since then that the book could easily double in size if it were rewritten today at the same level. Nevertheless, this is a most useful book, and it is warmly recommended to a broad audience. I hope the author writes a sequel soon in which he discusses the band structure of semiconductors away from the band edges, and treats reflectivity, differential reflectivity, and photoemission experiments with the same warmth and enthusiasm with which he has treated the older experimental techniques in the present volume.

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Optics of the Sea

Optical Oceanography. N. G. JERLOV. Elsevier, New York, 1968. xvi + 194 pp., illus. $13.50. Elsevier Oceanography Series.

A monograph on optical oceanography is a welcome addition to the literature of oceanography. N. G. Jerlov of the University of Copenhagen is qualified by many years of experience in the field to write such a monograph and has prepared a book that will certainly be of value to students and research workers in physical oceanography and related fields.

The organization of the material is straightforward and systematic. A brief introduction sets forth the terminology, definitions, and symbols used to represent the important quantities. This is followed by a section on the scattering and beam attenuation of pure water and of sea water. The next section, the major part of the monograph, applies the information presented in the previous parts of the book to the sea when illuminated by light from the sun and sky. The monograph closes with brief chapters on applications to physical oceanography and to marine biology. Appendices include an extensive list of references to publications in optical oceanography—a very valuable part of the book—and an index.

The author has excluded the consideration of underwater photography and television and included little on the problems of image formation with natural or artificial light. There is essentially nothing on the velocity of light in the sea (refractive index) and its dependence on the nature and amount of the material dissolved in the water, the temperature, and the pressure.

The book appears to be intended more as a guide to the literature than as an explanation of it. The reader is usually left to find details in the original articles to which he is referred. The inclusion of more complete explanations and references to standard text and reference books would have made it more useful to students. The inclusion of more references to work by physicists and chemists would have shown the close connection between optical oceanography and other fields of science. (This list of references as it stands gives the impression that knowledge of the optical properties of liquids and of liquids with solid particles suspended in them is of recent origin and the exclusive property of oceanographers.)

Although in general the figures and tables are clear and easy to follow without going to the text or the references, in a few cases some information such as the depth of the water or the precise meaning of different markings is lacking. (There appears to be a mistake in table 3, which lists the refractive indices of pure water rather than sea water as indicated in the title.) Since the plan of the book makes references to tables and figures in other chapters essential, it would have saved the reader's time if the cross-references had included page numbers.

The presentation is scholarly, direct, and concise. On the whole, the wording is clear and well chosen. The book is remarkably free of typographic errors and the few that are present are not likely to cause misunderstanding.

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Earlier Biology

Dawn of Zoology. WILLY LEY. Prentice-Hall, Englewood Cliffs, N.J., 1968. viii + 280 pp., illus. $7.95.

Origins of Modern Biology. URL LANHAM. Columbia University Press, New York, 1968. xii + 273 pp. $7.50.

Some recent studies in the history of biology have captured the sense of excitement and imminent discovery that characterize contemporary biology. But while biology has a long tradition, history of biology is in its infancy as an academic discipline. This means, among other things, that history of biology has not yet become crystallized and that there is a variety of different approaches to the rapidly growing discipline. The books under review illustrate two such approaches.

Willy Ley's eminently readable book does not, on the surface, resemble a history of zoology. The reproductions of old woodcuts, the absence of footnotes, and the attention given to writers whose names are virtually forgotten give the appearance of a popularization, suitable as a Christmas gift but valueless to the scholar. That impression is revised quickly upon reading. Ley's knowledge of Greek, Latin, and several modern European languages serves him well. From the first page onward, the reader is conducted through a score of the most influential zoological texts ever written. The author, throughout, withstands the temptation to rationalize ancient zoomythology or to poke fun at the allegorical whimsicalities and teleological exaggerations of the Middle Ages, all of which are a part of Romantic Zoology to which he has devoted several books. Rather, the texts are examined against their contemporary intellectual background. The net result is a running account of the development of our knowledge of the animal kingdom, interspersed with extracts, anecdotes, and bibliographical data, all contributing to the thesis that the road to modern zoology has had its share of blind alleys and costly detours. Naturally, Aristotle bulks large in the early pages, but due attention is given to medieval and renaissance zoology. In fact, the chapters on the allegorical and clerical attitudes to zoology are among the most valuable in the light of the fresh translations from early printed texts usually ignored by the textbook writer. From experience, the reviewer appreciates the patience and good humor required to make sense of medieval zoology with its different emphases and set of values.

Compared with the former book, Lanham's book is a clumsy rehash of second- and third-hand sources. Not that it is without value, for it is well written and contains some remarkable insights bearing upon those gray areas between biology and philosophy. As a series of loosely connected essays on various aspects of biology, the book may serve the function of stimulating

biologists to rethink some of the questions faced by their predecessors. But as a history of biology—one of whose tasks is to try to explain why the questions were answered the way they were—it will not bear serious scrutiny. Facile generalizations, startling omissions, factual errors, and antiquated prejudices severely limit its usefulness as a reliable guide to the history of its subject. The extracts are not documented and the "Bibliographical notes" (pp. 251–65) contain, without sufficient notice to the reader, many items that have been superseded. All in all, the author seems to be ignorant of the historian's responsibility to use primary sources and to weigh that evidence against the findings of later investigators.

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Blood

Platelets in Haemostasis. E. HAGEN, W. WECHSLER, F. ZILLIKEN, C. HAANEN, and J. JÜRGENS, Eds. Karger, Basel, 1968 (U.S. distributor, Phiebig, White Plains, N.Y.). x + 242 pp., illus. $16.60. Experimental Biology and Medicine, vol. 3.

The blood platelets play a dominant role in the physiology of hemostasis, and their variously impaired functions are associated with hemorrhagic diseases. Furthermore, intravascular clotting and thrombosis involve the platelets. This highlights their importance, because widespread manifestations of thrombosis and thrombohemorrhagic diseases present one of the great challenges of our time in clinical medicine. The tremendous attention given the platelets during the past two decades thus represents attention where it counts, and this new book comes near to summarizing the present-day perspective.

Platelets are round elements from 2 to 5 microns in diameter. "They extend and retract pseudopods, adhere to collagen, cohere to each other, undergo fusion and release substances that precipitate some of the events . . . culminating in hemostasis, coagulation, and final dissolution of the blood clot." Inside the limited membrane is a fine granular substance (hyalomer), which is distinguished from various types of vacuoles and granules. The vacuoles and granules have mitochondria, glycogen particles, and α-granules with their platelet factor 3, which is so very important for the clotting of blood. There are also microtubules and 5-hydroxytryptamine organelles. Ribosomes are very rare. The actomyosin-like substance called thrombasthenin is an adenosine triphosphatase and functions in clot retraction to express serum. The platelets contain numerous substances, including fibrinogen, antiheparin material, fibrinolytic inhibitor, fibrinoplastin, and a precursor of transglutaminase, which has a role in forming $\varepsilon(\gamma$-glutamyl) lysine crosslinks in the fibrin clot.

Adenosine diphosphate is the center of attention in platelet aggregation, the release reaction, and viscous metamorphosis (VM) and could very well turn out to be recognized as the essential pathway in VM. Adrenaline promotes platelet aggregation, and this opens the possibility for thrombogenesis through the release of adrenaline which occurs under stress. Platelet VM seems to be triggered by various external agents through an increase in membrane permeability. The search is on for compounds that will inhibit platelet aggregation with the hope of finding therapeutic agents for use in prophylaxis or where thrombogenesis is recognized. Examples of inhibitors are adenosine, prostaglandin, *N*-methylmaleimide, vasodilator drugs, and α-adrenergic blocking agents.

I amused myself with several items in the book. Lüscher states that it took a long time to recognize that thrombin can produce VM, and thinks the retarding factor presented a variety of obstacles. I thought it was because thrombin had first to be isolated. I remember the sample of thrombin I made for DeRobertus *et al.* which they used in their electron microscope studies of the action of thrombin on blood platelets (*Blood*, vol. 8, 1953, p. 587). They clearly demonstrated a profound effect of thrombin on platelet integrity. I made a quick survey of the 537 references in the book. About 80 percent of the citations are of papers more recent than 1958. Approximately 18 percent of these are for the year 1966. The number then declines to 35 percent for 1958. It is evident that emphasis is on recent contributions.

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Books Received

Angular Momentum. D. M. Brink and G. R. Satchler. Clarendon (Oxford University Press), New York, ed. 2, 1968. x + 160 pp., illus. Paper, $3.50. Oxford Library of the Physical Sciences.

Annual Review of Information Science and Technology. Vol. 3. Carlos A. Cuadra, Ed. Encyclopaedia Britannica, Chicago, 1968. x + 462 pp., illus. $15.

The Art of Organic Forms. Philip C. Ritterbush. Smithsonian Institution Press, Washington, D.C., 1968. (distributor, Random House, New York). x + 152 pp., illus. $10.

Aspects of Hydrocarbon Radiolysis. T. Gäumann and J. Hoigné, Eds. Academic Press, New York, 1968. x + 274 pp., illus. $11.

Automatic Information Organization and Retrieval. Gerard Salton. McGraw-Hill, New York, 1968. xiv + 514 pp., illus. $14.50.

Behind These Doors. Science Museum Makers. Margery Facklam. Rand McNally, Chicago, 1968. 144 pp., illus. $4.50.

Biological Interfaces: Flows and Exchanges. Proceedings of a symposium. Little, Brown, Boston, 1968. xii + 326 pp., illus. $7.50. New York Heart Association Basic Science Symposia. Also published as a supplement to the *Journal of General Physiology*, Vol. 52, No. 1, part 2.

Bird Navigation. G. V. T. Matthews. Cambridge University Press, New York, ed. 2, 1968 + 198 pp., illus. Cloth, $7; paper, $2.45. Cambridge Monographs in Experimental Biology, No. 3.

Black Rage. William H. Grier and Price M. Cobbs. Basic Books, New York, 1968. x + 214 pp. $5.95.

A Ceremonial Ox of India. The Mithan in Nature, Culture, and History. With Notes on the Domestication of Common Cattle. Frederick J. Simoons, assisted by Elizabeth S. Simoons. xvi + 324 pp., illus. $11.

Chemical Warfare. A Study in Restraints. Frederick J. Brown. Princeton University Press, Princeton, N.J., 1968. xx + 356 pp. $9.

Classical Electromagnetism via Relativity. An Alternative Approach to Maxwell's Equations. W. G. V. Rosser. Plenum, New York; Butterworths, London, 1968. x + 294 pp., illus. $12.50.

Climate and Agriculture. An Ecological Survey. Jen-Hu Chang. Aldine, Chicago, 1968. xvi + 304 pp., illus. $9.75.

The Closed Corporation. American Universities in Crisis. James Ridgeway. Random House, New York, 1968. xii + 276 pp. $5.95.

Cooley and Sociological Analysis. Albert J. Reiss, Jr., Ed. University of Michigan Press, Ann Arbor, 1968. xii + 178 pp. $7.50.

The Crime of Punishment. Karl Menninger. Viking, New York, 1968. xiv + 306 pp. $8.95.

Crystal Structures. Vol. 4, Miscellaneous Inorganic Compounds, Silicates, and Basic Structural Information. Ralph W. G. Wyckoff. Interscience (Wiley), New York, ed. 2, 1968. viii + 568 pp., illus. $25.

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