

lysis will be predominantly interested in volume II, whereas those concerned with mineral processing and flotation will find their subject covered in volume III. Although the subject of biological surface chemistry is recorded in only a limited number of papers in volume IV, biologists will find these profitable reading.

The standards of printing, format, and binding are high. Errors are few, and though the editor attributes the success of the publication to his many contributors, one cannot help thinking that this is overmodesty on his part. The price for all four volumes is high, but justified, and for those readers concerned with only one or two areas of study, the volumes are available singly.

ERIC HUTCHINSON

*Department of Chemistry,
Stanford University*

Physique électronique des gaz et des solides. Michel Bayet. Masson, Paris, 1958. 246 pp. Illus. F. 4900.

This book is based on material taught in a course by the author at the Faculté des Sciences de Toulouse for candidates for the "electronics certificate"; the course material is augmented by a number of theoretical developments, which are in part original. The purpose of the book is to give a unified account of transport phenomena associated with the motion of electrons in gases and solids; the greater part of the book (174 pages) deals with gases, the remainder being devoted to metals and semiconductors.

In the first chapter, the author briefly reminds the reader of the elements of Boltzmann, Fermi-Dirac, and Bose-Einstein statistics; the second part of this chapter discusses the classical theory of collisions between two particles. Chapter 2 deals with the kinetic theory of gases; the Boltzmann transport equation, diffusion, viscosity, thermal conductivity, and so on are discussed along standard lines.

In chapter 3 the author gives a detailed mathematical discussion of the transport properties of a nondegenerate Lorentz gas—that is, of a mixture of two gases, A and B, in which the A-A interaction is negligible compared with the A-B and B-B interactions. The results obtained in this chapter are carried over to the next one, in which the electromagnetic properties of a plasma are investigated. In chapter 5 one finds a rather standard treatment of the fundamental processes in ionized gases, such as ionization, excitation, and recombination. The various types of gas discharges are considered in chapter 6, which constitutes the last chapter dealing with gases. The last two chapters deal with the electron

theory of metals and semiconductors. The appendix contains mathematical details of derivations and gives properties of certain mathematical functions used in the text.

The general level of this book corresponds to senior undergraduate or beginning graduate physics courses in this country. It is clearly written and should serve a useful purpose for those who are interested in electron physics—particularly, of gases. The publishers should be congratulated on the good general appearance of this book.

ADRIANUS J. DEKKER

*Department of Electrical Engineering,
University of Minnesota*

The Origins of Modern Science, 1300–1800. H. Butterfield. Macmillan, New York, ed. 2, 1957. x + 242 pp. \$3.

In the eight years since the first edition of Butterfield's worthy *Origins* appeared on the market, perhaps no single volume has been so widely used in introductory courses dealing with one or another aspect of the scientific revolution. This is surely proof positive of its basic correctness and balance as well as of its extreme readability, for which its author, master of Peterhouse in the University of Cambridge, has come to be justly praised. Perhaps no better indication can be found of the popularity of this relatively slight book as well as the esteem in which it is held than the fact that one repeatedly hears professional historians of science express two desires: (i) that comparable studies suitable for textbook purposes existed for other periods in the history of science, and (ii) that *they themselves* had written this particular book.

In view of such kudos, it is slight wonder that its author and publisher should wish to perfect it by correcting any noted errors or misprints, by adding relevant material to the existing chapters of the original structure, and by keeping it up to date through the addition and use of entries under "Suggestions for further reading." The result is a revised edition, some 55 pages longer than the first edition, as eminently sound as ever, and no doubt headed for even greater success.

While the general content and number of the original chapters remain unchanged, I note the following additions. Pages 34–36 add useful ideas concerning ancient, nonscientific elements in Renaissance thought—including the role of occultism and cabalistic speculation—which help to round out the chapter on "The conservatism of Copernicus." This brilliant chapter, supporting the view that Copernicus' work can more meaningfully be viewed as the end of the old astronomy and cosmology than as the

beginning of the new, still, however, contains a possibly misleading concept. Of Copernicus we read, "To the old objection that if the earth rotated its parts would fly away and it would whirl itself into pieces, he gave an unsatisfactory answer. . . ." (page 32). Coupled with the allusion to Ptolemy on the following page, the reader could well get the erroneous impression that Ptolemy had faced "that whole question of centrifugal force." However, Ptolemy nowhere argues in such terms, or indeed says anything about what would happen if the earth were to rotate upon its axis. The truth of the matter is that Copernicus in *De revolutionibus* (book I, chapters 7–8) erroneously ascribed such an argument to Ptolemy and, unfortunately, most modern scholars writing about Copernicus have not bothered to check by reading Ptolemy.

Other material new to this book includes a section dealing with the work of Duhem and others on the theory of impetus (pages 14–16) and a section on the communications of scientists and early scientific societies in the 17th century (pages 71–76). Additional suggestions for further reading include such important work as T. S. Kuhn's paper on "Robert Boyle and structural chemistry in the seventeenth century" and E. Rosen's *Three Copernican Treatises*.

WILLIAM D. STAHLMAN

*Department of Humanities,
Massachusetts Institute of Technology*

Elements of Water Supply and Waste-Water Disposal. Gordon Maskew Fair and John Charles Geyer. Wiley, New York; Chapman & Hall, London, 1958. vii + 615 pp. Illus. + chart. \$8.95.

Conventionally and traditionally the undergraduate student of civil engineering has been introduced first to the subject of municipal water supply and treatment, then later to a separate and largely unrelated course in sewerage and sewage disposal. Yet the basic disciplines and engineering sciences governing all aspects of water supply and waste-water disposal are similar, whether the water passes through municipal, industrial, or agricultural systems. Although chemical engineers have long recognized these mutualities by stressing "unit processes and unit operations" that are applicable to many industries, Fair and Geyer have pioneered in utilizing this approach for sanitary engineering. Sedimentation and flotation, for example, involve identical principles of fluid mechanics whether they are used for water treatment, sewage clarification, or the separation of solids and oils from industrial wastes. Fair and Geyer emphasize the similarities of the fundamental principles and then go

on to describe the application to special situations.

Their original unabridged text, *Water Supply and Waste-Water Disposal* (Wiley, 1954), was a thorough treatise that stressed the application of scientific principles, rather than conventional practice, to the functional design and operation of water works and liquid-waste facilities. The new volume is a condensed version of the original text, with some subject matter simplified, some recast, and some shortened. A new feature of the present volume is the collection of 175 problems at the end of the book. Together with abundant examples that serve to illustrate and demonstrate scientific principles and formulas, these problems enhance the utility of the new volume as a textbook. The numerous illustrations and graphs are simple line sketches, uncluttered by details. Photographs are not used.

This book, like most other writings by these authors, is characterized by rigid organization, careful documentation, exemplary grammar, and a meticulous selection of words. It is designed for careful and prolonged study, not for casual perusal or for occasional reference. In company with its larger prototype, it is the most fundamental and rational treatise available in the broad field of water supply and waste-water disposal.

J. E. McKEE

Division of Engineering,
California Institute of Technology

Miscellaneous Publications

(Inquiries concerning these publications should be addressed, not to Science, but to the publisher or agency sponsoring the publication.)

Bentley and Driver's Qualitative Chemical Analysis. Revised by J. E. Driver. Hong Kong Univ. Press; Oxford Univ. Press, New York, rev. ed. 5, 1958. 47 pp. \$1.20.

Smithsonian Contributions to Astrophysics. vol. 2, No. 9, *On Two Parameters Used in the Physical Theory of Meteors*. Luigi G. Jacchia. Smithsonian Institution, Washington, 1958 (order from GPO, Supt. of Documents, Washington 25), 8 pp. \$0.15.

Skin Resistance Changes during Acceleration. WADC Tech. Note 56-397. ASTIA Document No. AD 97 275. Sanford I. Cohen, Albert J. Silverman, George D. Zuidema, Gilbert E. Johnson. Wright Air Development Center, Wright-Patterson Air Force Base, Ohio, 1958. 13 pp.

Research Bulletin of the Panjab University. Zoology, No. 116; *Studies in Reptilian Spermatogenesis*; No. 3, *Spermatogenesis of the Spiny-Tailed Lizard, Uromastix hardwickii Gray, with Observations on the Living Material under the Phase-Contrast Microscope*; Bhupinder Nath Sud; 16 pp.; Rs. 2/59. Chemistry, No. 117; *Fat Formation from Different Carbohydrates by Penicillium Aurantio-*

brunneum and the Effects of Varying pH, and Nitrogen Sources on the Production of Fat from Sucrose; Jagjit Singh and Gurmit Singh; 34 pp.; Rs. 0/85. Zoology, No. 118; *The Cytoplasmic Inclusions of the Neurones of the Earthworm*; S. K. Malhotra; 14 pp.; Rs. 2/39. Zoology, No. 119; *On the Direct Origin of the Refrigrant Granules from the Golgi Spheroids in the Spermatogenesis of the Nematodes, Polydelphis Sp.*; Sant Singh; 6 pp.; Rs. 1/39. Zoology, No. 120; *Cytological Studies on the Indian Spiders*. G. P. Sharma and Sant Singh. 5 pp.; Rs. 1/19. Zoology, No. 121; *Studies on Insect Spermatogenesis*; No. 3, *Odonata: Spermatogenesis of Neurobasis sp.*; Sukhdev Raj Bawa; 5 pp.; Rs. 1/17. Zoology, No. 122; *Cytological Studies in Heteroptera*; No. 3, *A Comparative Study of the Chromosomes in the Male Germ-Cell of Eleven Species of the Sub-Family Pentatominae*; Ram Parshad; 20 pp.; Rs. 2/75. Zoology, No. 123; *A Study of the Cytoplasmic Inclusions of the Neurones of the Snail, Euautentia, by Phase-Contrast Microscopy and Sudan Black Colouring*; S. K. Malhotra; 5 pp.; Rs. 1/27. Mathematics, No. 124; *Certain Averages Connected with Partitions*; Hansraj Gupta; 4 pp.; Rs. 1/03. Botany, No. 125; *The Polyporaceae of the Mussoorie Hills, II*. K. S. Thind and M. S. Chatrath; 12 pp.; Rs. 2/30. Zoology, No. 126; *Fish Spermatogenesis with Particular Reference to the Fate of the Cytoplasmic Inclusions*; No. 4, *Spermatogenesis of Ophiocephalus punctatus*; Hem Sagar Vasisht; 4 pp.; Rs. 1/06. Mathematics, No. 127; *Spheres Associated with a Semi-Orthocentric Tetrahedron*; Sahib Ram Mandan; 5 pp.; Rs. 0/95. Zoology, No. 128; *Some Observations on the Biology and Oviposition of Bruchus Analis F. (Bruchidae: Coleoptera)*; G. L. Arora and H. R. Pajni; 18 pp.; Rs. 3/00. Botany, No. 129; *The Polyporaceae of the Mussoorie Hills, III*; K. S. Thind, P. S. Bindra, M. S. Chatrath; 13 pp.; Rs. 2/36. Zoology, No. 130; *Some Observations on the Biology of Lipaeurus Tropicalis Peters (Mallophaga: Ischnocera)*; G. L. Arora and Narinder Perkash Chopra; 7 pp.; Rs. 1/47. Panjab Univ., Hoshiarpur (Panjab, India), 1958.

Canada, National Advisory Committee on Research in the Geological Sciences, 1956-57 (including survey of current research in the geological sciences in Canada, 1956-57). Geological Survey of Canada, Ottawa, 1957. 165 pp. \$0.50.

Annual Report of the Director of the Department of Terrestrial Magnetism, 1956-1957. Carnegie Institution of Washington, Washington, D.C., 1957. 50 pp.

The Work of WHO, 1957. Annual report of the Director-General to the World Health Assembly and to the United Nations. Official Records of the World Health Organization No. 82. World Health Organization, Geneva, 1958 (order from Columbia Univ. Press, New York, 27). 183 pp. \$1.25.

Preparation, Maintenance, and Application of Standards of Radioactivity. NBS Circular 594. W. B. Mann and H. H. Seliger. National Bureau of Standards, Washington, 1958 (order from Supt. of Documents, GPO, Washington). 47 pp. \$0.35.

Economia dell'energia atomica. Rassegna bibliografica e di documentazione. Banca Nazionale del Lavoro, Rome, ed. 2, 1957. 54 pp.

Symposium on the Peaceful Uses of Atomic Energy in Australia, 1958. sect. 1, *Materials*; sect. 2, *Power Engineering*; sect. 3, *Power Auxiliaries and Research Reactors*; sect. 4, *Basic Sciences*; sect. 5, *Associated Techniques*. Land Newspaper Ltd., 57-59 Regent St., Sydney, Australia.

Science and Foreign Policy. Headline Series, No. 130. Foreign Policy Assoc., New York, 1958. 62 pp. \$0.35.

Type Specimens of Lice (Order Anoplura) in the United States National Museum. Proceedings of the U.S. National Museum, vol. 108, No. 3393, Phyllis T. Johnson. Smithsonian Institution, Washington, 1958. 10 pp.

International Humanist and Ethical Union, Proceedings, Second Congress, London, 1957. International Humanist and Ethical Union, 152 Oude Gracht, Utrecht, Netherlands, 1958. 95 pp.

Flore du Congo Belge et du Ruanda-Urundi. vol. VII, *Spermatophytes*. Prepared by the Comité exécutif de la Flore du Congo Belge et le Jardin Botanique de l'Etat. Institut National pour l'Etude Agronomique du Congo Belge, Brussels, 1958. 367 pp.

Desciframientos de inscripciones cíclográficas del Mexico Antiguo. Raúl Noriega. Conferencia en la Asociación Mexicana de Periodistas, México, 1958. 26 pp.

Contributions of the Hawaii Institute of Geophysics, 1957. Univ. of Hawaii, Honolulu 14, Hawaii, 1958. 92 pp.

The Microbiology of Fish and Meat Curing Brines. Proceedings of the Second International Symposium on Food Microbiology held at Cambridge (United Kingdom) in April 1957. B. P. Eddy, Ed. Department of Scientific and Industrial Research, Food Investigation, London, 1958. 336 pp. £2 5s.

Educating a Chemist. A report on the conference held at the Johns Hopkins University, 16-20 October 1957, sponsored by the National Science Foundation. Donald H. Andrews. Johns Hopkins Univ., Baltimore, Md., 1958. 67 pp.

Glaciation in Big Bend National Park, Texas. Hubert O. Jenkins. Sacramento State College Foundation, Sacramento 19, Calif., 1958. 15 pp.

Aspects actuels de la biochimie des acides aminés et des protéines. J. T. Edsall. Masson, Paris, 1958. 156 pp.

Nuclear Magnetic Resonance. Annals, vol. 70, art. 4. Frederick C. Nachod, Consulting Ed. New York Academy of Sciences, New York, 1958. 168 pp.

A Review of the Middle and Upper Eocene Primates of North America. Misc. Collections, vol. 136, No. 1. C. Lewis Gazin. Smithsonian Institution, Washington, 1958. 112 pp.

Egyptian Reviews of Science. vol. 1, *Review of Egyptian Geology*. pt. 1, *Historical Geology, Paleontology, Tectonics, Geomorphology and Pleistocene Geology*, Rushdi Said; pt. 2, *Economic Geology, Engineering Geology, Ground and Surface Water, Meteorites, Mineralogy, Pre-Cambrian Geology and Soils*, E. M. El Shazly. Science Council, Cairo, Egypt, 1957. 91 pp.