functions, it seems to me, adds little information. Also definitions of some terms seem elusive and are dependent upon the practical examples for clarification. These are minor criticisms of a very carefully organized book.

Although this book was not written for physicists, it might help a physicist in suggesting economies in the planning of an experiment and in extracting maximal information from the experimental results. To graduate students interested in seeing a relation between their mathematics courses and engineering science, Bartee's book offers a wealth of authentic exemplary analysis.

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Operation and application

SCANNING ELECTRON MICROSCOPY: APPLICATIONS TO MATERIALS AND DEVICE SCIENCE. By P. R. Thornton. 368 pp. Chapman and Hall, London (Barnes & Noble, New York), 1968. $12.75

by L. MARTON

The first impression I had of this book was very favorable, for the table of contents indicates an excellent plan on which to build. It starts with the physics background necessary for the building and operation of a scanning microscope with plenty of space devoted to the interaction between the electron beam and the specimen. The later chapters are devoted to the operation of the instrument and to its applications.

Unfortunately that very good impression was spoiled in reading the book. The first part, relating to the physics of the instrument and its general principles, is marred by what may have been a very hasty attempt to get the book out before somebody else came out with a similar book. On almost every page one finds evidence for such undue haste: poor proofreading and a lot of errors that can not be attributed to proofreading alone. The author himself qualifies part of his treatment as "oversimplified." Many of his statements are subject to serious questioning, for in a book aimed essentially at the user of the instrument, the derivation of the scattering equations appears to me superfluous. Giving the equations with numerical constants, but without any indication of the units used, is a serious oversight.

The second part of the book, where the author is discussing the operation and application of the instrument, is considerably better. Thus the book could perform a useful service, in spite of all its defects, for the practical operator of scanning electron microscopes.

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Elongation measurement

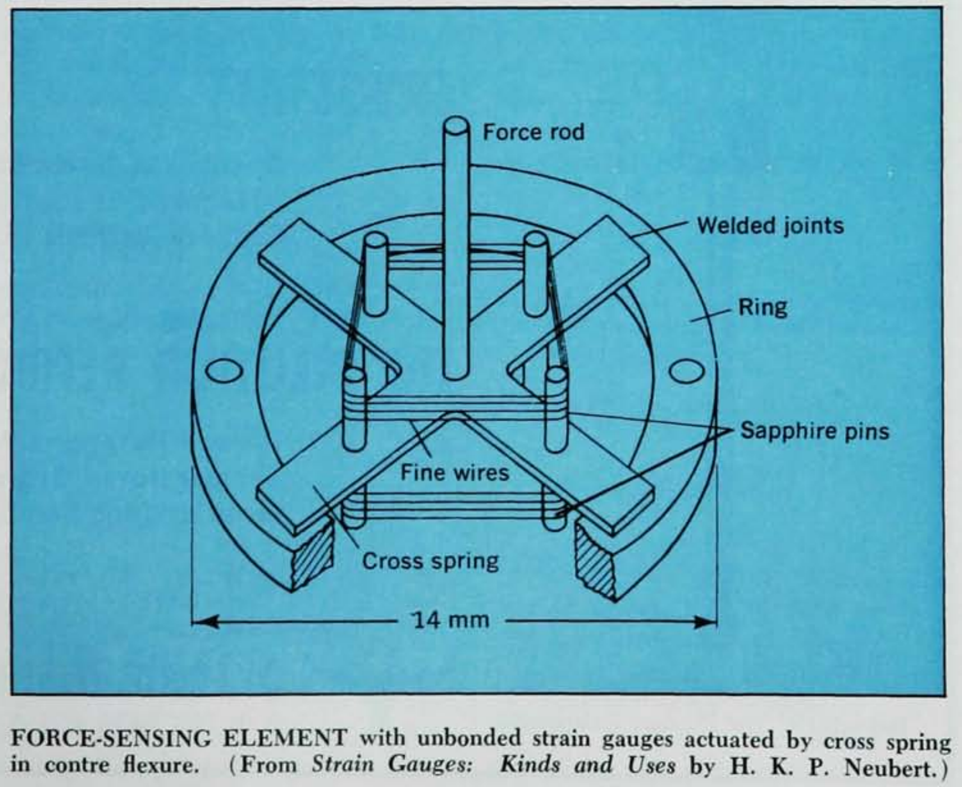
STRAIN GAUGES: KINDS AND USES: By Hermann K. P. Neubert. 164 pp. Macmillan, London (St. Martin's, New York) 1967. $7.00

by RICHARD B. ZIPIN

Many measurements of physical quantities depend on the measurement of a mechanical displacement. Strain or elongation gauges of various types are used to sense those displacements and are therefore of great interest to experimentalists. This little book provides a comprehensive introduction to this field and should satisfy both the students and experimentalists who are not familiar with electrical-resistance methods of measuring strain.

The book deals mainly with the two types of resistance strain gauges: wire (and foil) and semiconductor. The whole field of elongation measurement is covered without going very deep into any subject other than resistance gauges. The first chapter is a survey of the various methods of measuring strain, as well as a brief discussion of mechanical, optical, pneumatic, acoustic and electric strain gauges. Next are chapters on wire-resistance and on semiconductor strain gauges. The fourth chapter treats the evaluation of strain measurements and the final one is on strain gauges as the measuring elements of transducers for force, pressure and acceleration. The book is completed by an appendix on SI units and conversion tables, a short bibliography and an index. At the front of the book is a table that defines the nomenclature throughout the book, a very useful device that many authors overlook.

The author is very careful in defining the units of practically every equation used. This practice is often helpful but does become tiresome as one progresses through the book. Quite complete tables of characteristics of commercial wire-resistance and semiconductor strain gauges taken from manufacturers' literature are included and are welcome in this book, but sorely lacking are any references



FORCE-SENSING ELEMENT with unbonded strain gauges actuated by cross spring in contre flexure. (From *Strain Gauges: Kinds and Uses* by **H. K. P. Neubert.**)

to the available periodical literature other than manufacturers' catalogs. Names are often cited, but the author does not give any reference to the work of the men whose names he mentions.

Section 1.2 of this book is titled "Criteria of Strain Measurement Methods." It is only two pages long but provides an excellent summary of the desired properties and design goals for any type of measurement transducer or system.

The theory of strain gauging is not given in any depth, but the book is full of practical hints and lists of procedures. There is much more descriptive material than mathematical development, and therefore the book is an excellent source for those who are interested in experimental methods.

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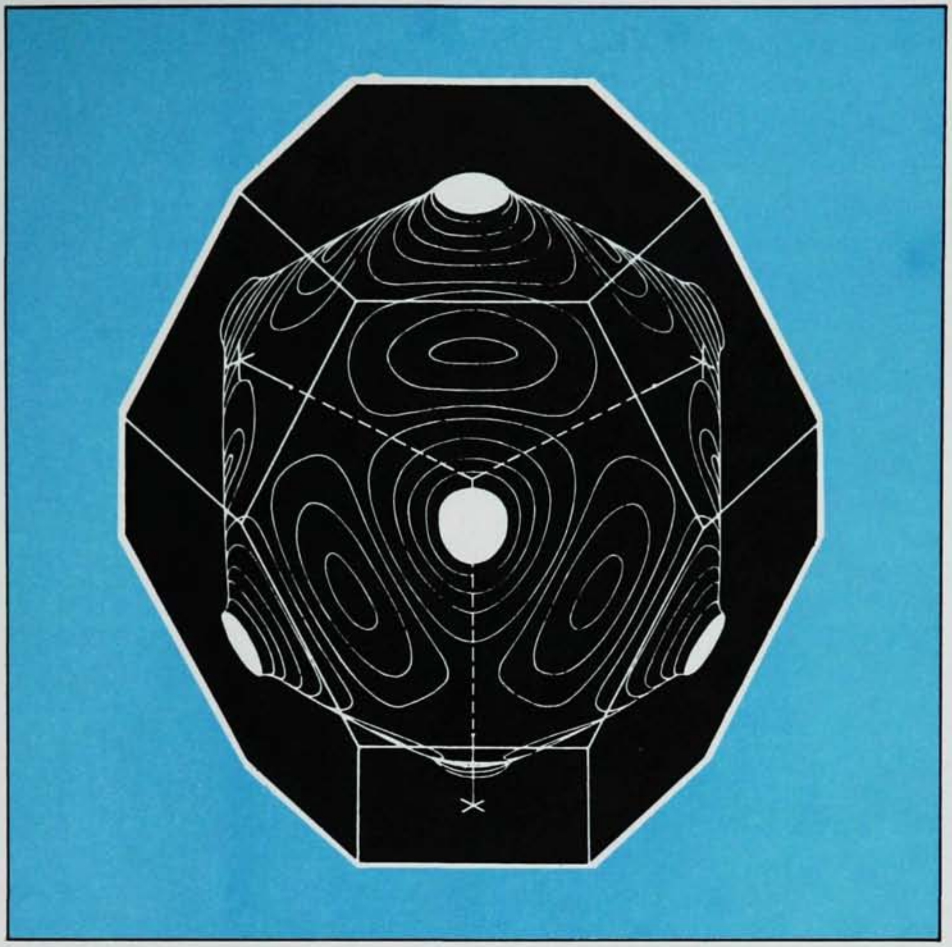

FERMI SURFACE for copper is formed by electrons in the half-filled 4s band. (From *The Fermi Surface*, edited by W. A. Harrison and M. B. Webb (Wiley, 1960.)

Electron-transport theory

PHYSICS OF ELECTRONIC CONDUCTION IN SOLIDS. By Frank J. Blatt. 446 pp. McGraw–Hill, New York, 1968. $14.50

by C. S. KOONCE

The author states in the preface, "This book was written with the expectation that it could be read profitably by seniors or beginning graduate students in physics, graduate students in material science, electrical engineering and physical metallurgy, and research scientists working in these fields." Indeed this book should prove rewarding to scientists in all of these fields because the author has succeeded in developing an introductory text that treats comprehensively a subject common to all of these disciplines: electronic conduction in solids.

Although the emphasis of the book is on electronic transport, the applications of electronic conduction cover many topics generally treated in introductory solid-state physics textbooks; thus the book is ideally suited for supplementary reading by students in introductory solid-state physics courses. The subject of the book is the research field of the author, a professor of physics at Michigan State University.

The book is a finished product: The chapters are organized into a cohesive and logical development of electronic conduction, and a preface explains this presentation. There is a rather complete index, numerous figures and tables and helpful problems. The first four chapters provide a brief background in solid-state physics, enabling the reader to understand the theory of electronic transport. The book assumes no previous training in solid-state physics and little knowledge of quantum mechanics. The theory of electronic conduction is developed in the next three chapters. The remaining five chapters deal with applications in both metals and semiconductors. All parts of the book are marked by an outstanding ease of expression.

A student reading this book will have the advantage of seeing the theory of electronic transport presented and its limitations discussed before applying the theory to specific cases in materials. In addition he will see the theory applied to both metals and semiconductors so that he may note both the similarities and differences.

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Value of groups

APPLIED GROUP THEORY. By Arthur P. Cracknell. 417 pp. Pergamon Press, Oxford, 1968. Cloth $7.50, paper $6.00

by GERALD ROTHBERG

Arthur P. Cracknell's book *Applied Group Theory* is published in a series (*Selected Readings in Physics*) intended primarily to provide undergraduate students with reprints of important papers in the development of a subject, along with introductory material illustrating present-day applications. In meeting these objec-