gene by another, the genetic control of enzyme synthesis, the interplay control of DNA (deoxyribonucleic acid), RNA (ribonucleic acid), and protein synthesis, and the feedback mechanisms in enzyme systems are examined in a penetrating way. The interdependent regulation of metabolic mechanisms (the Pasteur and Crabtree effects) are reexamined, and the effects of hormones on biochemical reactions and on growth are assessed for possible regulatory function. The effect of light on cell processes and the fascinating subject of built-in biological clocks—that is, temporal regulation of cellular processes—are covered in the final chapters.

The aim of the volume, as implied in the title, is not evenly maintained by the various contributors. This is not so much a fault of the individual authors as it is an indication of the state of knowledge in the areas which they serve. What is more to the point is that the reader is made clearly aware of the important unsolved problems, and that the biology of the future is rich in opportunities for a new generation of scientific giants.

TERU HAYASHI
Department of Zoology,
Columbia University

Well-Translated Tool

Kinematics of Nuclear Reactions. A. M. Baldin, V. I. Goldanskii, and I. L. Rozenthal'. Translated from the Russian by Ronald F. Peierls. Oxford University Press, New York, 1961. xii + 223 pp. + tables (45 pages). $6.10.

When we consider the prodigious rate of accumulation of data relating to nuclear reactions, it is somewhat surprising that more rapid progress has not been made in the fundamental understanding of the nature of the forces between the elementary particles. But the reason is not too hard to discover, if one examines in detail the nature of the data that are available, especially in the high-energy range. The fact is that most of the experimental results reflect, in one form or another, the consequences of one or more of the conservation laws—the conservation of energy, of angular momentum, of parity, of isotopic spin, of "strangeness," of baryons and of leptons, of "isotopic parity," and the like.

In the field of elementary particle physics especially, involving as it does interactions in the relativistic energy range, where the basic kinematical relationships are far from being intuitively obvious, the problem of separating out the inevitable consequences of the conservation laws is especially acute. Most observations, it turns out, yield little more than the confirmation of one of the principles of conservation or symmetry which govern the interactions among the elementary particles. Of course, as long as it is a question of discovering or verifying basic conservation laws, or when it is a matter of the discovery of a new elementary particle or symmetry principle, such observations are of fundamental importance. But in the great majority of experimental observations, the problem faced by the experimenter, or by the interpreter of his results, is one of extracting from the observations those aspects that only describe the effects of known conservation laws, in order to determine whether the observations can yield some new information relating to the dynamics of the interactions involved.

Towards this end, every nuclear experimenter will find this book indispensable for plying his trade. Beautifully organized, concisely presented, and written by a trio of physicists admirably qualified for their task, the book is concerned with this problem of extracting from experimental observations the inevitable results of kinematical relationships and conservation principles. The first part deals with the kinematical rules that govern nuclear interactions, deriving the relationships necessary for the interpretation of experimental observations, in simple and useful form. The second part is an exposition of the effects of conservation principles on the interactions among the elementary particles, utilizing the methods of the "S-matrix" as the formal device for imposing the conservation laws, especially those that are required by the quantum mechanics, on the interpretation of experimental observations.

The translation is excellent. Compared with another translation of this book, issued by Pergamon Press, this one is far superior in accuracy of translation, in printing and format, and in relative freedom from typographical errors. A short work, it manages to include in some 300 pages practically all the tables, graphs, and formulas that an experimental physicist might need. Although the authors apologize for not having covered more, they should be congratulated for having covered so much with such clarity and excellent organization. In the material covered, the only omission worth noting is in the chapter on multiple processes, where a brief discussion of the kinematics of the "two-fireball" model would have been a welcome addition.

Readers will look forward to the revised and enlarged version promised by the authors.

B. T. FELD
Department of Physics,
Massachusetts Institute of Technology

Lucid, Concise Volume

Manual of Field Geology. R. R. Compton. Wiley, New York, 1962. x + 378 pp. Illus. $7.50; text. ed., $6.25.

Many fledgling geologists are inclined to panic when faced with their first mapping project—the jump from lecture hall and laboratory to the field seems so severe. Here is a book that should ease the transition; it is written by a man with considerable and varied experience gained from detailed mapping work in California, Nevada, and western Europe and from 10 years of instructing the geology field course at Stanford University. The manual is intended to provide students with the advice and information essential for independent field work, and the intention is well executed.

The organization and presentation of the material is lucid and concise. Almost all of the technical terms used are carefully defined and indexed. The numerous illustrations by the author are superb, and happily a scale, where appropriate, is included. Chapter 1 begins with a geologist's definitions of *field* and *field geology* and discusses methods of collecting data and samples. Included are numerous techniques that most geologists eventually devise themselves and then mistakenly regard as original. Chapters 2 and 3 describe the use of basic instruments; 4 and 5, the plotting of geologic features on base maps and aerial photographs (including a valuable discussion of the delineation of rock units and contacts). The next four chapters thoroughly describe procedures for constructing base maps by alidade and plane table methods, by transit surveying, and by