

construction method; or, a conceptually skeleton-first ship, with ribbands used to determine the shape of the secondary frames. Put this way, one can see the appeal of such a layered metaphysic for categorising some examples. However, the 'conceptual principles' in this book are further extended, not only to include 'Bottom-based', but also 'Intermediate categories which may emerge'. These last presumably include 'Mixed construction principles'—for, at p.182, we read that the Byzantine wreck of Yassı Ada 'bears all the signs of a mixed construction principle'. It is hard to accept that this flowering of abstractions, which must surely transgress Ockham's Razor, is really going to help the ordinary reader gain a clearer view of the history of shipbuilding. Surely it is better to adopt a single-layer phenomenological approach, making the maximum possible use of coding features and shapes, and, if necessary, inventing one's own terms to explain the interest of each new discovery?

In the present context, of course, the authors have every right, and, indeed, obligation, to set out *some* theoretical scheme for their subject, and it will do students of nautical archaeology no harm to wrestle with such issues. On the whole a greater problem for nautical archaeology theory seems to lie in the distinction between boats, where the whole craft can be turned over during construction, and timbers can be shaped by being lifted in and out of the hull for trimming and fitting; and, on the other hand, ships, where the size of components or of the rising hull means that much work has to be done by design, rather than by trial-and-error. The uncertainty of how to distinguish these categories, especially in the field, makes a single theory of ship construction probably unattainable in the long run. In the short term, however, the present book gives plenty of scope for thinking about the issue, and is a stimulating and attractive introduction to the subject.

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Os Navios do Mar Oceano. Teoria e Empíria na Arquitectura Naval Portuguesa dos séculos XVI e XVII

FRANCISCO CONTENTE DOMINGUES

533 pp., 21 b&w illustrations

Centro de História da Universidade de Lisboa, Faculdade de Letras da Universidade de Lisboa, Alameda da Universidade, 1600-214, Lisbon, Portugal, 2004, €20, ISBN 972-98766-9-X

This book is an excellent synthesis of our knowledge about the Portuguese ships of the maritime expansion

period in the 16th and 17th centuries. And although we know a lot about them, what we know is not much when we consider all the unanswered questions that remain after more than a century of serious research by historians, ethnologists and archaeologists. As the author puts it, there is a gap of 150 years between the first voyages of discovery—carried out in caravels along the west coast of Africa in the 1420s—and the first technical texts written in Portugal about the conception and construction of ocean-going ships. The first of these texts is a Portuguese manuscript treatise on shipbuilding and navigation, unpublished, entitled *Ars Nautica*, dated to 1570, and written by a priest named Fernando Oliveira. That manuscript was the first of a number of important texts on shipbuilding, some of which were written in the form of treatises, and others—*regimentos*—are just inventories of timbers and scantling lists, sometimes describing a particular vessel, sometimes a ship-type. It is not clear why so many treatises and texts on shipbuilding were published in the late 16th and early 17th centuries, not only in Portugal and Spain, but also in Italy and England. It is a fact that some of these texts result directly from the legislative efforts made by the Habsburg kings of Spain and Portugal to standardise shipbuilding in the Iberian Peninsula. But it is somehow puzzling that they appear at the height of the political persecutions that followed the end of the Council of Trent in 1563, which fell mostly upon intellectuals—including Father Fernando Oliveira—and particularly upon those accused of valuing reason and experience over the authority of classical writers, in Portugal known as *erasmistas*, and in Spain *luteranos* and *iluminados*.

Writing around 1570—almost 20 years after the first attacks of the Holy Inquisition on Portuguese intellectuals that led, for instance, to the destruction of the prestigious Colégio das Artes, in Coimbra, and the arrest and even execution of some of its scholars—Oliveira starts his treatise emphasising the importance of experience in the preface of *Ars Nautica*. These persecutions had an impact on Spanish and Portuguese minds in general that is difficult to assess. It is even more difficult to imagine the effect on the minds of shipwrights, soldiers and sailors, but it is unquestionable that the new intellectual *status quo* imposed by the Holy Inquisition during the second half of the 16th century played a very important role in the erosion of the general optimism that accompanied the Iberian maritime expansion. In the following century this optimism gave way to a bitter pessimism and a feeling of inferiority in relation to the northern countries whose merchant class triggered the Dutch maritime expansion and the eventual destruction of the Portuguese empire.

Spanning the period from 1570 to 1630—although the information contained in the earliest manuscript analysed may have been compiled two decades before—this book focuses on the four treatises

authored by Fernando Oliveira (*Ars Nautica* and *Livro da fabrica das naus*), João Baptista Lavanha (*Livro primeiro de arquitectura naval*) and Manoel Fernandez (*Livro de traças de carpintaria*). Francisco Contente Domingues is one of the finest specialists on the history of the Portuguese discoveries and expansion, and therefore it comes as no surprise that these subjects—the books, their authors, and the time and context at which they were written—are treated with impeccable methodology and written in a clear and easy-to-read style.

The book is divided into two parts. In the first the author introduces the subject of technical documentation and describes and details the types of documents under analysis, which include both theoretical works on the nature of ocean-going ships and the best way to design them, and purely practical lists of dimensions and scantlings for particular types of ships (the *regimentos*). There follow the biographies of the three authors of the four treatises mentioned above, of which the most interesting is Oliveira's adventurous life as scholar, pilot, political negotiator and free-thinker persecuted and twice arrested by the Inquisition. João Baptista Lavanha was a competent mathematician and cosmographer, and we do not really know who Manoel Fernandez was. The following chapter deals with the other notable works on shipbuilding produced in Portugal during this period: the *Livro náutico* (c.1590), an extensive compilation of lists of timbers and scantlings, as well as copies of budgets for the construction and armament of ships, expenses for personnel and repairs; also the *Memorial das várias couzas importantes*, part of the same collection of texts that was bound together in the *Livro nautico*, which includes lists of archbishops, financial information and many other subjects; the codices of D. António de Ataíde (a number of 16th- and 17th-century documents compiled by this nobleman, of vast culture and experience, both as a soldier and a sailor, which include information about shipbuilding, navigation and the organization of the fleets among an impressive array of other information). Also within the collection are the *Coriosidades de Gonçalo de Sousa*, compiled by another nobleman in the early-17th century and containing many lists of timbers and *regimentos* for the construction of diverse types of ships; *Advertências de navegantes*, another manuscript with technical information about nautical things; and the *Tratado do que há-de saber um bom soldado*, a manuscript with a few brief references to shipbuilding in the second half of the 17th century.

The second part of the book deals with two important questions. The first pertains to the definition of the ship-types mentioned in historical documents: what were the differences between a galleon and a *nau* in 1520 and in 1580? The second question deals with the problems in defining the concept of naval power—and its political, military, strategic and logistical components—as an effective instrument of imperial control. How

can we analyse and evaluate Portuguese naval power in the 16th century, detail the role of its naval resources, and then compare it to other historical maritime empires in order to try to understand, for instance, its demise?

In the conclusion, the author stresses the fact that none of the four treatises analysed in this book was published in its time. In spite of the obvious importance and quality of their content—Lavanha for instance introduces the concept of naval architecture—it is difficult to assess their impact upon the shipbuilders of the time. From historical facts—such as the pace of expansion into the Atlantic, Indian and Pacific oceans—we know that Portuguese caravels, galleons and *naus* were excellent ships. From the documents analysed we know the quality of the knowledge and the sophistication of the theories they contain. It is not possible, however, to know whether theory and practice were related in any way during this period. That should be the role of underwater archaeology. These two parts are completed with a large appendix (152 pp.) containing the transcriptions of 54 documents pertaining to shipbuilding and produced during this period.

This book is an important reference for the study of Portuguese maritime history and should perhaps be translated into English, considering the growing interest in the secrets of ship-design and -construction among naval historians, historians of science, and nautical archaeologists.

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The Pepper Wreck: a Portuguese Indiaman at the Mouth of the Tagus River

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352 pp., 80 b&w figures, 10 maps, 46 tables

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In the 1990s, ship archaeology in Portugal went through a period of upheaval when a law favouring treasure hunters was passed, then replaced with a heritage-based law by a new government. Portuguese archaeologists mobilised to oppose the original legislation and to enact the new structure. In the process, they created a state underwater-archaeology service and also carried Portugal's maritime heritage to centre stage of the 1998 World Fair in Lisbon. The high-profile excavation of an early 17th-century East-Indiaman at the bar of the Tagus River symbolized the country's dramatic turnaround in its approach to