

## 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 con-

temporary 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.

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**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-