be most suitable for the following elements (or certain of their compounds): phosphorus, silicon, nitrogen, chlorine, bromine, iodine, fluorine, sulfur, tellurium and selenium, and boron. In general, following an introduction, each chapter covers separation, methods of determination, and important specific applications.

The list of supporting literature cited includes 718 references. A chemist informed about the literature would note that only two of the references cited appeared as late as 1957 and only six in 1956, although the book did not appear until well into 1958. The following are possible explanations for this small number of late citations: (i) there has been no more recent work; (ii) if there has been, the methods have not been sufficiently tested to justify inclusion in the volume; and (iii) the inevitable time lag in publication prevented inclusion of late work. In evaluating the up-to-dateness, of course, an experienced worker will rely on the date of the latest references cited rather than on the date of the copyright.

Three notable nonmetals not included are carbon, hydrogen, and oxygen. I would have welcomed chapters on these important elements, especially on hydrogen ions and simple inorganic compounds such as water, carbon monoxide, and carbon dioxide. Obviously, the wealth of organic compounds susceptible to colorimetric measurement could not be included.

This book is a valuable reference compilation for the elements covered and no doubt will be often cited, as Sandell's companion volume has been. The methods are carefully selected and concisely stated. Meticulous editing and proofreading have reduced inconsistencies and typographical errors to a minimum.

M. G. MELLON
Department of Chemistry,
Purdue University

Handbuch der Physik. vol. XXXIV, *Corpuscles and Radiation in Matter, II.* S. Flügge, Ed. Springer, Berlin, 1958. viii + 316 pp. Dm. 78.

This new volume of the *Handbuch der Physik* contains six more or less independent articles pertaining to the processes involved in the slowing down and disappearance of particles and radiation in matter. The emphasis throughout is on the experimental results; theory is introduced only in order to show the agreement between theory and experiment.

The first article, written by R. Kollath, is in two parts—the first on slow electrons and the second on slow ions. The discussion of electrons starts with a careful review of the experimental determinations, both as to methods and as to results. The comparison with theory that follows is restricted to angular distributions, these being the most sensitive to test. The part concerning the passage of slow ions through gases starts with a discussion of sources and proceeds to the experiments. The results are indicated in some detail, with major emphasis on the role of exchange and resonances. A short paragraph about negatively and multiply charged ions concludes the article.

The second article, written by R. D. Birkhoff, treats the passage of fast electrons through matter. Summaries of the theories for various types of events are given and compared with the results of experiment. Free electron-electron and positron-electron collisions are discussed. This is followed by a section on stopping power for electrons, including density effect and Cerenkov radiation. Considerable space is given to a treatment of collisions with the conduction plasma. The rest of the article treats the statistical behavior of electrons. Energy loss and straggling are well treated. This is followed by a thorough discussion of the theory and results in multiple scattering. The results of single nuclear scattering calculations by several authors are collected in convenient form. Finally, the effects of thick targets and associated range relations are presented.

Positronium is the subject of the third article, written by L. Simons. The theoretical results are presented in the first part. There follows a more or less historical discussion of the experiments on positronium, including quenching, spectra, angular correlations, and solid state aspects, which does very well in introducing the reader to all but the most recent work.

The fourth article, written by E. Merzbacher and H. W. Lewis, is on x-ray production and ionization by heavy ions. It starts with a theoretical discussion of some length. Experimental results are given and compared to the theory, particularly with respect to ionization. The article concludes with a short section on continuous radiation.

Energy loss by heavy particles in the energy range below 10 Mev is treated by W. Whaling in the fifth article. The results in this region are mostly experimental. A very useful collection of results has been assembled. Most of the values given are for protons and alpha particles, but a few results for heavier ions are included. I regret that the article does not include results at higher energies, which occupy a position of major interest today.

In the final article, R. D. Evans gives a comprehensive treatment of the Compton effect. Starting with a historical background, he discusses the early experiments and their later improved versions. The treatment is such as to point up the similarities and differences of the classical and quantum treatments. Formulas, graphs, and tables for various cross sections are given, including some energy distributions useful in instrumentation. Following this is a summary of absorption data for photons. The effect of electron binding on the photon scattering is discussed, including Rayleigh scattering. Finally, there is a section on Compton scattering by magnetically oriented electrons, with an indication of the possibility for detecting circular polarization.

Two general items disturbed me slightly. The termination date of the bibliographies was not always clear, and some of the graphs appear to be only of qualitative value. The articles do, however, supply good introductions to the various topics.

WALTER ARON
Department of Physics,
University of Virginia

Anatomist at Large. An autobiography and selected essays. George W. Corner. Basic Books, New York, 1958. v + 215 pp. $4.

George Corner presents a brief but poignant glimpse of his personal and professional life as introduction to ten selected essays and addresses from his pen. The autobiographical matter tells of family, and of boyhood and education in Baltimore. It tells of the young doctor's decision to follow a laboratory career and of the felicitous associations and circumstances accompanying a productive life as a distinguished leader in investigations of the sex hormones. One could wish for more than 64 pages of autobiography in this book of 215 pages. Readers would have welcomed inclusion of a photograph of the author.

Arranged in chronological sequence, from student days to retirement, the several essays and addresses suggest a measure of the wisdom and humanity of the author. Three essays, reflecting his scholarly interest in medical history, are followed by a look at the scientist in his workshop. In this account of his "quest for a hormone" one may discern the undercurrent of subdued excitement, the sense of urgency, and the aura of imminent discovery that pervaded his laboratory. Such an atmosphere is heady wine, and it drew able and dedicated investigators to his side from across the world.

The addresses offer sage advice and reflective comment on subjects ranging from the attributes of a good physician to a contemplation of the "incomprehensibles" that the thoughtful scientist cannot evade. Finally, there is consideration

of the duty of the scientist as a leader in education, and of trends in this area.

This is a very readable account of a full and satisfying career. It was a fitting compliment that Corner's official retirement as director of the department of embryology of the Carnegie Institution of Washington, in December 1955, was followed immediately by his appointment as historian of the Rockefeller Institute for Medical Research.

ELBERT B. RUTH
Department of Anatomy, School of Medicine, Johns Hopkins University

Atmospheric Explorations. Papers of the Benjamin Franklin Memorial Symposium of the American Academy of Arts and Sciences. Henry G. Houghton, Ed. Technology Press of Massachusetts Institute of Technology and Wiley, New York; Chapman & Hall, London, 1958. x + 125 pp. Illus. $6.50.

The five scientists represented in this small book on atmospheric electricity and the upper atmosphere are active along the "cutting edge" of atmospheric research. They know their subjects, and they believe that they have something worth while to say. These qualities insure a good technical book.

Henry Houghton of Massachusetts Institute of Technology has edited papers presented at the Benjamin Franklin Memorial Symposium of the American Academy of Arts and Sciences, in 1956, by Ross Gunn of the U.S. Weather Bureau, Joachim P. Kuettner of the Geophysical Research Directorate, Leonard B. Loeb of the University of California, Harry Wexler of the U.S. Weather Bureau, and Henry G. Booker of Cornell University.

Gunn reports that the charge distribution on cloud droplets and on rain is to be explained by diffusion of atmospheric ions, and he presents the relevant quantitative theory; he brings a simple and rational order to a problem which has often been discussed in a complex and confusing manner. Kuettner discusses some aspects of the problem of charge segregation in thunderstorms and presents his quantitative ideas about the crucial processes; this important problem still appears to be characterized by interesting and puzzling data unsupported by a solid theoretical structure. Loeb, to whom chief credit is due for the explanation of the mechanism of lightning, here gives further evidence of the similarity between lightning and the electric spark. Wexler presents some of his current thinking on large-scale upper-atmosphere local temperature changes (he attributes them to adiabatic changes accompanying large-scale cyclonic systems) and the question of upward or downward propagation of large-scale disturbances (he favors upward propagation but recognizes that downward propagation is conceivable). Booker describes nine phenomena associated with the scattering of radio waves by the ionosphere which are not easily explained. He suggests that atmospheric turbulence in the ionosphere may provide the key to their explanation but recognizes that no quantitative theory exists.

The scientific study of the atmosphere presents a number of trying difficulties; not the least of these is the fact that, whereas activity in recent years has been rather great, progress has been disproportionately small. The result has been that the good work tends to get lost in the abundance of indifferent work. Some of the most important problems today appear to be enmeshed in tangled chains of suppositions and in endless data which are never quite complete or quite accurate enough. It is in facing this situation and in trying to overcome it in a limited field that *Atmospheric Explorations* has made its most important contribution. Other books with similar objectives by equally eminent and capable scientists are needed to clarify and unify other of the most important atmospheric problems.

R. G. FLEAGLE
Department of Meteorology and Climatology, University of Washington

Admission Requirements of American Medical Colleges, Including Canada, 1958–59. Compiled by Helen Hofer Gee and E. Shepley Nourse. Association of American Medical Colleges, Evanston, 1958. viii + 227 pp. $2.

This new edition of *Admission Requirements of American Medical Colleges* contains the latest official information on premedical preparation in general and the requirements of each medical school in the United States and Canada.

Students seeking vocational guidance will find useful information on the specific requirements and costs for each school.

New Books

Advances in Enzymology and Related Subjects. vol. XX. F. F. Nord, Ed. Interscience, New York, 1958. 495 pp. $12.50.

The Birds. Oskar Heinroth and Katharina Heinroth. Translated by Michael Cullen. University of Michigan Press, Ann Arbor, 1958 (published as *Aus Dem Leben Der Voegel,* Springer, Berlin, ed. 2, 1955). 181 pp. $5.

A Century of Darwin. S. A. Barnett. Harvard Univ. Press, Cambridge, Mass., 1958. 392 pp. $5.75.

The Changing Face of New England. Betty Flanders Thomson. Macmillan, New York, 1958. 197 pp. $3.75.

Ebb and Flow. The tides of earth, air, and water. Albert Defant. Translated by A. J. Pomerans. University of Michigan Press, Ann Arbor, 1958 (published as *Ebbe und Flut des Meeres der Atmosphäre und der Erdfeste,* Springer, Berlin, 1953). 121 pp. $4.

Elementary Statistical Physics. C. Kittel. Wiley, New York; Chapman & Hall, London, 1958. 238 pp. $8.

The Exploration of Time. R. N. C. Bowen. Philosophical Library, New York, 1958. 150 pp. $6.

The Fertility of American Women. Wilson H. Grabill, Clyde V. Kiser, Pascal K. Whelpton. Wiley, New York; Chapman & Hall, London, 1958. 464 pp. $9.50.

Fluid Dynamics and Heat Transfer. James G. Knudsen and Donald L. Katz. McGraw-Hill, New York, 1958. 585 pp. $12.50.

The Genetic Basis of Selection. I. Michael Lerner. Wiley, New York; Chapman & Hall, London, 1958. 314 pp. $8.

The Idea of Freedom. A dialectical examination of the conceptions of freedom. Mortimer J. Adler. Doubleday, Garden City, N.Y., 1958. 716 pp. $7.50.

Industrial Evolution of Columbus, Ohio. Bureau of Business Research Monogr. No. 93. Henry L. Hunker. Ohio State Univ. Press, Columbus, 1958. 285 pp. $4.

Influence of Temperature on Biological Systems. Incorporating papers presented at a symposium held at the University of Connecticut, Storrs, Connecticut, on 27–28 August 1956. Sponsored and published under the auspices of the Society of General Physiologists, with the support of the National Institutes of Health. Frank H. Johnson, Ed. American Physiological Society, Washington, 1957. 289 pp.

The Infra-red Spectra of Complex Molecules. L. J. Bellamy. Methuen, London; Wiley, New York, 1958. 438 pp. $8.

An Introduction to the Theory of Integration. Adriaan C. Zaanen. North-Holland, Amsterdam; Interscience, New York, 1958. 263 pp. $7.25.

Human Dissection. Its drama and struggle. A. M. Lassek. Thomas, Springfield, Ill., 1958. 320 pp. $6.50.

Konstitution und Vorkommen der organischen Pflanzenstoffe (exclusive Alkaloide). Walter Karrer. Birkhauser, Basel, Switzerland, 1958. 1207 pp. F. 136.

Looking at the Stars. Michael Ovenden. Philosophical Library, New York, 1958. 192 pp. $4.75.

Metals and Enzyme Activity. Biochemical Society Symposium No. 15 held at the University of Leeds on 13 July 1956. E. M. Crook, Ed. Cambridge Univ. Press, New York, 1958. 102 pp. $3.75.

Methods of Testing Chemicals on Insects. vol. I. Harold H. Shepard. Burgess, Minneapolis, Minn., 1958. 356 pp. $5.

The New Chemotherapy in Mental Illness. The history, pharmacology and clinical experiences with rauwolfia, phenothiazine, azacyclonol, mephenesin, hydroxyzine and benactyzine preparations. Hirsch L. Gordon, Ed. Philosophical Library, New York, 1958. 779 pp. $12.