on quantum mechanics taught at American universities, with their emphasis on the practical aspects of the theory. In fact many standard topics (such as details of the wave functions of the hydrogen atom and phase-shift analysis in scattering theory) are hardly treated at all and the reader is referred to books such as the one by Schiff. But Mandl's book will be very useful to anyone who wants a simple, but systematic and self-contained, exposition of the formal aspects of quantum mechanics and of the mathematical techniques used in its application.

E. E. SALPETER
*Laboratory of Nuclear Studies, Cornell University*

***Characteristics and Applications of Resistance Strain Gages.*** Proceedings of NBS symposium held 8–9 Nov. 1951. National Bureau of Standards, Washington, D.C., 1954. iv + 140 pp. Illus. $1.50. (Order from Supt. of Documents, GPO, Washington 25, D.C.).

As of the date of the symposium, these papers consisted of the latest experimental results with respect to resistance strain gages and the latest attendant theoretical considerations. They were contributed, not only by leading experts in the United States, but by such well-known foreign personalities as R. G. Boiten of Delft, Holland, G. V. A. Gustafsson of Ulvsunda, Sweden, and A. U. Huggenberger of Zurich, Switzerland.

The papers cover a variety of topics and include the application of strain gages to measurement of mechanical quantities (acceleration, impact forces, and dynamic pressure), as sensing elements in the field of instrumentation, and to determination of the strain in concrete by imbedding techniques. Also, as of the date of the symposium, new work in progress is reported, including such applications as strain sensitivity in conducting coatings and strain gages in commercial weighing.

A valuable part of the book is the inclusion of discussions that followed presentation of the papers.

GEORGE L. KEHL
*Department of Metallurgy, Columbia University*

***Physical Chemistry.*** Based on *Physische Scheikunde.* A. J. Rutgers. Interscience, New York–London, 1st Eng. ed., 1954. ix + 804 pp. Illus. $8.50.

The thoroughness of Rutgers' treatment of the fundamental principles of physical chemistry is indicated in part by the inclusion of a chapter on classical theoretical mechanics, in which the importance of the phase integrals is pointed out before the introduction of Bohr's quantum postulates and the development of wave mechanics. The chapters on thermodynamics also exhibit a high standard of pedagogy (although, in the discussion of temperature scales, the identity of the thermodynamic and ideal gas scales is not recognized).

In an attempt at completeness, a chapter on the physical chemistry of high polymers, written by Turner Alfrey, has been appended. Nevertheless, a number of important topics have been treated either very briefly or not at all. For example, little space is devoted to quantum mechanical valence theory. In the chapter on the Einstein and Debye theories of the specific heats of crystals, no mention is made of the computations of frequency distributions in crystals by Blackman and others. No reference is made to Hildebrand's treatment of regular solutions or to extensions of the Debye-Huckel theory of strong electrolytes.

In spite of these and other omissions, the meticulous presentation of the topics covered should prove valuable to any student of physical chemistry. The translation, although generally good, is awkward in places. The recurring phrase "we follow" for "it follows that" in some of the derivations should certainly have been corrected before publication. There are a number of typographical errors, but these should not cause any misunderstanding of the text.

JERRY BRAUNSTEIN
*Department of Chemistry, University of Maine*

***Highway Engineering.*** Laurence I. Hewes and Clarkson H. Oglesby. Wiley, New York; Chapman & Hall, London, 1954. xi + 628 pp. Illus. $8.

This volume is an excellent, comprehensive book intended for a textbook in highway engineering. In this respect it is entirely satisfactory. The junior or senior engineering student being introduced to highway engineering for the first time will find it completely comprehensible. The ambiguous and often confusing verbiage found in technical engineering books is conspicuous by its absence here; hence, the subject matter is presented clearly and simply without the necessity of long interpretations.

Although the volume is long for presentation in a one-year course it is so written that it may readily be adapted as such. It is ultramodern and completely up to date with the latest features of current superhighway design and construction included.

The documentation of the materials in the book is complete with references to source matter indicated at the bottom of the page, close to the text. Tables, charts, and diagrams are used profusely and are invariably clear, simple, and easy to follow and interpret.

The book approaches the details of design and construction after an orderly introduction to highway systems, planning, economy, finance, and other fundamental chapters. Those on highway economy and finance are particularly excellent. Many of the chapters have contributions by various members of the U.S. Bureau of Public Roads. The effect of these and other collaborators has been to eliminate prejudice and regional emphasis.

The practicing highway engineer will find it a valuable investment of his time to review this book and its systematic development of current practice. It will not only prove to be a "refresher" course but should