doubt whether Wilms' kidney tumor should be still called embryonal adenosarcoma (Birch-Hirschfeld), and whether *cortical* adrenal carcinomata are "relatively frequent" in children. A comparison with the frequency of cancer arising in the tiny medulla of the very same organ (neuroblastoma) shows that they are rather rare and late.

The book has 638 excellent photographic illustrations in black and white, an index of authors and subjects, and, at the end of each chapter, references; it is concisely written and stimulating.

SIGISMUND PELLER
New York, N.Y.

Perinatal Mortality in New York City: Responsible Factors. A study of 955 deaths by the Subcommittee on Neonatal Mortality, Committee on Public Health Relations, New York Academy of Medicine. Schuyler G. Kohl. Harvard Univ. Press, Cambridge, Mass., 1955. xxi + 111 pp. $2.50.

In this book, whose small size belies its importance, an analysis is made of 955 perinatal deaths in the city of New York during the years 1950–51. The term *perinatal* is used to include stillbirths as well as deaths in prematurely born and mature babies.

A startling fact brought out in this study is that about a third of the perinatal deaths were preventable. The best records were made by the voluntary teaching hospitals; the poorest, by the municipal nonteaching hospitals. Responsibility for preventable deaths was shared about equally by erroneous medical judgment, unsatisfactory medical care, and erroneous medical technique. Death was more often preventable in the mature than in the premature infants.

HARRY BAKWIN
Department of Clinical Pediatrics, New York University College of Medicine

Theoretical Structural Metallurgy. A. H. Cottrell. St. Martin's Press, New York, ed. 2, 1955. viii + 251 pp. Illus. $4.50.

The understanding of the behavior of metals and alloys has made rapid progress in the last decade, especially with the help of the electron theory of metals, statistical thermodynamics applied to phase changes, and clearly defined descriptions of several lattice defects and the way in which they affect metallic properties. These developments have to show up in today's training of students of metallurgy. The Birmingham school, from the curriculum of which Cottrell's book derives, is well known for its pioneering in metallurgical education.

The author tries to build up the present theoretical picture of the structure of metals from fundamental physical principles. One cannot, of course, expect here a rigorous description of the electron theory of metals. However, the essential aspects of modern theory are explained step by step. The presentation adopted should enable the reader to appreciate the current developments and consequences of the theoretical picture and perhaps even to overcome some metallurgists' horror for the theory and its terminology.

The first chapters give a wave-mechanical picture for the electronic states in atoms and for interatomic forces, together with some fundamentals on crystallography. Some difficulties are unavoidable in a qualitative review of, for example, the Heitler-London molecule that introduces exchange forces. The chapters which follow give a good idea of the quantum theory of the free electron and the electron in a periodic potential as well as some applications to conductivity, ferromagnetism, and cohesion. The thermodynamic variables and their statistical interpretation are introduced next and immediately used to study the thermal behavior of metals. Both electron theory and thermodynamics are employed in the following chapters on the structure and the free energy of alloys and an interpretation of equilibrium diagrams (including zone melting). Diffusion, the diffusion-controlled order-disorder changes and precipitation kinetics are treated in the next three chapters. The book concludes with a chapter on shear processes, a new feature of the second edition. It combines a very brief description of dislocations with a review of the martensitic transformation. Introduction of the latter after the diffusion-controlled transformations probably justifies the position of the chapter on dislocations in the book, although knowledge of dislocation properties would undoubtedly aid comprehension in many of the preceding chapters.

The second edition has been almost entirely rewritten and, in my opinion, greatly improved. Some of the statements are now less dogmatic, and only the essential features of some theories are considered. In addition, simple mathematics are now left to the reader. The number of good figures has been increased, but the total size has been decreased despite the enlarged content. The book is very well written; the last chapters in particular read like a detective story. Cottrell's book can be highly recommended to everyone interested in the physical foundations of the science of metallurgy.

PETER HAASEN
University of Chicago

The Biology of a Marine Copepod Calanus finmarchicus (Gunnerus). S. M. Marshall and A. P. Orr. Oliver & Boyd, London, 1955. vii + 188 pp. Illus. 21s.

One of the most important animals in the sea is this little arthropod, and Marshall and Orr have published so many papers about it that their names are almost synonymous with it. This book is not a simple collation of these papers, but a carefully prepared treatment of the various aspects of the biology of *Calanus finmarchicus,* beginning with systematics and distribution and proceeding through such topics as anatomy, reproduction, food, migrations, parasites, and environmental relationships.

Although this is the latest and most exhaustive word on the subject, it cannot be said to be the last word. The uncertainties and lacunae are constantly called to the reader's attention, beginning with the as yet unresolved question of whether there are two species, or two—or even three—distinct forms involved under this name. Nevertheless, this book is a splendid example of the sort of information we must have about the important animals of the sea before we can understand more completely the economy of the sea.

JOEL W. HEDGPETH
Scripps Institution of Oceanography

Radiobiology Symposium, 1954. Proceedings of the symposium held at Liege, Aug.–Sept., 1954. Z. M. Bacq and Peter Alexander, Eds. Academic Press, New York; Butterworths, London, 1955. xix + 362 pp. Illus. $9.80.

The second International Symposium on Radiobiology was held at Liege, Belgium, in August and September 1954. This volume, edited by Z. M. Bacq and Peter Alexander, contains most of the papers that were presented, together with the discussions. It is of particular value to the American reader who has a general interest in the effects of ionizing radiations on biological systems because the preponderance of material is presented by outstanding European radiobiologists or representatives of their laboratories. The discussions are for the most part of a very high order and serve to highlight present-day thought on the complex mechanisms involved in the production of initial, secondary, and ultimate effects in simple chemical systems and in living organisms.

The several papers and discussions dealing with the action of protective, sparing, and restorative agents in simple and complex systems give an exceedingly full picture of present knowledge of

and experimental approaches to this very timely and practical problem. Alexander's paper summarizing his systematic studies of primary chemical effects of radiation, using certain polymers as models, is outstanding. His experimental work, using appropriate polymers with selected additives and aromatic side chains, has demonstrated the occurrence in these systems of a number of postulated mechanisms that indicate that the so-called direct effects of ionizing radiation on molecules are not necessarily inevitable, but may be subject to a variety of modifying factors.

For those who are especially interested in minimizing the effects of whole-body radiation in mammals, there are several papers on the subject with lively discussions by Bacq, Patt, Mogat, Alexander, and others. The reader interested in enhancing radiation effects on tumors will be fascinated by Mitchell's report of his extensive studies with radiosensitizers.

In the field of genetics, there are five papers with discussions dealing with the mechanisms involved in chromosome breaks and rearrangements. In addition, there are interesting papers dealing with the effects of physiologic state, ion density, types of ionizing radiation, and post-irradiation factors on the number and nature of the surviving mutants.

There are also a number of papers dealing with the effects of ionizing radiation on a variety of biochemical compounds and enzyme systems.

In short, this volume, although it is not calculated to give complete coverage to the entire field of radiobiology, does include a large amount of first-rate material dealing with certain very active areas of research.

C. L. DUNHAM
U.S. Atomic Energy Commission

Books Reviewed in The Scientific Monthly

December

The Facts of Life, C. D. Darlington (Macmillan). Reviewed by H. P. Papazian.

Man on Earth, J. Hawkes (Cressent). Reviewed by J. D. Lovell.

The Equatorie of the Planetis, D. J. Price, Ed. (Cambridge Univ. Press). Reviewed by G. M. Smith.

Pomp and Pestilence, R. Hare (Philosophical Library). Reviewed by M. H. Adams.

Apes, Angels, and Victorians, W. Irvine (McGraw-Hill). Reviewed by G. Hardin.

Human Physiology, W. B. Youmans (Macmillan). Reviewed by F. A. Hitchcock.

Cells and Societies, J. T. Bonner (Princeton Univ. Press). Reviewed by C. R. Carpenter.

Bird Recognition 3, J. Fisher (Penguin Books). Reviewed by W. H. Drury, Jr.

Plane Trigonometry, C. R. Wylie, Jr. (McGraw-Hill). Reviewed by L. M. Kells.

School Facilities for Science Instruction, J. S. Richardson, Ed. (National Science Teachers Assoc.).

Studies in Mathematics and Mechanics, Presented to Richard von Mises by friends, colleagues, and pupils (Academic Press). Reviewed by A. Rosenthal.

Astronomy, R. H. Baker (Van Nostrand). Reviewed by A. P. Linnell.

Introductory Applied Physics, N. C. Harris and E. M. M. Hemmerling (McGraw-Hill). Reviewed by M. W. White.

Sir Isaac Newton, E. N. daC. Andrade (Collins).

Minnesota's Rocks and Waters, G. M. Schwartz and G. A. Thiel (Univ. of Minnesota Press).

Ferns of Tennessee, J. M. Shaver (George Peabody College for Teachers). Reviewed by C. V. Morton.

The Encyclopedia of Child Care and Guidance, S. Matsner Gruenberg, Ed. (Doubleday).

Educators Guide to Free Films, M. F. Horkheimer and J. W. Diffor (Educators Progress Service).

Mammals, H. S. Zim and D. F. Hoffmeister (Simon and Schuster).

Plant Life in Malaya, R. E. Holttum (Longmans, Green).

Your Career in Physics, P. Pollack (Dutton). Reviewed by J. S. Coleman.

Plants without Flowers, H. Bastin (Philosophical Library). Reviewed by G. M. Smith.

Miscellaneous Publications

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

Clinical Testing of Dental Caries Preventives. Report of a conference to develop uniform standards and procedures in clinical studies of dental caries. American Dental Assoc., Chicago, 1955. 67 pp. Single copy, free.

Alfred P. Sloan Foundation, Report for the Year, 1953–1954. The Foundation, New York 20, 1955. 127 pp.

International Scientific Radio Union, Proceedings of the XIth General Assembly. vol. X, pt. 3. Commission III on Ionospheric Radio. The Union, Brussels, 1955. 194 pp. $4.

Oak Ridge Institute of Nuclear Studies, Ninth Annual Report. 30 June 1955. Atomic Energy Commission, Oak Ridge, Tenn., 1955. 72 pp.

Illinois Trees: Their Diseases. Circular 46. J. Cedric Carter. Illinois Natural History Survey Div., Urbana, 1955. 99 pp. Single copy, free.

Physical-Chemical Properties of Ethane-Nitrogen Mixtures. Research Bull. 26. B. E. Eakin, R. T. Ellington, and D. C. Gami. Inst. of Gas Technology, Chicago 6, Ill., 1955. $5.

The American Museum of Natural History, Eighty-Sixth Annual Report, July 1954 through June 1955. The Museum, New York, 1955. 84 pp.

The American Species of Aeschynomene. Contributions from the U.S. National Herbarium. vol. 32, pt. 1. Smithsonian Institution, Washington, 1955 (Order from Supt. of Documents, GPO, Washington 25), 172 pp. $0.75.

Strengths and Weaknesses of the Junior High Schools. Report of the National Conference on Junior High Schools, Washington, D.C., 25–26 February 1955. Circular No. 441. Compiled by Walter H. Gaumnitz. U.S. Office of Education, Washington, 1955 (Order from Supt. of Documents, GPO, Washington 25). 56 pp. $0.40.

Life and Death of the Soil. Robert C. Sherman. Science Research Associates, Chicago 10, 1955. 48 pp. $0.60.

Making the Years Count. New York State Joint Legislative Committee on Problems of the Aging. The Committee, 1955. 162 pp. Single copy, free (Send request to Thomas C. Desmond, Chairman, 94 Broadway, Newburgh, N.Y.)

The Writings of David Barnard Steinman Relating to the Design, Construction and History of Bridges, Including Contributions to the Development of the Engineering Profession, 1909–1954. A bibliography. Engineering and Science Ser., No. 67. Library staff. Rensselaer Polytechnic Institute, Troy, N.Y., 1955. 28 pp.

Conference on the Plasma Proteins and Cellular Elements of the Blood. 15 November 1954. Protein Foundation, Inc., and Commission on Plasma Fractionation and Related Processes, Cambridge 38, Mass., 1955. 76 pp.

An Engineering Pilot Study to Determine the Comparative Injury Potential of Steering Wheel Assembly Designs (Automotive). Sections I–III. Andrew J. White. Motor Vehicle Research, Inc., South Lee, N.H., 1955. 23 pp.

Educational Directory, 1954–55. pt. 1, *Federal Government and States.* U.S. Office of Education, Washington, 1955 (Order from Supt. of Documents, GPO, Washington 25). 56 pp. $0.25.

Planning Florida's Health Leadership: Medical Education in the University. vol. 5, Medical Center Study Ser. Louis J. Maloff, Ed. Univ. of Florida Press, Gainesville, 1955. 161 pp. $1.50.

On the Dynamics of Wind-Driven Ocean Currents. vol. 2, No. 4, Meteorological Papers. Gerhard Neumann. New York Univ. Press, New York, 1955. 32 pp.

Longitudinal Study of Individual Development. Techniques for appraising developmental status and progress. Leland H. Stott. Merrill-Palmer School, Detroit, Mich., 1955. 115 pp. $2.75.

Baccalaureate Origins of Science Doctorates Awarded in the United States, 1936–1950. Publ. 382. National Acad. of Science–National Research Council, Washington 25, 1955. 158 pp. $2.

Ninetieth Annual Report of the Surgeon General, U.S. Navy, to the Secretary of the Navy. Relative to statistics of diseases and injuries in the U.S. Navy for the calendar year 1954. Government Printing Office, Washington, 1955. 183 pp.

The Story of Cosmic Rays. W. F. G. Swann. Sky Publishing, Cambridge, Mass., 1955.