publication is a link that can provide a common basis for the interchange of ideas.

Because of the key role played by such a book, it is important that the contributors devote considerable effort to present their material in a stimulating as well as informative manner. It is not enough to write a running commentary on a series of bibliography file cards. Outstanding examples of good review writing are to be found in chapters on "Nitrogen metabolism" (G. Webster), "Functional aspects in mineral nutrition of green plants" (A. Pirson), and "Chemical nature of disease resistance in plants" (J. C. Walker and M. A. Stahmann). These authors have the ability to weave a presentation of the latest material into the patterns of previous knowledge. Furthermore, they are able to point out the broad as well as specific areas where future research is needed.

The other articles, all of high caliber, but lacking the sparkle that would make them outstanding, concern the following topics: mineral nutrition, photosynthesis, growth regulators, flowering, abscission, ater relationships, flower colors, cotton physiology, pathogenicity, alkaloids, and tissue culture.

It seems unfortunate that H. Lundegårdh in his review on "Mechanisms of absorption, transport, accumulation, and secretion of ions" took this opportunity to present, essentially, a defense of his own theories with references made only to those works that tend to support him. The omission of the important researches of Epstein and others gives evidence of this reluctance to present a balanced view of this subject.

D. I. Arnon is to be commended for his efforts as editor for the past 6 years. It is hoped that L. R. Blinks, as the new editor, will continue to make *Annual Reviews of Plant Physiology* not only an essential encyclopedic reference source, but a dynamic and stimulating publication to be enjoyed by all plant scientists.

PAUL SALTMAN
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Polarographic Techniques. Louis Meites. Interscience, New York–London, 1955. xiii + 317 pp. Illus. $6.

In writing a manual to guide the student who is being introduced to the science of polarography, Meites has contributed an easily read and well-organized textbook.

A short introductory chapter on the nature and scope of polarographic measurements is followed by a description of present-day instrumentation. The polarographic limiting current is the subject of the third and longest chapter (43 pages), which contains a discussion of the residual, migration, and diffusion currents followed by a description of the kinetic, catalytic, and adsorptive phenomena that complicate the interpretation of the magnitude of the limiting current. Eight experiments at the end of the chapter are included to illustrate the main points developed. In all, 28 such experiments are included in the book. After mastering the first three chapters and Chapter 6 on maximum suppressors, the student should be ready to proceed to the interpretation of current-voltage curves (Chapters 4 and 5), quantitative analyses (Chapter 7), amperometric titrations (Chapter 8), and the more specialized techniques of polarography (Chapter 9). One hundred and twenty-six well-chosen references are inserted to encourage the interest of the student in further study and research.

The limited usefulness of the appendix on trouble-shooting in polarographic circuits is more than over-balanced by the usefulness of the extensive table of half-wave potentials and diffusion-current constants of inorganic substances that is compiled in the second appendix.

HARRY A. SAROFF
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Histologische Geschwulstdiagnostik. Systematische Morphologie der menschlichen Geschwulste als Grundlage für die klinische Beurteilung. A. V. Albertini. Thieme, Stuttgart, 1955. xvi + 544 pp. Illus. $23.40.

The book of the prominent Swiss pathologist A. V. Albertini deals with the micromorphology of benign, malignant, and borderline tumors, discusses interpretations of histological structures and prognostic evaluation, and contains remarks on relative frequency, age, and sex.

The author covers systematically and completely *all* kinds of tumors of the respiratory, digestive, and urinary organs; the female genitals; the breast; the male genitals; the thyroid and parathyroids; the adrenals; the sympathetic nervous system; the heart and blood vessels; tendons and bursae; spleen and lymph nodes, bones and skin. Neoplasia of each organ is grouped according to histogenesis and cell and tissue differentiation. The scheme, well executed, permits a quick and easy orientation. Some exceptions are made either because of difficulties in classification or for reasons of tradition (for example, Ewing sarcoma and Brenner tumor).

More flexible than other conservative pathologists, the author acknowledges the usefulness of cytological tumor diagnosis and recognizes the superiority of Papanicolaou's method over other methods. Albertini is not enthusiastic about the prognostic evaluation of tumors by grading slides according to cell activity, differentiation, and mitotic index. He views this method as pseudoexact and gives preference to Walther's formula, which empirically accounts for three variables: growth by expansion, lymphatic spread, and hematogenous dissemination. However, this procedure also has shortcomings.

Albertini thinks that the cytoplasm of cancer cells gets too little attention and advocates examination of fresh unstained tumor samples by means of Zernike's phase-contrast method. This method reveals important regressive changes, otherwise missed, within the cytoplasm and in the cell membrane (in highly dedifferentiated tumors).

In each chapter the author gives an account of unsettled problems of classification. Differences of opinion occur at the delineation of precancerous conditions from cancer, as, for instance, in Hinselmann's stages III and IV of cervix pathology. Stressing histological more than cytological features, Albertini includes preinvasive carcinoma (surface carcinoma, carcinoma *in situ*, or "carcinoid") in the group of precancers. Thus, Bowen's disease is a precancer as long—and this means many years—as the numerical equilibrium between proliferation of the *cancerous* cells and their disintegration has not been shaken.

Time and again the author points out difficulties arising from disagreement between histology of a tumor—appearance as a benign tumor or a granuloma—and its malignant clinical course—for example, in Kaposi's angiosarcoma, and vice versa. Thus, he classifies skin epithelioma, because of its clinical course, as a precancerous condition, despite its histology. He also discusses histological divergencies between primary epithelial tumors and seemingly sarcomatous metastases (epithelioma fusocellulare).

Albertini still excludes leukemia from the family of tumors, and since some lymphocytic lymphosarcomas (of the mediastinum) turn into leukemia, he considers those a localized form of leukemia and not members of the sarcoma group. In view of the prevailing opinion regarding leukemia, this complex deserved a more thorough discussion than a paragraph in the subchapter on *benign* lymph-node tumors.

No place was reserved for tumors of the central nervous system, the eye, and the ear. I doubt whether Cushing and Bailey's work is a valid reason for excluding them from a comprehensive book on histopathology of tumors. Omission of these tumors is the more deplorable because, in recent years, much attention has been paid to childhood cancer. I also

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
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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
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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
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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