Also of interest are the sections on electron spin and the Dirac equation where many manipulations of the Pauli and Dirac operators are considered in detail.

One cannot be too critical of the selection of subject matter in a book of this length, but the applications of the theory are somewhat overly limited to basic elementary problems such as the hydrogen atom, harmonic oscillator, and square-well potential. Approximation methods, particularly time-dependent perturbation theory, are too summarily dealt with, and certainly applications to scattering or radiation theory, for example, would help to impress one with the power of quantum mechanics.

This book will probably be of more value to the physicist who wants to go a little deeper into the mathematical background of quantum mechanics than to the mathematician who wants to learn some of the physics. Clarity and readability, however, make it a welcome addition to any library.

JOHN DIRK WALECKA
Department of Physics,
Stanford University

Measure of a Man

Social Research to Test Ideas. Selected writings of Samuel A. Stouffer. Free Press (Macmillan), New York, 1962. xxxi + 314 pp. $8.50.

Sam Stouffer was, by common agreement, the dean, chief exemplar, and advocate of modern, quantitative social research. This book, a collection of his papers which he selected and organized shortly before his death in 1960, will come to his many students, associates, and friends as a poignant reminder of their loss. As Paul Lazarsfeld observes in his introduction, "His academic life coincided with the development of empirical social research in the United States. . . . The present set of papers is, therefore, not only the record of a man's work: it symbolizes the growth of a science."

A sociologist amply honored by his discipline, Stouffer cared little for disciplinary boundaries. Not only was he a founding father of modern survey analysis, but—see in this volume his theory of "intervening opportunities" in population mobility—he also helped to establish the fruitfulness of formal mathematical models in the behavioral sciences. Scornful of social theory in the grand tradition, he played a leading part in shifting the emphasis toward modest, limited theories tightly linked to empirical research. In this vein, the present volume extracts from *The American Soldier* his treatment of "relative deprivation," and reprints his influential papers testing a formulation of role conflict. It samples his continuing substantive interests in demographic analysis and in the effects of the mass media, and his methodological contributions and programmatic essays.

Yet, in sum, the papers cannot give the full measure of the man and his contribution to a developing social science. Sam Stouffer was at his best close to the data—running IBM cards through the counter-sorter, revising his tactics and concepts as the results emerged—in hot pursuit of a problem to its lair. The results were substantial, but he was properly modest about them—as, indeed, he was about the claims of social science generally. More important was a contribution that is more implicit in the papers of this collection: his contribution to the shaping of a style of enquiry in the main stream of American social research. The contemporary student can still learn much from the work of this master of the art of making social data speak articulately and unambiguously.

Lazarsfeld's introductory essay increases the value of the book for graduate teaching in sociology and social psychology by making explicit how the various papers reflect developments in the forming of Stouffer's characteristic approach.

M. BREWSTER SMITH
Department of Psychology, and
Institute of Human Development,
University of California, Berkeley

For Prospectors

The Rock-hunter's Range Guide. Jay Ellis Ransom. Harper, New York, 1962. x + 213 pp. Illus. $4.95.

Part 1 presents a wealth of detailed information which the sophisticated rock-hunter should know and which the neophyte must learn. The introduction, on the prehistory and history of "rock" collecting, seems too brief, and this part might well be expanded into a book. The chapters that follow contain a condensed version of fundamental materials commonly found in beginning geology texts. Many additional sources for information are given. An extensive bibliography and lists of museums and libraries are included. The illustrations are few, but they have been carefully selected for their informational content. Colored plates of minerals which might "sell" a book but which have little practical value are not used.

Somewhat reminiscent of Dana's old *System of Mineralogy* is part 2, which lists important collecting localities, preceded by a description of the salient features of the geology of each state. The detailed directions for finding principal outcrops will be most helpful to peripatetics with their trailers.

NORMAN DOLLOFF
Department of Geology,
San Jose State College

Programmers and Computers

Programming for Digital Computers. John F. Davison. Gordon and Breach, New York, 1961. xi + 175 pp. Illus. $6.

Davison's book is principally concerned with the programming aspects of digital computers. It gives an overall view of the programmer's role, in the context of the whole subject of digital computers, and describes the programmer's task and how he goes about doing it. But it is not a textbook for training programmers, and it requires no mathematical background.

Following a brief description of digital computers in chapter 1, the role of the programmer is described in the second chapter. Operations that the computer can perform are discussed in a manner that is designed to indicate some of the machine commands available to programmers. The programmer's part in the overall task of solving a problem with a digital computer is explained in chapter 3. The experienced programmer will recognize many of the things he has been doing, although he may never have tried to specify where his responsibility begins and ends. The inexperienced reader may find the discussion somewhat vague and general, and he may not get a true

picture of what the programmer does.

The next three chapters give the details of coding, using a fictitious machine with a simple three-address order code for the examples. The basic ideas of looping, address modification, transfer of control, use of subroutines, and the like are all clearly described. The description may be rather technical for the general reader, but it is not sufficiently detailed for use in training programmers. The basic ideas of autocodes, or compilers, as they are usually called in the United States, is described in chapter 7. The description is brief and basic, but it gives no hint of the power and widespread use of problem-oriented languages which one observes today, especially in the United States. Chapter 8, the concluding chapter, contains a description of variations in computers and peripheral equipment —such items as word length, size and type of store, magnetic tape, and input/output are mentioned.

The emphasis is strongly on machine-language coding, which is probably more widely used in England than in the United States.

JOHN G. HERRIOT
Computation Center,
Stanford University

Comprehensive, Well Arranged

Particle Accelerators. M. Stanley Livingston and John Blewett. McGraw-Hill, New York, 1962. xvi + 666 pp. Illus. $17.50.

The literature on accelerators, while extensive, consists mostly of papers in journals and project reports. There are only a few books and review articles. In *Particle Accelerators* the authors have produced the most comprehensive volume so far published on this subject.

The arrangement of the book is good. Most of the material is organized around accelerators, by types, with a few topics treated separately. Particle motion in magnetic and electric fields and certain components—ion sources, magnets, and shielding—are given separate chapters, which are generally good. The level of the book is appropriate to a beginning graduate student in physics or engineering, but substantial portions can be understood by undergraduates. The indexing is good, and the extensive references will be useful to all workers in the field.

The physical principles of all presently useful types of accelerators are clearly and completely explained, and the relevant mathematical expressions are presented for convenient reference. Considerable emphasis is also properly given to a technical description of accelerators and components, and some space is devoted to historical material. In these areas the book has shortcomings which mar an otherwise excellent effort. There are interesting descriptions of some pioneering accelerators—for example, the early low-voltage generators —and valuable material on the latest alternate gradient accelerators, on magnetic measurement techniques, and on shielding, for example, but there are also tiresome details on accelerators that are neither pioneering types nor examples of the latest technology. The treatment of sector focused cyclotrons, which have undergone intensive development in the last decade and which now dominate the field in the energy range of tens of Mev, is disappointingly brief. Heavy ion accelerators, another recent development that has interesting special features, are little more than mentioned. The selection of historical material is spotty—there is a good treatment of electrostatic accelerators and of betatrons, but the treatment of Lawrence's development of cyclotrons at Berkeley is not sufficient to convey the extent to which modern accelerators and accelerator laboratories derive from that development. The faults are probably due to the authors' having relied too much on their own personal experiences, which, while undeniably extensive, are not quite great enough to provide a framework for a definitive work covering the entire field.

Despite the faults enumerated and a few errors of fact, the book on the whole is good and will be a valuable addition to every physics library.

EDWARD J. LOFGREN
Lawrence Radiation Laboratory,
University of California, Berkeley

Magical Minerals

Applied Clay Mineralogy. Ralph E. Grim. McGraw-Hill, New York, 1962. viii + 422 pp. Illus. $12.50.

In this, his second excellent book on clay mineralogy, Grim has successfully compiled much of the scattered and unorganized information on the industrial uses of clays. Although information about some areas is abundant, much of it is empirical, and application is often based on rule-of-thumb. Grim has made an effort to explain many of the observed phenomena and properties in terms of the structure and composition of the clay minerals. Although these minerals play a vital role in many industries, the reason for many of their functional properties is not well known.

Kaolinite and montmorillonite are the clay minerals most widely used in industry, although illite, attapulgite, halloysite, and sepeolite have many uses. Some of the more important properties of clay minerals are their small grain size, their sheet-like shape, their charged lattice, and their ability to disperse, adsorb a wide variety of materials, and orient water molecules.

The structure and properties of clay minerals are briefly covered in the second chapter. The chapter on clays in ceramic products (89 pages) is the most complete and covers the field with which the author is most familiar. Such properties as plasticity, stress, strain, green strength, shrinkage, drying, dry strength, firing, high-temperature modifications, fusion, color, vitrification, permanent moisture expansion, translucency, glaze properties, and reheat volume changes are discussed. A large number of graphs are presented showing how these properties vary as a function of the type of clay mineral and the size, temperature, water content, and the like.

A chapter on clays in foundry molding sands (63 pages) describes how sand, various clays, and water are prepared to meet property specifications necessary to produce the wide variety of molds used in the metallurgical industry, and one on clay mineralogy in relation to the engineering properties of clay materials (74 pages) describes such properties as compression strength, permeability, swelling, consolidation, penetration, and density. Two brief chapters (29 and 26 pages) review the role of clays (in the discovery, recovery, refining, and preparation) in the petroleum industry. Here, even more so than in other industries, the reason for the effectiveness of clay minerals in producing desired results is seldom known.

A final chapter (78 pages) describes a large number of other uses for clays. For example, a cement floor may contain 40 percent clay; the paint on your wall is probably 25 percent kaolin; your cotton shirt may be finished with