from situations encountered in the course of research, but only from ambitions for a total explanation of organic nature.

It is a measure of Erasmus Darwin's success as an exponent of the scientific vision of nature that King-Hele should register so generous an estimate of his place in history. He is compared to Leonardo and to Goethe and is credited with an influence on the Romantic poets, as well as on Charles Darwin, which it is doubtful that he exerted. For the most part, however, the author lets his versatile and imaginative subject speak for himself, for his speculations, and for his belief in the importance of science in the advancement of knowledge and the progress of man.

PHILIP C. RITTERBUSH
Office of Senator McIntyre, Washington, D.C.

Earthquake Seismology

An Introduction to the Theory of Seismology. K. E. Bullen. Cambridge University Press, New York, ed. 3, 1963. viii + 381 pp. Illus. $9.50.

The appearance of this updated edition of Bullen's valuable textbook on earthquake seismology is most welcome. The book remains primarily an exposition of basic theory, a concise and lucid presentation of fundamentals, but much material of current interest has been added. This includes three new chapters on long-period oscillations of the earth, seismic effects from nuclear explosions, and planetary seismology.

The plan of the earlier editions is retained. The first six chapters, nearly one-third of the book, lead from the general theory of elasticity into a discussion of waves and vibrations, and to a consideration of the body and surface waves important in seismology. The presentation is in the nomenclature of Cartesian tensors, although no prior familiarity is assumed; vectors, where needed, are also indicated by subscript notation rather than by conventional symbolism. Most of the discussion refers to infinitesimal motion in uniform media, but effects of imperfect elasticity and finite strain are considered.

Chapter 7, on seismic ray theory in a spherically symmetrical body, is the only chapter on basic theory which has been substantially rewritten for this edition. It is a condensation of material published elsewhere by the author.

Brief chapters on seismic energy and instrumentation principles precede a long chapter in which Bullen describes the construction and use of travel-time tables. Chapters 12 and 13 offer detailed discussions of the physical constitution, particularly density, of the earth's upper layers and deep interior. In the remaining quarter of the book, Bullen considers briefly a variety of topics: long period oscillations; earthquake mechanism, distribution, and periodicity; nuclear explosions.

Bullen is chairman of the Department of Applied Mathematics at the University of Sydney as well as a distinguished seismologist. Not unexpectedly, thorough treatment is given those topics to which he, sometimes in collaboration with Sir Harold Jeffreys, has made important original contributions: seismic ray theory, construction of travel-time tables, and determination of the earth's density distribution.

The omission of references from the first edition was remedied in the second. In this third edition, there is a bibliography of nearly 700 items, grouped in 33 categories and arranged chronologically through 1963. Russian authors appear under-represented with only 31 entries, if we consider their contributions to seismology. A comprehensive 19-page index adds to the value of the text.

This third edition maintains and improves on the high standards of the previous editions.

HAROLD M. MOONEY
Department of Geology and Geophysics, University of Minnesota, Minneapolis

Political Geography

Politics and Geographic Relationships. Readings on the nature of political geography. W. A. Douglas Jackson. Prentice-Hall, Englewood Cliffs, N.J., 1964. xiv + 411 pp. Illus. $6.95.

It is important for the nonsocial scientist to appreciate what Jackson set out to do in assembling the readings in *Politics and Geographic Relationships*. Otherwise he may conclude what some have long suspected—that geography in the United States, once on at least speaking terms with the earth sciences and biology, has finally flown off to find a more congenial home shared by politics, theoretical economics, and metaphysics. Even some rather traditionalist geographers may wonder if the book is really their concern when the authors are able to reach page 223 without needing to explain themselves in maps or charts and when it is noted that rather less than half of the chapters are by geographers. In truth, the title warns us what to expect, for the book is primarily about *politics* and geographical relationships. It may find its widest audience in endeavoring to persuade political scientists or specialists in "government" that there are geographical relationships which should be taken into account when the affairs of nation states are being considered.

The editor has selected 34 papers for inclusion, all previously published. About half of them fall into the orthodox field of political geography, including those by well-known geographers such as Richard Hartshorne, Stephen B. Jones, O. H. K. Spate, Mark Jefferson, Roy Wolfe, N. J. G. Pounds, Norton Ginsburg, and Jean Gottmann. The essays in which they discuss traditional topics include "A free and secure access to the sea" (Pounds), "The nature of frontiers and boundaries" (Kristof), and "National resources and economic development" (Ginsburg), as well as several of a soul-searching character—for example, "What is political geography?" (Hartshorne).

It is this last question, Jackson confesses, which originally led him to assemble these papers for the use of college students, and he enlarges on the problem in an all too brief introductory chapter. In searching for a line of demarcation between political geography and political science, Jackson concludes that the essential distinction lies in the point of view, for, while the latter is concerned mainly with institutional structure, the geographer keeps his eye on the resulting geographical patterns and relationships. Nevertheless, he believes that the geographer should be more fully aware of the emphasis placed on institutional structure by the student of politics, hence the strong representation among the authors of such political theorists as George Santayana, Karl W. Deutsch, Gunnar Myrdal, and Ernest B. Haas.

Taken as a whole the book provides

a well-balanced selection of short articles bearing on Aristotle's "political man," who, Jackson suggests, is the vital link between the study of politics and the study of geography. He hopes the book may aid in the development of a political geography that is not only geographical but, in the most sophisticated sense, political.

Politics and Geographic Relationships is an example of a useful group of college textbooks which bring together essays that, although published in professional journals, are not for practical reasons accessible to large bodies of students. This particular volume is a success, but it would be more so had the publisher provided an index and had the authors been more generous with maps to amplify their texts.

TREVOR LLOYD
Department of Geography,
McGill University

Chemical Technology

Gas Phase Chromatography. vols. 1–3. vol. 1, *Gas Chromatography* (207 pp. $7.95); vol. 2, *Capillary Chromatography* (130 pp. $6.95); vol. 3, *Tables for Gas Chromatography* (172 pp. $7.75). Rudolf Kaiser. Translated from the German by P. H. Scott. Butterworth, Washington, D.C., 1963. Illus.

The chief value of these volumes, which are translated from the German editions, lies in the explicit and detailed instructions that they give for gas chromatographic procedures. The wealth of practical information that they contain, based as it is upon Kaiser's experience, should make them useful to newcomers and practitioners alike.

The second volume is especially welcome because it presents a timely and heretofore unobtainable exposition on capillary gas chromatography. The third volume contains various tables and lists of equations that the chromatographer will find useful. Reference is made, in volumes 2 and 3, to papers published in 1961, and, in volume 1, to papers published in 1960, so the coverage is of necessity dated.

Perhaps the chief shortcoming of these volumes is that the review of the theory of gas chromatography is somewhat cursory. The short, uncritical treatment is limited, for the most part, to the presentation of final equations without derivation. In the first volume the theoretical review is not well organized and will be difficult for the newcomer. For example, Kaiser frequently refers to subjects without explaining them or citing expositions provided later in the book—Martin's pressure correction and Janak's integral detector. Nowhere in the book is there an adequate definition of either the *theoretical plate* or the *apparatus dead volume*, although both terms are mentioned frequently. These factors detract from the cogency of the presentation. The second volume is however much better in this respect, and it can be recommended as a good introduction to capillary chromatography.

The translation is adequate but often quite literal, and the English is somewhat stilted as a result. Here again, inexplicably, the second volume is superior to the first.

The author states near the beginning of the first volume that "The term 'chromatography' is at present understood to include all those processes in which separation is brought about by adsorption or solution partition of a mixture between two non-miscible phases." This is incorrect because many extractive and adsorptive processes are not chromatographic in nature. Other errors are few and are minor.

In short, except for reservations about the introductory and theoretical treatments in the first volume, these works can be recommended as worthwhile additions to the chromatographer's library.

ALLAN WEINSTEIN
Department of Fuel Technology,
Pennsylvania State University

Note

History of Chemistry

The number of series devoted to the popularization of science and its history is increasing almost exponentially. They all, more or less, share the same characteristics: they are lavishly illustrated and the texts are clearly written. They also leave something to be desired in accuracy. **A History of Chemistry** (Hawthorn, New York, 1963. 112 pp. Illus. $5.95), by Charles Albert Reichen, which is volume 10 of the *New Illustrated Library of Science and Invention*, is no exception. It is graced with some of the loveliest illustrations that I have seen. The text is clear and filled with mistakes. It would be tedious to detail them; suffice it to say that, as the author comes down to the modern period, his errors increase until the book loses all its value as a history. It is a pity that so much care has been expended on the purely mechanical aspects of the work and so little on its scholarly content.

L. PEARCE WILLIAMS
Department of History,
Cornell University

New Books

General

Health Progress in the United States, 1900–1960. A report of Health Information Foundation. Monroe Lerner and Odin W. Anderson. Univ. of Chicago Press, Chicago, 1963. 371 pp. Illus. $6.50.

A History of Wine as Therapy. Salvatore P. Lucia. Lippincott, Philadelphia, 1963. 254 pp. Illus.

The Human Brain: Its Capacities and Functions. Isaac Asimov. Houghton Mifflin, Boston, 1964. 377 pp. Illus. $5.95.

Lighting Problems in Highway Traffic. Proceedings of a symposium (Stockholm), October 1962. Erik Ingelstam, Ed. Pergamon, London; Macmillan, New York, 1963. 157 pp. Illus. $10.

The Making of the Electrical Age. From the telegraph to automation. Harold I. Sharlin. Abelard-Schuman, New York, 1963. 256 pp. Illus. $5.95.

Psychoanalysis and Faith. The letters of Sigmund Freud and Oskar Pfister. Heinrich Meng and Ernst L. Freud, Eds. Translated by Eric Mosbacher. Basic Books, New York, 1963. 152 pp. $4.95.

Quest for a Continent. Story of the Antarctic. Walter Sullivan. McGraw-Hill, New York (© 1957), 1963. 382 pp. Illus. Paper, $2.95.

Rechtfertigung und Bericht uber meine Reisen in verschiedene Orte. Ambroise Pare. Translated from French to German and edited by E. H. Ackerknecht. Huber, Bern, Switzerland, 1963. 125 pp. Cloth, DM. 22.50; paper, DM. 7.50.

Resins, Rubbers, Plastics Yearbook, 1962. vols. 1 and 2. Norman G. Gaylord, Ed. Published for Information for Industry by Interscience (Wiley), New York, 1963. vol. 1, 1641 pp.; vol. 2, 1542 pp. Illus. $120. A collection of abstracts of papers that deal with the properties and behavior of resins, rubbers, and plastics. The material was originally published as *Resins—Rubbers—Plastics.*

The Science Book of Modern Medicines. Donald G. Cooley. Watts, New York, 1963. 238 pp. $4.95.

The Science-Engineering Secretary. Allison R. Stafford and Billie Jean Culpepper. Prentice-Hall, Englewood Cliffs, N.J., 1963. 352 pp. Illus. $8.65.