Book Reviews

The Ancient Mariners. Seafarers and sea fighters of the Mediterranean in ancient times. Lionel Casson. Macmillan, New York, 1959. xx + 286 pp. Illus. $5.95.

Modern historical scholarship is producing increasingly precise studies of the maritime activities of the ancient nations, particularly of the classical period. The latest contribution in this field is Lionel Casson's book. This is a concise description of the development of sea trade, of exploration, and of formal naval warfare through national migration, piracy, and expansion of empire from the dawn of recorded history to the collapse of the Roman Empire. Though intended for the general reader, the book is based upon very extensive research and is written with great precision.

Casson has reproduced in modern language some of the trade correspondence and legal briefs of the ancients; these, together with a running account of historical events, give an excellent picture of sea trade in Egyptian, Athenian, and Roman times. In addition, there are very useful appendices: a table of dates, which, though often approximate, give a sense of the chronological order of events; a well-selected bibliography with references to chapter and page; and, finally, an important addition, a "Glossary of Greek and Latin nautical terms." The illustrations of ancient ships are adequate.

It is almost impossible to discuss ancient maritime history without describing the ships employed. This leads to the problems of hull design, construction, and propulsion. There is a mass of literary and artistic evidence available that requires interpretation; such interpretation is made difficult by an almost total lack of technical information on the subject. Casson has dealt with this troublesome matter in a common-sense manner.

The method of rowing and the arrangement of the rowers in ancient galleys has long been a matter of controversy among scholars and also among technical experts. The three-banked triremes of the 5th century B.C., of which the fleet of Athens was made up in her days of naval power, are the basic source of controversy.

There is a school of thought that interprets the evidence, literary and artistic, as indicating that the rowers of a trireme sat in three superimposed banks (in echelon, when the ship was viewed broadside on), each rower having an oar. This may be said to be the natural assumption, after inspection of contemporary vase paintings and relief carvings. There are differences of opinion within this school about the positions of the banks of rowers, particularly of the upper two, viewed transversely. For many years it was assumed that the lowest bank of rowers sat nearest the side of the hull, the uppermost bank being inboard of the second, and that the hull was either vertical or flared in the rowing chamber. The modern opinion is that the uppermost bank, at least, was "outrigged," on a projecting frame along the rowing chamber, the rowers in this bank being seated a little above and outboard of the second bank and nearly over the lowest bank. By this arrangement it would also be possible to place the upper two banks on the same level, with but slight modifications in seating arrangement.

In all of these attempts at reconstruction it is assumed that each rower had his individual oar, and that the oars were in three lengths. The shortest oar was used by the lowest bank. The upper two banks are believed by some to have used oars of the same length when the rowers in the two banks were seated at the same level. Most recently the English authority J. S. Morrison, writing in the *Mariners' Mirror,* the journal of the Nautical Research Society [**27**, No. 1 (1941)], suggested that all three banks used oars of the same length, and he modified the modern concept of the seating arrangement in accordance with this belief. Morrison suggested, as one of two possibilities, that the blades of the oars struck only a very narrow band of water, parallel to the rowers.

The second school of thought dismisses all of the foregoing as impractical and assumes that the rowers were all on one level, sitting on staggered or raking thwarts, each with his individual oar. The oarlocks or pins of the oars were thus in closely spaced groups of three on the "outrigger frame" or *apostis.* This was the grouping, called *a zenzile,* once used in Venice. Thus, the method is shown to be practical, though there appear to be some very obvious difficulties involved in trying to interpret the contemporary pictorial evidence in line with this concept.

None of these reconstructions seem to fit when we consider the various galleys of later date than the trireme—galleys in which four, five, and up to 30 banks are mentioned by ancient writers. It seems probable that the arrangement of the banks of rowers must have changed during the existence of the trireme, and it is possible that more than one system was used; the most probable arrangement is one of three or possibly four banks, with more than one man to an oar. Four banks would appear to be the limit to which arrangements involving superimposed banks could be carried.

It may be observed that superimposed banks of rowers in two levels, one on each deck, were employed in some of the 24-gun ships of the British navy about 1745; *Centaur,* a ship of this class, was so fitted out, as is shown in her building plan. In her case it seems probable that oars in two lengths must have been employed, and it is doubtful whether the insistence that the oars of a trireme must necessarily have been all of one length is warranted.

Casson has accepted Morrison's reconstruction, which is workable in a full-size vessel, at least. He has taken too seriously, perhaps, some of the estimates of size given in ancient literature. However, there is at least some justification for this, for peoples like the ancient Egyptians, Greeks, and Romans, who were capable of building large and well-designed engineering structures, might well have been capable of building large wooden ships on occasion. Casson has avoided the too common error of underestimating the capabilities of the ancient shipwrights and mariners.

The Ancient Mariners is an excellent addition to any marine library, for it is a book to which both the general reader and the specialist will refer when interested in maritime matters of the classical period.

HOWARD I. CHAPELLE
U.S. National Museum,
Smithsonian Institution

Phosphorus and its Compounds. vol. 1, *Chemistry.* John R. Van Wazer. Interscience, New York, 1958. xiii + 954 pp. Illus. $27.50.

In volume 1, Van Wazer presents an intelligent account of the chemistry of phosphorus and its compounds. He is to be commended for this effort to bring order out of such a complex mass of material and to make available data and information in a form which will be useful to workers in the various fields of phosphorus chemistry.

The author states that he has not ex-

haustively reviewed the literature but has covered it sufficiently to enable the reader to locate the entire literature on any particular subject of interest.

The scope of the book may be seen from the division of the subject matter into the following chapters: "The phosphorus atom, its nucleus and electronic structure"; "Interaction between atoms, with especial reference to phosphorus chemistry"; "Systematic chemistry of phosphorus and its compounds"; "Elemental phosphorus and the metal phosphides"; "Hydrides, halides, and pseudohalides of phosphorus and their organic derivatives"; "Oxides, sulfides, nitrides, and related compounds of phosphorus"; "Lower oxyacids of phosphorus, their salts and esters"; "Structure and properties of the condensed phosphates"; "Orthophosphoric acid, its salts and esters"; "Individual chain phosphates (pyro-, tripoly-, tetrapoly-, and pentapolyphosphates as well as Kurrol's salt and Maddrell's salt)"; "Ring and branched phosphates"; "Amorphous phosphates, including phosphate glasses, condensed phosphoric acids, and phosphate esters"; and "Halo-, peroxy-, thio-, and amidoacids of phosphorus, their salts, esters, and related compounds."

In addition, the book contains three appendices. Appendix A lists 187 accepted mineral names for phosphates, together with the chemical formulas, crystallographic data, and associated minerals. Appendix B contains a collection of single-bond energies and distances, with electronegativity differences for use in calculations concerning phosphorus compounds. Appendix C contains available thermodynamic data on the compounds of phosphorus.

Volume 2, still in preparation, will be devoted to the technology, functions, and applications of phosphorus and its compounds.

RALEIGH GILCHRIST
Division of Chemistry,
National Bureau of Standards

The Atomic Age and Our Biological Future. H. V. Brøndsted. Translated by E. M. Huggard. Philosophical Library, New York, 1957. xiv + 80 pp. $2.75.

This little book is an attempt to supply the physical and biological background needed for an assessment of present and future radiation hazards. The author is professor of zoology at the University of Copenhagen, and the book is based on a series of his public lectures.

The first chapter is an elementary, simplified account of the structure of matter and the nature of radiation. Then follow sections on heredity, mutation, and embryogenesis and on the effects of radiation in these areas. The style is simple, and full use is made of analogies.

The over-all effect of the book is to create a correct impression—that is, that radiation can produce both genetic and somatic damage, and that suitable precautions are necessary. Yet there are so many factual errors, inconsistencies, oversimplifications, and vague statements that the book is of limited use for the serious reader. Perhaps it has suffered in translation, for some words are used in an unusual way, or even incorrectly. For example, *fallout* is given a meaning that is different from the customary one. On page 52, background radiation is given as one five-thousandth of a roentgen per week, whereas one five-hundredth would be more nearly correct.

So much has been written on this subject that this book does not fill a great need. There are much better sources of information—for example, the United Nations report; and there are other publications on the subject, as easy to read as this book, that are not marred by so many errors.

JAMES F. CROW
Department of Medical Genetics,
University of Wisconsin

Manuale di Micologia Medica. Raffaele Ciferri. Renzo Cortina, Pavia, Italy, 1958. 370 pp. L. 4000.

As a reflection of the growing interest in medical mycology throughout the world, manuals dealing with the fungus diseases of man have been published in many countries. Notable books have been written by mycologists in Argentina, Belgium, Brazil, Czechoslovakia, England, France, India, the Netherlands, and the United States. The latest addition to this growing family of publications is the present book, the first of two volumes, written by Raffaele Ciferri, director of the Botanical Institute and Cryptogamic Laboratory of the University of Pavia (Italy). This first volume is intended to provide basic information for the physician who is embarking upon the study of human pathogenic fungi with little or no training in mycology.

The author has fulfilled his objective admirably, for in the ten chapters of this volume a wealth of information, both theoretical and practical, is presented. This material, if assimilated, should enable the invesigator to detect, isolate, and identify fungi in clinical materials of all types.

In chapter 1, a concise history of the science of medical mycology is presented, along with a discussion of the nomenclature and classification of the mycoses. The biological affinities of fungi to other living organisms are discussed, and this is followed by a review of the taxonomy and nomenclature of the fungi. The chapter closes with a brief summary of the histological differences between deep mycotic infections and the superficial mycoses.

The activities of fungi as allergens, symbionts, and parasites and their industrial and pharmacological value are covered in the second chapter.

The next two sections are devoted to a thorough discussion of the morphology, physiology, ecology, and classification of the fungi.

Chapters 5 and 6 deal with specific techniques for the microscopic examination and culture of fungi. These are followed by a chapter on the preparation of antigens and their utilization in serological and skin tests.

Chapter 8 describes pathogenicity tests and their value in the identification of fungi.

A dichotomous key designed to aid in the diagnosis of all the mycoses constitutes chapter 9.

The book concludes with a brief discussion of the therapy of fungus diseases, some remarks on the publication of research findings, and an extensive bibliography. The bibliography cites general mycologic texts and books that deal specifically with medical mycology and includes a selected list of current papers on pathogenic fungi and the diseases that they cause.

The book is of a convenient size and is printed on glossy paper of a good quality. Simple line drawings and several photomicrographs are used to illustrate the text.

On the whole, the author has more than adequately fulfilled his objective of providing useful background information for the study of human pathogenic fungi. Objection can be taken to the classification schemes and nomenclature employed. For example, no valid evidence exists for considering *Coccidioides immitis* to be a phycomycete and for placing it in a special order, the "Coccidiales." Few mycologists will agree that sexual reproduction has been verified in the life cycle of *Cryptococcus neoformans.* Thus, the placement of this anascosporogenous yeast in the genus *Debaryomyces* is of questionable validity. The use of the generic names *Gilchristia* and *Scedosporium* for *Blastomyces dermatitidis* and *Monosporium apiospermum,* respectively, is also contrary to current usage. I also object to the use of *Rhinocladium beurmani* as the preferred name for *Sporotrichum schenckii.*

The most serious limitation in the value of this volume is the absence of an index. While an index for both volumes undoubtedly will be included in the second volume, it would be more convenient for the reader if the contents of each volume had been indexed separately.