an eigenfunction of more than one component of the angular momentum operator. The absence of degeneracy is a general concomitant only of potentials that possess no singular points, a classic counterexample being the one-dimensional Coulomb potential, $-e^2/|x|$, which gives rise to doubly degenerate bound states. The ground state of the hydrogen atom, of course, is an eigenfunction of all components of the angular-momentum operator; this point is probably worth an explanatory phrase in a careful exposition. (Lest we be accused of subtle criticism here, we shall also cite as example the remarkable portrayal of the Stern-Gerlach experiment appearing on page 239, wherein the beam is shown running *across*, rather than *along* the gap between the magnet pole faces.)

As written, *Fundamentals of Quantum Mechanics* is to be used by majors in physics, chemistry and engineering. This brings up an important pedagogical question, even aside from the debatable position that one text on quantum mechanics can equally serve all three disciplines. The question is whether a derivation of the Schrödinger eigenvalue problem is worth 150 pages of preparatory material, especially in view of the fact that the derivation also produces an *incorrect* equation of motion for state vectors. Indeed, one might well ask if the introductory pages would have been employed better to broaden the quantity and depth of the purely quantum-theoretical discussion. The answer does not come hard if one takes *The Feynman Lectures* seriously and keeps a watchful eye on the way things are going in quantum physics at the graduate level.

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For a good foundation

CALCULUS WITH ANALYTIC GEOMETRY AND LINEAR ALGEBRA. By Leopoldo V. Toralballa. 920 pp. Academic Press, New York, 1967. $11.95

by Peter L. Balise

For a good reason, most current introductory calculus books espouse rigor. This text is not only in accord, but perhaps advances the trend. Evidently the book was written for the serious mathematics student, although of course science and engineering students also need a good foundation in mathematics. The author, associate professor of mathematics at New York University, in 1963 published *Theory of Functions*, characterized by a unifying rigor. The present volume is similarly systematic in its approach.

One may compare it with Goodman and with Kline, two other introductory calculus texts that have appeared this year. Toralballa accomplishes more than Goodman in depth and scope, but Goodman seems a more empathic treatment combined with rigor, at least for the average student. Toralballa is in marked contrast to Kline, who emphasizes intuition and physical application. (Kline's book is very attractive to me—an engineer.) However, Toralballa is by no means lacking in the amenities of an introductory textbook: Heuristic arguments accompany the proofs, historical background is provided, and there are appropriate problems in physical terms.

The book contains the usual topics of introductory calculus, but much more is included and in an unusual sequence. Following a review of set theory, the real-number system is treated with a thoroughness that characterizes the entire book. Soon after the derivative is introduced, the integral is given and some applications discussed. Returning to the derivative, the author considers such matters as critical points in a way that should give the student a good background for concepts such as state space. Following typical chapters on plane analytic geometry, elementary functions, series, and derivative and integral applications, there is a rather comprehensive presentation of three-dimensional analytic geometry. Functions of two or more variables and multiple integrals are also included. Linear algebra is treated, with the emphasis on vector space concepts rather than matrix operations although solution techniques are given.

The book is adequately indexed and includes sufficient exercises, some with answers. The preface includes a table of parts to be covered for an average course, as an alternate to complete coverage for an honors course. The text seems particularly suited for the latter.

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Metals and semiconductors

SEMICONDUCTORS AND SEMIMETALS, Vol. 3: OPTICAL PROPERTIES OF III-V COMPOUNDS. R. K. Willardson, Albert C. Beer, eds. 568 pp. Academic Press, New York, 1967. $23.00

ATOMIC AND ELECTRONIC STRUCTURE OF METALS. Conf. proc. (Ohio, October 1966). 259 pp. American Society of Metals, Metals Park, Ohio, 1967. $12.50

by Henry M. Otte

These two books can be appropriately reviewed together although the subject matters do not overlap. Both have two editors (J. J. Gilman and W. A. Tiller in the case of the ASM publication) who assembled twelve articles for each of the books. The areas covered are those of rapidly advancing fields that require the articles to be written by experts or authorities. It used to be that a person only qualified as such by having contributed significantly to the field, but now one is labelled as an expert or authority merely by any editor for whom one is willing to write an article on a familiar subject. Thus although both books are blessed with some contributors who need no introduction, it would nevertheless have added to the value of the books if the editors had included a little about the background of all the authors to justify their choice.

Of the two, the book on the III–V compounds is a somewhat more integrated piece of work. Volume 1 of the series reviewed key features of the III–V compounds, with special emphasis on band structure, magnetic field phenomena and plasma effects. In Volume 2 the emphasis was on physical properties, thermal phenomena, magnetic resonances, and photoelectric effects as well as radiative recombination and stimulated emission.