

ted and easy to use. The volume fills a real need as it enables people in the pharmaceutical industry to locate and ease the meaning of terms that are difficult to find in other dictionaries — Frank M. Berger, *Wallace Laboratories, Cranbury, N.J.*

Space-Charge Flow by P. T. KIRSTEIN, *et al.*; 509 pages; \$22.50; McGraw-Hill Book Co., 1967.

The treatment of charged particle motion involves conventional aspects of dynamics, with some overlying complexities from electric and magnetic forces—providing sufficient evil for any day. If, in addition, the density of particles is such as to alter, either partially or totally, the “vacuum” electric field, then treatment of the flow problem indeed. It is the problem which electron tube workers have pursued with diligence and success. Now, in this present text, the authors, contributing members themselves in the ongoing development of beam systems, have detailed the mathematical and physical bases for the treatment of such systems as well as the techniques used to develop working systems. The resultant should be of value to students developing an understanding of the field and to those scientists and engineers actively participating in it. The mathematical description of space charge flow is thorough and well ordered for further understanding. The relevance of the material to working beam systems is well-detailed. Problems given at the conclusions of the several chapters are of value for formalized courses of study. References to the archival literature are sufficient to direct any further examination of source material. Areas discussed briefly, and considered beyond the scope of the text by the authors, include electric and physical instabilities in beam systems. Treatment of natural instabilities follows the present unsettled understanding of these phenomena by the engineering community. Treatment of “mathematical” instabilities (in iterative solutions to beam flow problems) is included for several boundary conditions. —J. M. Sellen, Jr., *TRW Systems, Redondo Beach, Calif.*

Pogonomyrmex Harvester Ants: A Study of the Genus in North America by A. C. COLE, JR.; 222 pages; \$7.50; The University of Tennessee Press, 1968.

Although we insect taxonomists dabble these days in chromosomes, electrophoresis, numerical phenetics, and other fashionable topics, our most important payoff product is still the taxonomic revision of the family, genus or species-group, primarily based on gross morphology. Most ant genera, or large parts of genera, have never met their first reviser, but the quality and quantity of taxonomic revisions has improved dramatically in the last 15 years, due mainly to better taxonomic concepts and to the enlightened support of the U.S. National Science Foundation. To these influences we owe such fine recent monographs as Taylor's on *Ponera*, and the standard-setting *Acanthomyops* revision by M. W. Wing.

The monograph of the North American harvester-ant genus *Pogonomyrmex* by Cole, while it does not match the sophistication or quantitative detail of the Wing revision, nevertheless is a solid contribution in the new tradition. Cole recognizes 22 species (happily, no subspecies) of *Pogonomyrmex*, four of them newly described in this book, and places them into two subgenera, the status of which will eventually depend on a thorough study of the South American species.

One never really knows how sound a specialist's species are until his keys have been fully tested in practice, but in this case it already seems apparent that Cole's treatment is a great improvement over the previous revisions of Olsen and Creighton. Cole has studied this important genus closely for over 30 years, much of the time in the field, and he has made the first full use of the valuable characters of the males. It does seem that we have here a revision that will remain both definitive and useful for a long time.

Points that remain bothersome at the theoretical level are Cole's treatment of “hybrids” between, for example, *P. occidentalis* and *P. maricopa*, and his idea of “character convergence” between

parapatric or contiguous population of different species. Given the notoriously potent sting of several common species, one wonders whether this "character convergence" is not just localized mimicry.

The book is handsomely produced by the University of Tennessee Press, and by present standards is reasonably priced. It will be a necessary reference item for all ant specialists, desert ecologists, range managers, and western entomologists and naturalists in general. —William L. Brown, Jr., *Entomology*, N.Y. State College of Agriculture, Ithaca

Geochemistry & Mineralogy of Rare Elements & Genetic Types of their Deposits, Vol. 3: *Genetic Types of Rare Element Deposits*, edited by K. A. VLASOV; 916 pages; 165 figs.; \$30; Daniel Davy and Co., Conn. Translation of the 1966 Russian edition, Israel Program for Scientific Translations, Jerusalem, 1968.

This volume and the two earlier volumes (AMER. SCI., 3, 333A, 1968) comprise a definitive account of the geochemistry, mineralogy and types of occurrence in nature of Li, Rb, Cs, Be, Sr, Sc, Zr, Hf, Nb, Ta, Cd, Ga, In, Tl, Ge, Se, Te, Re, Y, and the lanthanides. Many of these elements have become of increasing importance in recent decades in a variety of technological applications, providing impetus for the study of their geochemistry to aid in creating an adequate raw material base. The book was prepared by 53 research workers associated with the Institute of Mineralogy, Geochemistry, and Crystal Chemistry of the Rare Elements, one of several institutes in the area of the geological sciences operated by the Academy of Sciences of the USSR. The systematic manner of treatment and the numerous extensive tabulations of analytical and other data, together with adequate indices, make this and the earlier volumes easy and convenient to use. Text references in Vol. 3 include 875 Russian and 520 non-Russian titles, making a total, with some duplication, of about 4500 titles for the 3-volume set. The translation is good, and errors are few.

Deposits of the rare elements are extremely diverse genetic types and complex mineralogical expression. Search for an exploitation of these posits involves many problems encountered with the more common accessible elements such as iron, aluminum, or lead. The book does not attempt a full-scale catalog of the known posits, but is more concerned with characterization of the geochemical processes and geological environments that lead to local concentrations of rare elements from an initial dispersed state in the lithosphere. The treatment follows the distinction between endogenic and exogenic processes. Under the former are included concentrations in magmatic segregations, pegmatites, greisens, hydrothermal deposits deriving from the main igneous rock types. Exogenic concentrations include residual deposits and placers, evaporites, phosphorite, subsurface waters, oil, and coal. Metamorphic concentrations, often prominent in origin, are treated only briefly. The three volumes are an invaluable reference work for geochemists, mineralogists, and economic geologists. It should be added that they are a monument to Russian leadership in the general field over many decades. —Clifford Frondel, *Geological Sciences*, Harvard University

A Comparative Quantitative Phonology of Russian, Czech, & German by KUČERA & G. K. MONROE; 196 pages; \$12; American Elsevier Publishing Co., Inc., 1968.

This study applies quantitative methods and procedures to the comparative phonological analysis of two closely related languages and a more distantly related one. A brief survey of the phonological phenomena of the three languages (distinctive feature matrices are included) elicits little that has not already been stated; for Czech, for example, Kučera himself in *The Phonology of Czech* (The Hague, 1961). But the section is followed by an extremely enlightening discussion of the phonological syllable which deals with both makeup and with the exploitation of various structures in speech. The phonological