroom experience.

W. C. Michels, M. Correll, and A. L. Patterson's *Foundations of Physics* and S. Borowitz and L. A. Bornstein's *A Contemporary View of Elementary Physics* are very different books; yet they have, besides their 900-page bulk, a number of things in common. Both intend to be all-purpose introductory books, suitable for both physics majors and nonmajors. Both sets of authors believe, rightly I think, that we usually make too much of the difference between majors and nonmajors. Accordingly they emphasize that physics is much more than sets of equations and recipes for solving problems, and both hold mathematics to a modest level.

Foundations . . . uses calculus, *A Contemporary View . . .* does not; yet this difference is more illusory than real. In the former, the calculus is sparse, and many topics are treated qualitatively: The latter makes fairly free use of Δ 's, and includes solid angle and some Fourier analysis. I would consider Borowitz and Bornstein's book slightly more demanding mathematically, although certainly either book could be used in a "non-

calculus" course. Both books avoid a historical approach, but my impression is that the history in *Foundations . . .* is more reliable.

Among these five authors is a great deal of experience in elementary-physics teaching; their keen interest in pedagogy shows clearly in both books. Unfortunately neither book can be awarded a gold star for prose style, and I would rate them about the same in this respect. The writing is adequate; neither inspiring nor annoying. But both books are well organized and have many good figures and an excellent index.

Now to some significant differences. *A Contemporary View . . .* is considerably the more unconventional. It

is organized into just four big blocks: mechanics, thermodynamics, waves and the structure of matter. The Lorentz transformation appears on page 31, and relativity is used throughout with electromagnetism dispersed in pieces. It is decidedly theoretical, with fairly deep treatments of thermodynamics and oscillatory motion, but is, on the other hand, almost entirely devoid of practicalities. I could find neither a single circuit diagram, nor any mention of transistors, diodes, triodes, microscopes, telescopes, dewars, or Wheatstone bridges, to mention some devices that are described in *Foundations . . .*. Indicative of his theoretical emphasis is the absence of any photographs, except on title pages.

Foundations . . ., with more and shorter chapters, is organized roughly into nine blocks: mechanics (including relativity), heat, waves and optics, gravity, electromagnetism, the structure of matter, kinetic theory, oscillation and electromagnetic waves, and quantum mechanics and atomic structure. This organization, although somewhat unconventional, is not radical. Numerous photographs and good figures supplement the text. The practical and the theoretical stand in good balance and many references are provided at the ends of the chap-

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ters, a feature missing in *A Contemporary View* . . .

Each book distinguishes between "exercises" and "problems," and both have more than enough. Most of the exercises in both are simple plug-in's, to test single ideas. The problems in *Foundations* . . . are mostly for physics and engineering students, and some are quite challenging and go beyond the level of the text. Problems in *A Contemporary View* . . . are exceedingly numerous and also challenging, but lean towards the theoretical and appear to be more imaginative, on the whole, than the problems in the other book.

In my very incomplete sampling of the two books, I turned up a few minor errors of physics as well as of history in *A Contemporary View* . . . and none in *Foundations* . . . This difference could be chance, because I read only a small fraction of each book with care. In any case, both books seem to be generally reliable, and the authors clearly know their subject and know how they want to present it.

In giving pleasure to the eye, Borowitz and Bornstein's publisher, McGraw-Hill, scores a clear victory over Van Nostrand. *A Contemporary View* . . . is done in two colors, with marginal notes, and has a roomy, uncluttered appearance. *Foundations* . . . on the other hand, despite its cramped appearance and less glossy paper, has page headings that are more useful, and its figures are more appealing than the entirely idealized figures of the other book.

Overall, what are the merits of these new additions to the recent flood of elementary textbooks? Both are good books; I would not be unhappy to teach from either one. Yet the very thing that is their strength, their all-purpose goal, is also their weakness. If you are teaching a class entirely of nonscience students, you can certainly find a text more suitable than either one. If you are teaching a class of physics majors and other science students, chances are you and the students might be happier with another choice. However, if you teach a class containing both science and nonscience students, or if you teach physics majors but want to retreat from the sophisticated approach of some recent books, you should examine both of these books and give them serious consideration.

As a theoretical physicist, I find

Borowitz and Bornstein's approach appealing, especially the way they imbued relativity into the whole fabric of the text. As a teacher, however, I would find it easier to use Michels, Correll and Patterson, for it would leave me more freedom to organize my course in my own way, and I like to mix the practical with the theoretical.

Also, I must give Michels, Correll, and Patterson a slight edge in their attention to detail.

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For the nontechnical

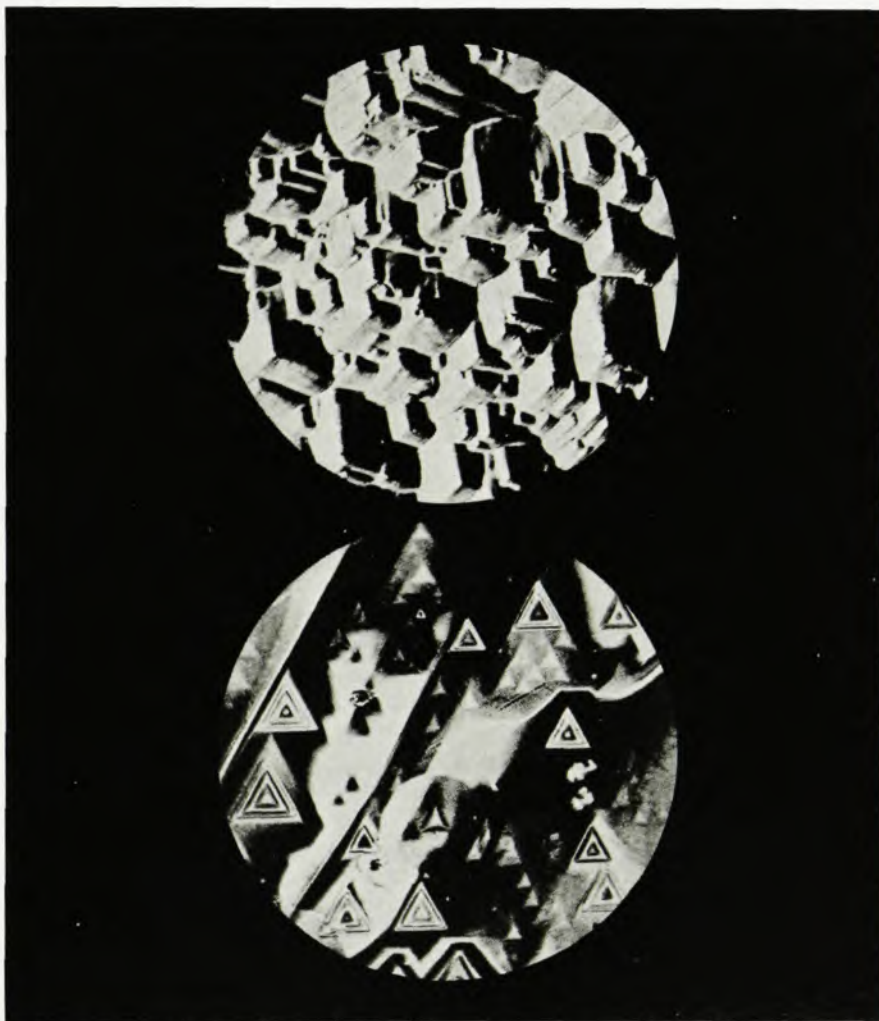
REVOLUTION IN OPTICS. By S. Tolansky. 222 pp. Penguin Books, Baltimore, Maryland, 1968. \$1.45

by ROBERT LINDSAY

In this addition to the Pelican paperback series, the author gives ample support to his assertion that there has been a revolution in optics. Samuel Tolansky is a distinguished British physicist who has written sev-

eral books and contributed much published research in atomic physics, spectroscopy and optics; first at Manchester University and then at University of London where he is now a professor. In writing this book he has brought to the layman's attention some significant discoveries and applications marking progress in optics since early in the 20th century.

The presentation is carefully or-



INTERFERENCE FRINGE contour pattern of trigons is revealed by the face of a diamond crystal, as shown in the photo below.