

Documents on Portuguese Naval Architecture (late 16th-early 17th century) – a general overview¹

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There is a valuable collection of technical documents on Portuguese shipbuilding for the period c. 1570 to c. 1640: so valuable that Pimentel Barata stated in a paper published in 1970 that this is the most complete collection known in Europe for that period, allowing a comprehensive knowledge of the geometry of the ships of that era. The reconstruction of that geometry was the aim of the dozen papers published by that author between 1965 and 1984, giving us what is up to now the most systematic attempt to understand how Portuguese ships were designed in the 16th and early 17th centuries.

We do not intend to go back to what it is currently a field of research pursued by other authors, with remarkable results. Our aim is to discuss how many and what kind of documents are in fact available and how they should be classified. In other words, before attempting to reconstruct the geometry of Portuguese ships, we think that it would be desirable to have a general perspective of the documented materials available.

Something this paper will not discuss — it should be done and we intend to do it in the near future — is the comparison obviously needed between that documentation and those available in Spain, England, Holland and France.

We are clearly reporting written documentation only, for the data available from other sources of information — in particular underwater archaeology — will not be considered here. That comparison lies beyond our purpose, which intends precisely to ‘clear the field’ for those who regard written documentation as a source of information to be integrated with other testimonies and approaches.

In a single word, then: what do we have?

Returning to our starting point, the statement of Pimentel Barata was based on the appreciation of a collection of no less than nine treatises or codices on shipbuilding, classified in three different types:

1 – The theoretical works: *Ars Nautica* (c. 1570), the very first text by a Portuguese author, both by Fernando Oliveira, and the first one written in Portuguese, the *Livro da Fábrica das Naus* (c. 1580).

2 – The “theoretical-practical” texts: the *Livro Primeiro de Architectura Naval* by João Baptista Lavanha; the *Tratado do que deve saber um bom soldado para ser bom capitão de mar e guerra*, anonymous; and the *Advertências de Navegantes*, by Marcos Cerveira de Aguiar, c. 1640.

3 – The practical documents, including only texts with practical rules for the design and construction of different kinds of ships: the *Livro Náutico*, a manuscript codex of the National Library in Lisbon, with documents around c. 1590; the *Coriosidades de Gonçallo de Sousa*, in the Library of the University of Coimbra, also a compilation, this time c. 1630 (?); and the *Livro de Traças de Carpintaria*, by Manuel Fernandes, 1616.

We must add to this list another codex from the National Library in Lisbon, the *Memorial de Várias Cousas Importantes*.

If we intend to understand what kinds of ships were in use by the Portuguese navy, in several diverse situations, a general overview could be obtained by collecting the information available in these treatises and codices. Before anything else, however, we should evaluate the reliability of those sources and understand if they can or may be considered together in the same way.

A general lack of information provided by previous generations, at least from the point of view of some modern scholars, moves Portuguese authors to collect information about ships from no matter what kind of sources for the purpose of obtaining significant data about general characteristics of ships and their uses. Treatises on shipbuilding can for instance be considered side by side with chronicles as useful aids for the proposed final aim.

In first place, there is no such a thing as general documentation. Perhaps it can be regarded as an obvious statement, but first of all we have to consider that chronicles, seafarers testimonies and other sources cannot be understood as historical sources on the same level as technical documentation. However this has happened quite frequently.

On the other hand, Portuguese technical documentation does not exist as a whole, meaning that we cannot accept the existence of a closely related series of documents, even considering several sub-types, as Pimentel Barata did in a way: but it must be considered only a very first attempt to propose a classification, something not done previously.

Even at a first glance, it can easily be seen that, apart from literary testimonies, legal documents (contracts, for instance), and others, three general categories summarize the essential relevant documentation available: treatises, regiments, and accounts for repair and construction.

The codices known to us with technical references are not and cannot be considered as treatises, even considering the obvious differences between the theoretical and the practical ones.

This category is by far the most important to be considered, for it reveals what should be considered as a comprehensive view of the ship or several kinds of ships, from the theoretical explanation to the catalogue of several kinds of ships. What a treatise does, differently from all other sources, is to reveal the author's points of view, his own theories, perspectives and peculiar ideas.

Only three texts match this category, the first being the *Livro da Fabrica das Naus* by Fernando Oliveira (*Ars Nautica* is also a treatise, but shipbuilding is a subsidiary matter and must not be considered in this category, contrary to what P. Barata has done). A remarkable and unique attempt to explain the theory of the ship in the 16th century, for the author was clearly more interested in general explanations about reasons that should explain the shape of the hull, for example, rather than the technical details about how to build it. The book is not as useful to historians of shipbuilding as the one that would follow it, by Lavanha, but the History of Renaissance technological and scientific ideas cannot ignore the fact that shipbuilders tended to reflect — when they did it — a proper view about one major issue: the relation between Man, Nature and machine.

João Baptista Lavanha wrote the *Livro Primeiro de Architectura Naval* c. 1600, according to the other documents on the same codex. Again one author, one book, one idea. However he was much more concerned with the proper way of doing things than Oliveira, in consequence lacking any attempt to insert the subject in the global perspective of human knowledge. If Oliveira was a theoretician, in a certain way a philosopher with a wide view of the surrounding world, Lavanha can in contrast be considered one of the very first engineers of the Iberian Renaissance.

The *Livro de Traças de Carpintaria* is the third Portuguese treatise on shipbuilding known to us, and the last one in this series. Written in 1616 by Manuel Fernandes, a shipbuilder of the Ribeira das Naus — at least the author identifies himself like that, for we do not know anything about his life and career. His *Livro* is completely different from the two that preceded it: it is a compilation of regiments of shipbuilding, starting with the texts and then following with the drawings. The aim is to give the reader the instructions to build all the kinds of ships used at the time, beginning with the *Nau da India* and finishing with the auxiliary boats for the big vessels.

The *Livro de Traças* is the only one of the three Portuguese treatises that did not receive a proper study until now; it is because of this lapse that it should now be considered more carefully, but not only for that reason: there are so many things to say about this text that we cannot move on as we did with the others before.

However this paper is not about the *Livro de Traças*; we will do no more than comment on the obvious questions.

First, the authorship and the autograph. Nothing suggests that this is a manuscript from Fernandes own hand; the book is considered thus (or, more precisely, the question is not discussed) just because it opens with a portrait of Fernandes, stating below it that the book was made by him. It has been seen however (remarkably by Richard Barker) that the book is full of errors and corrections, the most common being missing words in sentences and corrected drawings (but not always correctly corrected!). One particular drawing is rather different from all the others, strongly suggesting that it was added later on.

We can consider that the book is not a manuscript by Fernandes, but rather a copy ordered by him. What for is the question that naturally follows.

It is quite well known that some people used to collect drawings and manuscripts with relevant information about Portuguese navigation, both in Portugal and abroad. Considering the number of errors in this book, the hypothesis that it is something like a master-book of the shipyards must be discounted immediately. In view of the size, the coloured drawings, and the handwriting, everything suggests a luxury book ordered and owned by some important person at the time. If this is the case, some things can be understood clearly: the comprehensiveness of the book, giving its future owner a general overview about the ships of that time; the errors made by someone who copied Fernandes' instructions or regiments, for there was no need for a particular accuracy; and the general appearance of the book.

Can it be considered as a fair reflection of the practical regiments used by Fernandes and other shipbuilders? Not necessarily; so the *Livro das Traças* must be approached carefully.

The *Livro de Traças* is, after all, a collection of regiments for shipbuilding: and that is precisely what we are looking for.

The *Livro* contains no less than 37 general regiments of shipbuilding: we mean regiments with general rules for the construction of a certain kind of ship — distinct from the regiments to build a particular ship. There are 49 general regiments, 8 others in the *Coriosidades de Gonçallo de Sousa*, and 4 in the *Livro Nautico*, sometimes duplicating the kind of ships referred to: for example two regiments for *naus* da India and one other for a 600 tons *nau* — the average tonnage of those ships, in general; or two for the caravel with 150 to 180 tons.

It is incomprehensible how this documentation is not already published together and with a coherent reproduction of the originals; and that is precisely what we will do in the near future, to guarantee access to those documents.

These 49 documents do not include two other important groups: the particular regiments or instructions for building a particular ship, and the accounts for repairs and constructions, with complete lists of materials needed for both things. It is amazing how Portuguese authors almost ignored this last group, at the documents are included in the very same codices where general regiments are also copied.

This main collection of general regiments is in fact the basis for any study on Portuguese shipbuilding for the late 16th century-early 17th century. Despite the cautions needed with the *Livro das Traças* and the fact that all other 12 regiments are copies, not originals, our point of view is that (and summarizing):

1 – Treatises of shipbuilding can and should be considered as a major source for the study of Portuguese ships, for they reveal author's coherent and systematic point of view, which

must be considered. Nevertheless they do not necessarily express what is usually done in the shipyards, and each case must be studied extensively, Lavanha certainly being more aware of practice than Oliveira.

2 – Regiments guarantee a closer approach to shipyard practice, for they are undoubtedly practical documents. They are a reliable source even if we don't know anything about their authors.

Particular regiments and calculation of prices provide valuable complementary information.

3 – All other sources (literary sources in general) must not be considered to have the same level of accuracy and reliability, as was and is still sometimes currently done.

^I This paper summarizes a sub-chapter of our forthcoming Ph.D. thesis. In vol. II we reproduce all the 49 regiments of naval architecture referred to in the text, among other documents.

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