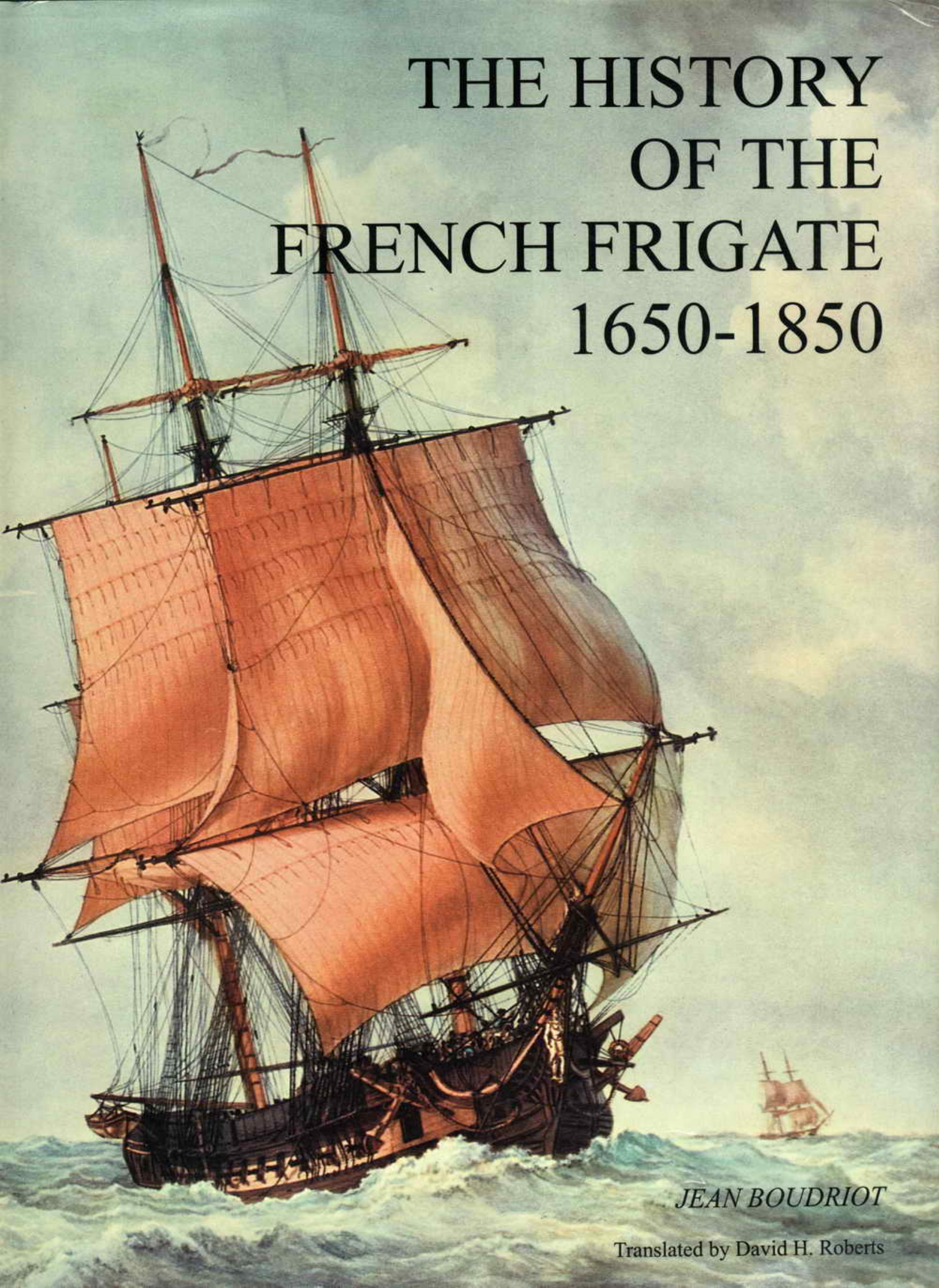
THE HISTORY OF THE FRENCH FRIGATE 1650-1850



JEAN BOUDRIOT

Translated by David H. Roberts

THE HISTORY OF THE FRENCH FRIGATE 1650-1850

The frigate is perhaps the most romantic of all warships from the great age of sail. Fast and yet extremely powerful for its size, able to keep the sea in all weathers, the frigate was a redoubtable adversary. Its sleek lines made it a favourite subject of marine painters and engravers, and its tactical role ensured that it was in action much more frequently than the larger ships of the line, such that the names of frigate captains are often better-known than those of the Admirals of the period: Suffren, Cochrane and Pellew, Manley and Preble, to name but a few.

However, in frigates perhaps more than in any other type of vessel, the actions of the commanders are inseparable from the technology at their command: arguably, the true victor is the frigate, a complex machine of wood, canvas and cordage, a floating gun-platform, harnessed to a tactical purpose. And it is this machine, rather than the men who commanded, which forms the subject of this book. The "modern" frigate, of the type instroduced into all the major navies of the 18th century, was a French development, so that the history of the French frigate is an essential adjunct to the study of the frigate of any of the world's navies.

While much has been written about the less glamorous work-horse of the Navy, the ship of the line, surprisingly little has appeared in print on the subject of the frigate. This is the first book in any language to attempt to tell the whole story of its development. Jean Boudriot is uniquely qualified to tell that story. His **Collection Archéologie Navale Française** now extends to over twenty volumes, and, to use the words of a recent reviewer, "the whole is a contribution to maritime history unequalled by any other scholar, or any other country".

The French frigate has already been the subject of three monographs in the series, with ***La Renommée*** (8-pdr, 1744), ***La Belle-Poule*** (12-pdr, 1765), and ***La Vénus*** (18-pdr, 1782), but this book is entirely new: it follows the evolution of the sailing frigate in the French Navy from its earliest beginnings to the advent of steam. Each type is covered in a separate chapter: the light cruisers of the 17th century, the 8-pdr class of the 1740s and 1750s, the 12-pdrs of the Seven Years' War and after, the much-admired 18-pdrs of the Revolutionary and Napoleonic Wars, and the 24- and 30-pdr frigates of the 19th century. The final chapter investigates all aspects of their evolution, with major sections on French sea ordnance, internal arrangements, masting and rigging, sails, carved-work and decoration, as well as a thorough review of the magnificent collection of frigate models in the *Musée de la Marine* in Paris. Profusely illustrated like all Jean Boudriot's books, no major documentary source in the French archives has been neglected, with much else culled from the collections of the National Maritime Museum in Greenwich and the Danish National Archives in Copenhagen; a significant proportion of these documents are reproduced or quoted from at length. They are enriched by a selection of Jean Boudriot's own meticulous plans from the monographs, reproduced at a smaller scale in three additional chapters, so that this book forms acompanion volume to the four volumes of **The Seventy-Four Gun Ship**, and to the three monographs shortly to be published in English.

For anyone who wishes to understand the complex technology of the frigate, and the various stages of its development, this book is essential reading: historians and modelmakers, enthusiasts of the sea novel or the armchair sailor, all will find much which is new and fascinating.

For those who would like to make a model of any of the three frigates covered extensively in this book, sets of plans at a much larger scale will shortly be available separately (see below).

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THE HISTORY OF THE FRENCH FRIGATE 1650-1850

Jean Boudriot is the leading authority in the world on French ships of the sailing era. Since the first volume of **Le Vaisseau de 74 Canons** appeared in 1973, he has published on average one book a year, each devoted to a different subject and forming what he calls the ***Collection Archéologie Navale Française***. His work is distinguished by the highest standards of historical accuracy and by his remarkable skill as a draughtsman, through which he has succeeded in bringing his subjects to life in a way never before achieved for the 18th century warship. A well known figure at international conferences and a prolific contributor to the specialist publication ***Neptunia***, Jean Boudriot is a former President of the Council of the Musée de l'Armée in Paris, and a Council Member of the Musée de la Marine. In 1987 he was awarded the Prize of the Académie de Marine for his outstanding contribution to French maritime history, and in 1990 he was chosen among forty candidates for the award of the first ever **Prix Neptunia** for maritime literature. For the last few years he has run a course in naval archaeology at the Ecole des Hautes Etudes en Sciences Sociales and at the Sorbonne. He and his wife live in Paris, and have a holiday home near Angoulême.

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JEAN BOUDRIOT
with the collaboration of
HUBERT BERTI

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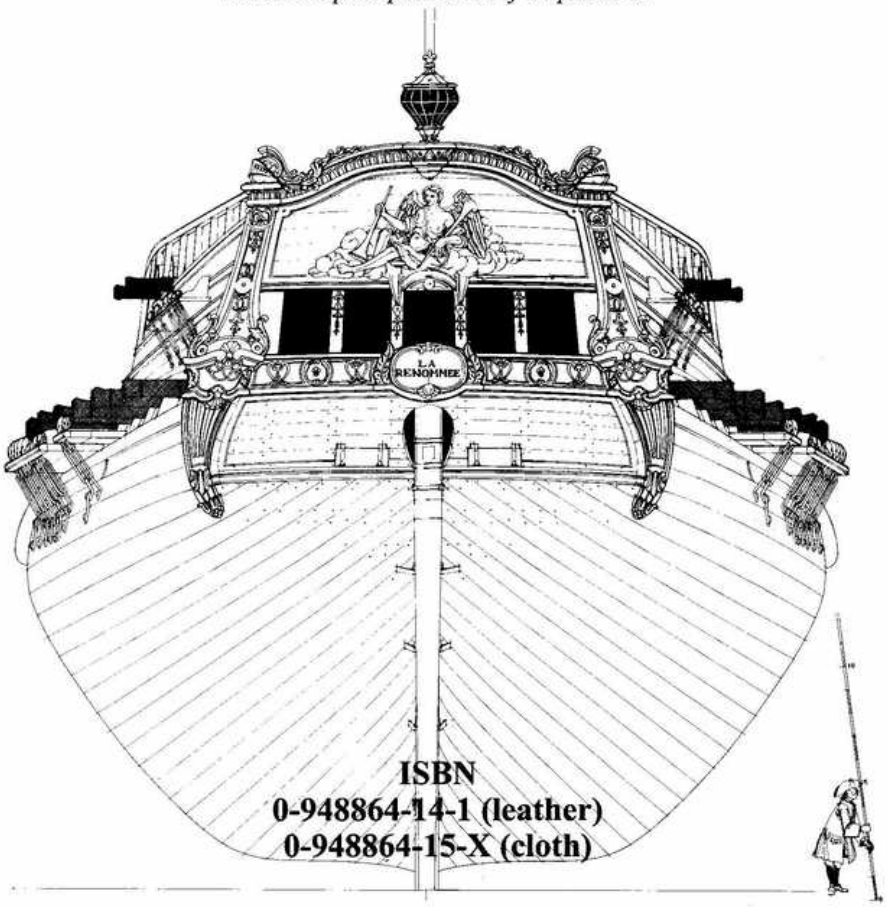

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Preface to the French edition

In this latest book we have set out to present the history of a type of vessel which has passed into legend – the sailing frigate. We will trace its development in the French Navy from the first archival references in 1660 to the middle of the 19th century, the very end of the age of the wooden sailing navy. Although a history, it is above all a history of technology, for historical events, however important, find no place in this work. Nevertheless, a knowledge of the technical aspects of the frigate over a period of some two hundred years may explain many aspects of French naval history.

We can distinguish two phases in the development of the frigate: the first draws to an end around 1740-1750 with the abandonment of a class of vessels essentially of 17th century design. These were small two-decked ships, classed as Fourth and Fifth Rates. For the sake of convenience, we have chosen to call these "ship-frigates" (an invented term), whose gundeck armament was composed of nothing larger than 12-pdrs. As a means of classification, this seemed preferable to the official lists, often subject to arbitrary changes.

Coming after the five Rates of ships were another class of vessel, called "light frigates", which in the English Navy were classed as Sixth Rates.

The second and "modern" phase of development came about through the abandonment of the "ship-frigates" and the promotion of the light frigate. This occurred shortly before the middle of the 18th century, and it was the increase in dimensions and above all in the weight of armament which justified the disappearance of the adjective "light". Liberated from the constraints of the ship, the frigate acquired characteristics and qualities which it was to make its own. Thereafter, its development was determined by the inexorable progression of gun calibres, which form the milestones of its history over nearly a century.

For all warships, it is the gun which explains and indeed drives the progress towards ever greater dimensions. By the end of the 18th century, it is apparent that the ship of the line had reached the limits of possible development. Not so the frigate: born in the 1740s, it was to continue its development for more than thirty years beyond the end of the century, so that it was the frigate, far more than the ship of the line, which typified the French Navy of the post-Napoleonic era.

A word of explanation is also required concerning the archival sources, for it is these which condition the content of a work such as this: the French archives are immeasurably poorer than those of, for example, England, so that it is largely impossible to trace the ministerial decisions and technical debates which must have accompanied developments over the decades. After so many years' research, our familiarity with these archives is such that I think that I can safely say that we have not missed anything of significance preserved there concerning the development of the French frigate; indeed, the vast majority of the surviving documents and plans are quoted or indeed reproduced in this work. But this does not disguise the inevitable lacunae: much is missing, and many links in the story are without any remaining monument.

Despite these shortcomings, in preparing this book, our aim has been to assemble as rich a body of archival material as possible, bringing together in a single volume everything relating to frigates. While it is true that the quality of reproduction of many of the older documents, especially draughts, is very uneven, we have nevertheless preferred, wherever possible, to reproduce the originals, "warts and all", rather than to supply tracings. This decision is not however without its impact on the appearance of the book, which lacks the unity of style which the latter method might have afforded. And, in our further defence, we can only plead the paucity of surviving information, obliging us to concentrate on what is known, rather than resorting to what might only be conjecture.

The book starts with a number of general considerations designed to facilitate the comprehension of the various chapters, each of which is dedicated to a particular class of frigate; other chapters discuss the development of their armament, carved-work and decoration, and rigging. We conclude with a number of comparative comments and reflexions, which we hope will satisfy the demands of our readers for hitherto unpublished material and complete historical rigour in our approach.

Each of the chapters devoted to a particular class of frigate starts with a background section designed to situate historically and technically the key elements which distinguish that class. Armed with this background information, it is then possible to go on, without fear of getting lost, through the draughts, figures, tables, comments and notes describing the class under discussion. There are also a number of synoptic tables which indicate the essential characteristics of each class of frigate. It is our hope that this disciplined approach will allow a comparative yet global analysis of what is a vast subject, covering as it does nearly two centuries and some six hundred vessels.

These vessels are listed individually, category by category, and while the lists are as complete as possible, there are inevitably a number of blanks, and no doubt some errors also. As in the third volume of The Seventy-Four Gun Ship *(to which this book is in effect an "Appendix"), we have indicated in the last column of these lists references to any draughts or other archival records of the frigate in question. And in the chapter on the carved-work and decoration, there is a further table with a list of all the known designs for carved-work which have survived in the archives.*

Those readers who are already familiar with the two monographs on frigates already published in French, will find occasional repetitions in this book, but this does not in any way lessen the originality of this new work. This book, the twentieth title in our series Collection Archéologie Navale Française, *appears more or less simultaneously with a third frigate monograph devoted to the* Renommée, *representative of the very beginning of the "modern" phase of frigate development. Allow me to repeat that all these books have to be read with the utmost attention and if necessary re-read, if all the information they contain is to be absorbed!*

It remains only for us to thank you, our faithful readers, once again for your interest and encouragement, and to assure you of our best wishes and kind regards.

H.B. *J.B.*

Preface to the English edition

In one sense at least, this English edition is more a "version" than simply a translation of the French original, from which it differs in one major respect: while it contains the text of the original in its entirety, it also contains significant additional material, in the form of three extra chapters.

The explanation for this is to be found in the closing paragraphs on the preceding page: the French frigate is a subject which has already been treated twice in the *Collection Archéologie Navale Française*, with *La Vénus*, and *La Belle-Poule*, and the third title, *La Renommée*, is about to appear in French as we go to press. However, when I started this translation, none of these titles had as yet been published in English. This made it possible to consider options unavailable to the French reader, and to treat all four books as a whole, avoiding unnecessary duplication from the outset.

The major changes concern the monographs of *La Vénus* and *La Belle-Poule*, which are significantly shorter in their forthcoming English editions through the omission of all the background information on the 12-pdr and 18-pdr classes, covered in much greater depth in the present work. However, this decision has also had an impact on the structure of the present work, with the result that we felt it desirable to add two extra chapters as "exemplars" of the 12-pdr and 18-pdr frigate classes, reproducing a selection of Jean Boudriot's plans at small scale; and having included two extra chapters, it seemed only logical to add a third, with matching material from *La Renommée*, despite the fact that in this instance there was no risk of duplication. One further addition has been made, with the incorporation of an important section on copper sheathing, originally published in *La Belle-Poule*, and inserted here at the end of Chapter V. This seemed justified in the light of the fact that it was omitted from the French edition of this work as having already been covered, and also because the *Belle-Poule* was one of the first vessels in the French Navy to be coppered.

Modelmakers have always bought Jean Boudriot's books with enthusiasm, and they are perhaps the principal beneficiaries of this changed format, but it is hoped that the inclusion of this extra material will also benefit the more general reader and historian, as well as adding an element of continuity in the iconographic material reproduced here. The present *History* thus fulfills a dual role: while it stands on its own as the definitive book on the development of the frigate, it is also the essential companion volume to the three monographs and sets of plans.

Finally, readers are reminded that unless otherwise stated all measures used in this book are the French units of measure of the Ancien Régime; a detailed explanation of these will be found on page 10.

David H. Roberts

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- Documents marked with a degree sign ° are plans or scale drawings preserved in the collections of the Service Historique de la Marine, Vincennes, the Musée de la Marine, Paris, the Dockyard Archives of Toulon and Rochefort, or the Danish National Archives, Copenhagen; the generosity of these institutions in allowing us to reproduce them in this book without charge is especially appreciated.
- Where such documents are marked with an asterisk *, this indicates that they are preserved in the collections of the National Maritime Museum, Greenwich: we gratefully acknowledge the permission of the Trustees to reproduce these precious draughts.
- Tables and lists are identified with a dagger symbol †.

French Units of Measurement

Unless specifically indicated to the contrary, units of measurement used throughout this book are the French measures used in the 18th century, which in many cases are approximately 10% larger than the equivalent English measures. The principal measures to be taken into account are the following:

Linear measure: The French foot (*pied*) measured 324.8 mm, and was divided into 12 inches (*pouces*) of 27.1 mm; the inch was divide into 12 lines (*lignes*) of 2.26 mm, and the line was in turn divided into 12 points (*points*) of 0.188 mm each.

There were 6 feet to a span (*toise*): 1.95 m.

The nautical league (*lieue marine*) was equal to one twentieth of a degree or 2,850.4 *toises*, making 5,565 m.

A mile (*mille*) was equal to one third of a league, or 950 *toises*: 1,855 m.

A fathom (*brasse*) was equal to 5 (not 6) French feet, or 1.62 m.

An ell (*aune*), used for measuring canvas, was 1.188 m in length.

Masts were measured (for their circumference) in palms (*palmes*) of 13 lines or 29.2 mm.

A cable's length was 120 fathoms: 194.4 m.

Liquid measure: The *pinte de Paris* was roughly equivalent to an English quart, at 93 centilitres. There were two *chopines* (46.5 cls) to the *pinte*, two *demi-chopines* (23 cls) to the *chopine*, and four *boujarons* (5.8 cls) to the *demi-chopine* (i.e. sixteen to the *pinte*). Two *pintes* made a *pot* (1.86 l). For larger measures, the unit used by the Navy was the *barrique*, translated in this text as a "hogshead", a cask containing 242 litres; there were also half-hogsheads (*demi-barriques*) of 121 litres, and third-hogsheads (*tiercons*) of 161 litres. Water casks were often larger, and came in multiples of hogsheads, between 2 and 8. They were known as *pièces de 2*, *pièces de 3*, *pièces de 4*, etc., and contained between 484 and 1,936 litres. In practice, the largest sizes were only used in slavers, the Navy being usually content with *pièces de 4* (968 litres) at most.

Weight: The French pound (*livre*) weighed 489 grammes, and was divided into 16 ounces (*onces*) of 30.56 grs. 100 French pounds made a quintal (*quinteau*), and 2,000 equalled a ton (*tonneau*) or 978 kgs. In measuring the burthen of ships, note that there is also the cubic ton, estimated at 42 cubic feet or 1.43 m^3.

GENERAL CONSIDERATIONS

GENERAL CONSIDERATIONS

In his *Glossaire Nautique*, published in 1848, Augustin Jal presents a critical analysis of the etymology of the word *frigate*, basing his conclusions on a large number of quotations, finally retaining the Greek word 'αφραχτος (aphraktos), which, via Latin, had given rise to the form *fragata*. Whatever the case, the word frigate found its way into most of the navies of the Atlantic and Mediterranean seaboards, albeit with phonetic and spelling variations, but for all that recognisably the same word.

In the 16th century, the frigate in the Mediterranean was an oared vessel, not unlike the *brigantine*[1]; however, according to Fournier's *Hydrographie*, published in 1643, the frigate was somewhat smaller.

In the 1660s, during the period of rebirth of the French Navy, the term frigate was employed to describe the small vessels below the five Rates of ships, designated as "light frigates" (*frégates légères*); their existence at this period is attested by the first "List of ships in the Navy" of January 1st 1672, and regularly appeared as such until their disappearance (from the lists) in the middle of the 18th century.

Fournier goes on to describe the Atlantic frigate as a "middling vessel, driven by sail and by oars". The Regulation of 1670 made official the classification of the ships of the French Navy into five Rates. The first three Rates carried guns of a calibre sufficient for them to take their place in the line of battle. On occasions, the same might be true of certain ships of the Fourth Rate, but the others, like all those of the Fifth Rate, had no place there. Consequently, such vessels, which we have called "ship-frigates", formed a sort of "hybrid" class which although quite numerous in the 17th century, disappeared by the middle of the following century as a result of the ever-increasing strength of armament of the ships in the first three Rates, and the development of the light frigate.

A short definition of the ship of the line may not be out of place: any vessel with more than one gundeck, carrying on the lower gundeck *guns of a calibre of at least 18 pounds weight of ball*[2]. This is a definition which should be retained, if one is to avoid any confusion between ships and frigates in the period up to the middle of the 18th century. What then was the role of the frigate during this period? The so-called light frigates were used for voyages of discovery, and for relaying orders (*advice vessels*[3]). The weakness of their armament restricted them essentially to these roles, for at most they might have taken on small privateers, or been employed themselves as cruisers on a modest scale. Such roles imply lightly-rigged vessels, and thus fast sailers, especially when sailing close-hauled, together with ease of handling.

The "ship-frigates" were mainly employed as cruisers, to intercept enemy merchant shipping, and as commerce protection vessels, acting as convoys to French merchantmen. They might also be suitable for protecting the coasts and for voyages to the colonies, such missions not being regarded as appropriate for ships of the line, but neither of these latter roles demanded the virtues inherent in the light frigate; such virtues were moreover beyond the reach of the ship-frigates, which were generally considered as vessels of very mediocre quality.

The redefinition of the matériel of the Navy in the 1740s and 1750s, marked notably by the abandonment of the ship-frigates and the "promotion" of the light frigate, paved the way for the "modern" frigate. While the adjective "light" continued for a while to be applied to the smaller vessels of the class, it was rapidly abandoned in favour of a more up-to-date term, that of *corvette* or sloop-of-war.

Despite these changes, the real importance of the modern frigate remained largely unrecognised until after the lessons learned from the sad experiences of the Seven Years' War and, above all, from the American War of Independence; only then did the numbers of frigates increase significantly in the French Navy. The upward progression in the calibres of guns arming the upper deck[4] of frigates provides the clearest evidence of the development of the frigate in the second half of the 18th century. This progression continued during the decades following the fall of the Empire, culminating in the 1830s and 1840s, by which time frigates were armed with exactly the same calibres of guns as ships of the line, albeit fewer in number! The powerful frigates of the European and American Navies of the 1840s provide a superb sunset to the sailing navy, condemned to eventual extinction by the invention by a land artilleryman, Colonel Paixhans[5], of the shell gun firing explosive projectiles.

The modern frigate can lay claim to vastly superior qualities to those of its predecessors from before the middle of the 18th century. They were still not able to take part in fleet actions in the line of battle, but they could harry the enemy and cause him considerable discomfort if he were disabled. They were extremely useful for voyages of discovery, as dispatch vessels, for assisting and taking in tow a ship of the line in difficulty; they were ideal for cruising and for convoy protection, and finally, for any operation or mission in distant waters.

A good frigate must be a fast sailer, especially close-hauled; she must be easy to handle, able to point up as sharply as possible; in addition to these qualities, she must be quick in stays even in a seaway, rise easily to the seas, be weatherly, and relatively dry. For all these reasons, frigates were given considerable waterline length, sharp floors, good support at the entry and the run aft, and spars which were loftier than those of ships of the line, their upper works, however, being kept as low as possible in the water, for the flusher a frigate is, the better she is able to deceive the enemy. This picture of the "ideal" frigate, by comparison with the ship of the line, is taken for the most part from the three volume *Vocabulaire de Marine* (1798) by Lescallier, and from J.B.A. Babron's *Précis de l'Art Naval* (1817). I would also add that frigates were much more actively employed than ships of the line, and more often in action also.

I thought that it might be useful to include among these general remarks the definitions of the frigate as they appear in the succession of French maritime dictionaries published from the 17th century to the middle of the 19th century. To some extent, these defintions reflect the evolution of the frigate; on reflection, I decided that no commentary was necessary, since the reader will discover as this book develops the significance behind the definitions of the various authors.

1. See J. Boudriot: *Xebec Le Requin*, Paris, 1987. English translation, 1991.
2. The 18-pdr calibre was abandoned for the gundeck of ships of the line with the building, in 1749, of the last ship to employ this calibre, the *Hippopotame*; henceforth, the minimum calibre would be the 24-pdr. This was the case until 1776, when the last ship with this calibre was built, the *Sphinx*. Thereafter the gundeck of ships of the line was armed with 36-pdrs.
3. Hence the term *aviso*, employed from the end of the Ancien Régime onwards to designate in an almost generic manner a whole variety of smaller vessels of the Navy.
4. *Upper deck*. The naming of the decks in frigates can be confusing, until it is realised that the vocabulary stems from the two-decker, where the lower deck is always referred to as "the gundeck". In the classic frigate, with a single armed deck and the crew berthed on an unarmed deck at the waterline, the armed deck was nevertheless called the *upper deck* and the berth deck continued to be called the *gundeck* (or sometimes the "lower deck"), until about the end of the 18th century. [Trans.]
5. See the section in Chapter XII on the development of the armament of frigates.

SOME DICTIONARY DEFINITIONS

1643. P. Fournier. *Frigate.* Single-decked vessel, long and armed with guns, which also has an upper deck, but which is smaller than the brigantine, it is to be compared with the ancient ships with two banks of oars, one at the bow and the other at the stern. In the Mediterranean, they usually accompany the galleys to scout and to carry back news quickly. In the Atlantic there are some two-decked frigates also, and they are but middling warships, driven by sail and by oars.

1678. Guillet de Saint-George. A frigate is a warship, lightly framed and not over-burdened with timber, agile under sail, and which usually has but two decks. That is a well-formed vessel, and of an agreeable mould.
A light frigate is a small warship, a good sailer, which has but one deck, and which is usually armed with from sixteen guns up to twenty-five.

1687. Desroches. Frigates are what are called middling vessels which are flush-decked and which are not high out of the water.

1702. N. Aubin. It is a warship, lightly built, and which is not high out of the water, a fast sailer, and which usually has but two decks. We say: "That is a well-formed vessel, long at the waterline and of an agreeable mould." The English were the first to give the name of frigates, in the Atlantic, to long vessels armed for war, and which have their gundeck much lower than that of gallions and ordinary ships. The word frigate originates from the Mediterranean, where it was given to long vessels powered by oars and sails, where the rowing benches were covered by a deck and all the sides, which were much higher than in galleys, were pierced with openings like gunports for the oars. It appears that the weight of the deck and of the upper works made these frigates heavy under sail and under oars, such that little by little their building was abandoned.

1736. B. Ollivier. It is a warship armed with between 24 and 46 guns. Some Builders call frigates Fifth Rates. They are distinguished as frigates of the first order, frigates of the second order, frigates of the third order.
Frigates of the first order have between 42 and 48 guns on two complete gundecks. Frigates of the second order have 36 guns in one complete battery and one half battery, finally, frigates of the third order carry 24 to 30 guns in a single battery and on the quarterdeck.
Light frigate: it is a warship of between 18 and 22 guns, it occupies the middle position between the frigate and the sloop-of-war, and it is built like the latter, save that its deck is not interrupted aft.

1758. A. Savérien. A frigate, on the Atlantic seaboard, is a warship which is low in the water, lightly built, a fast sailer, and which usually has but two decks. In the Mediterranean, it is a long vessel powered by oars and sail, smaller than the brigantine. There is a deck over the rowing benches; and its sides, which are higher than those of galleys, have openings like gunports, for the oars.
Advice frigate: small vessel which carries dispatches and orders to the fleet, and which is also used for scouting.
Light frigate: small warship, fast sailer, with but one deck, armed with between sixteen and twenty-five guns.
Moreover, a frigate is never armed with more than sixty guns; for any vessel which carries more is called a ship of the line.

1773. J. Bourdé de Vilehuët. All warships armed with less than sixty guns are called frigates. Our frigates in France have in general but a single tier of guns and their forecastle and quarterdeck are also armed, there are a very small number with two tiers of guns; and I believe that we have taken a good course in doing away with them, for it is always easier to make a vessel a fast sailer which has but one tier of guns on the upper deck and on the forecastle and quarterdeck; and they will always be of sufficient strength, if they be armed with 18-pdrs or 12-pdrs, with 6-pdrs on the forecastle and quarterdeck: forty to forty-six guns in all; and they will be able to hold their own against an enemy armed with fifty-six guns on two decks and on the forecastle and quarterdeck, because they are lower in the water, and because they will have, for the same proportions, a larger crew; and they will certainly be faster and easier to handle. A good frigate will have a good height of gundeck sill, be a fast sailer, and be very stable, with spars which are not too high: easy to handle, quick in stays, and responsive to the helm.

1777. D. Lescallier. Vessel of war, rigged like a ship, which it resembles in every respect in its rigging, and which differs from it only in that it is smaller, and that it has but one gundeck. Frigates have between twenty and thirty-two guns. When they have less than twenty guns they are no longer called frigates; they are called sloops-of-war. Frigates are classed as Fifth Rates. They cannot take their place in the line of battle; but they are useful for voyages of discovery, for chasing, for carrying dispatches, for rendering assistance to and protecting ships which have been disabled. They may also be sent on detached service for cruising, to convoy a fleet of merchantmen; and for divers other purposes where speed of sailing is required; for which they are more apt than large ships, being built for speed and being lighter.
A good frigate must be a fast sailer and especially when close-hauled; she must point up as sharply as possible. To that end, they are given length on the waterline, with steep floors, and plenty of support in the entry and the run aft, and with spars which are proportionately higher than they are in ships; but care must be taken that these qualities do not impair their stability: they must be stiff, handle well in a seaway, rising to the seas, and be dry, for they will ship seas readily if their tumblehome be too great. Another disadvantage of excessive tumblehome, all too common in frigates, is that the shrouds are insufficiently spread, so that the masts are not adequately supported.

1786. Encyclopédie méthodique. The entry for "frigate" is merely reproduced word for word from Bourdé de Vilehuët.

1792. N.C. Romme. Warship, with but a single gundeck, or a single uninterrupted tier of guns, and which is armed with not less than twenty and not more than fifty pieces, arranged on its upper deck and on the forecastle and quarterdeck. Frigates also have a lower deck, which, with the upper deck to which we have referred, determines the space necessary for berthing the crew and for other conveniences. Its rig is similar to that of ships of more than one deck. Frigates are distinguished by the number of their guns; they are also differentiated by the calibre of these same guns. Thus there are 8-pdr, 12-pdr and 18-pdr frigates, according to the weight of shot employed by their upper deck armament. In general terms, the word frigate implies a vessel which is a fast sailer, and faster than any other type of vessel; which is why, when a large ship is a fast sailer, she is said to sail like a frigate; or rather, like a frigate should sail, for the vessels which are classed as frigates do not always have the qualities of speed which their Builders intended.

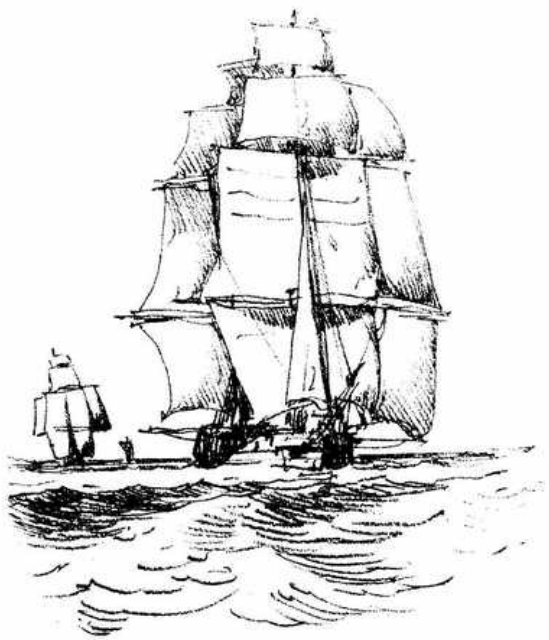
1798. D. Lescallier. Warship rigged in the same manner as a ship of the line, which it resembles in all aspects of its rigging,

and from which it differs only in that it is smaller and has but one uninterrupted tier of guns. Frigates have most commonly between twenty-six and forty guns of 12-pdr or 18-pdr calibre for those on the upper deck; and 6- or 8-pdrs on the forecastle and quarterdeck. We have recently built in France some excellent frigates armed with 24-pdrs on the upper deck. With less than twenty guns, they are no longer frigates: they are called sloops-of-war, and they are usually armed with 8-pdrs or less.
Frigates cannot take their place in the line of battle.

1820. J.B. Willaumez. Warship which, in terms of strength, comes after the ships of the line. For many years frigates have been armed with up to twenty-six 12-pdrs on the upper deck, going up to as much as twenty-eight 18-pdrs, and 24-pdr carronades (fourteen in number for the former and eighteen for the latter) armed the forecastle and quarterdeck in place of 6- or 8-pdr long guns. 12-pdr frigates have already been abandoned, and the 18-pdr vessels will soon be generally replaced by stronger frigates armed with thirty 30-pdrs on the main deck, and at least as many carronades of the same calibre on the spar deck.

1841. A.S. de Montferrier. Among warships, those which are distinguished by this name are those which have but a single covered tier of guns and two tiers in all, armed with a total of 40 guns and more. The qualities demanded of a good frigate are that it should be a fast sailer and be very stable, easy to handle, and responsive to the helm. The 44 guns frigates, built to draughts both old and new, ...have earned a strong reputation. Being flusher than two-decked ships, and offering on this account less area to the enemy's fire while at the same time handling more quickly, these frigates were also capable of holding their own against small ships of the line armed with more guns in three tiers (where the lower deck guns, in a seaway, could not be served), and which handled more slowly and with greater difficulty. But, in addition to the advantages which these older frigates had, those built to the new draughts also have considerably heavier scantlings, and armament as well. They are now veritable ships of the line with a single covered tier of guns, like *rasées* (in other words, ships which have been cut down by a deck or by their forecastle and quarterdeck), being thus of the same scantling and much more powerfully armed than the former 50- and 60-gun ships, which were still to be seen in large numbers in the fleets of the middle of the last century.

1847. P.M.J. de Bonnefoux & E. Pâris. Three-masted vessel armed today with between forty and sixty guns; frigates are divided into three classes: the first is composed of those armed with 60 guns; the second armed with 50, the third 40. They have a single covered tier of guns and forecastle and quarterdeck armament; which is what distinguishes them from ships, which have at least two covered tiers of guns; and in this respect, they resemble sloops-of-war of the first rank, from which they differ, moreover, by their size and their armament. The number of guns which I has been given above for each class of frigate is the regulation number, but there are almost always some differences. In building and fitting out frigates, the principal aim is to combine strength with lightness, and solidity with speed of sailing. They are, usually, excellent vessels, which are perfectly suited, in time of war, for cruising against the enemy's merchant fleets. [The article goes on to describe the so-called "steam auxiliaries".]



Chapter I
SHIP-FRIGATES

SHIP-FRIGATES

As the title indicates, these are hybrid vessels, or a sort of "bastard" category. Their continued existence over a period of nearly a century intrudes on the notion of the frigate, which we tend to think of only in terms of the characteristics which came to distinguish it from the middle of the 18th century onwards. It is important therefore to attempt to define the ship-frigates, which can be classed either as small two-decked ships or as powerful frigates with two tiers of guns.

Having devoted this chapter to their treatment, it will then be possible to move on, in the following chapters, over a development which is governed by what I will call the "progression of calibres". The following pages bear careful reading, in view of the variety of vessels which fall under the heading of ship-frigates.

Having thus situated the context, let us now examine the official texts, which defined the types of ships in the French Navy in the 17th century.

1669. Regulation of December 1st, on the subject of the arming of ships. Implicit recognition is given for a classification in five Rates, but the text restricts itself to defining the proportions for each Rate, in bronze and iron guns, without however specifying either the number or the calibre. The salient points which interest us are that the Third Rate is armed with half iron guns and half brass, the Fourth Rate one third brass and two thirds iron, and the Fifth Rate entirely with iron guns,

1670. Regulation of August 4th laying down the principal arrangements to be respected for the five Rates. Thus, the Fourth Rate is to be armed with 40 to 50 guns; these vessels have two uninterrupted decks, and a forecastle over the fore part of the upper deck sheltering the galley. In the aftercastle is the Captain's cabin, and above it a poop. The aftercastle or quarterdeck runs as far as the capstan, with galleries (staircases) on either side leading up to the poop, and serves as the station for the soldiers when the ship is in action.

The Fifth Rate is armed with 18 to 28 guns. Two decks run from bow to stern; at the stern is the quarterdeck with the Captain's quarters and a poop, proportioned according to the size of the vessel, but there is no forecastle and the galley fires are to be placed between decks wherever space can be found.

1671. The Regulation dated March 22nd concerns the Shipbuilding Councils established in each of the great Royal Dockyards, and lays down the general procedures to be adopted in the design of ships. "Ships of war are to be made longer and less broad than in the past; the lower tier of guns must be kept high out of the water, in order that they may be served in rough weather, which in the past has often been in the water, from not being high enough; the heights between decks to be diminished, to reduce the great height of the ships on the water.

"The gunports to be well cut, with a distance of about 7 feet between them.

"The said vessels are to be lightened in their upper works as much as possible. Observe also that they be sufficiently strong in their bottom that they may take the ground at low tide without risk, and that they be flat in the floor so as to draw as little water as possible in order that they may enter roadsteads, harbours and the mouths of rivers more easily, making their upper works light so that they may also be light under sail."

1673. Regulation dated September 13th. The text attempts to "regulate the various measures to be taken in the building of ships of war, so that they may be uniform". Here are a number of extracts from the text concerning frigates: "*Two-decked frigates shall have as their greatest breadth, to outside of plank and at the midship bend, no more than a quarter of the length from stem to stern, without increase.*

The rake of the stem shall be one foot less than a fifth part of the length on the keel; and the rake of the post shall be a quarter that of the stem.

The height of the stem shall be one and a half feet above the upper deck, and that of the post shall be two feet and a half less than that of the stem.

The flat of the floor at the midship bend shall be half the length of the midship beam, and it shall be placed in such a manner that, having divided the keel into six equal parts, of which two form the rising of the after body and one the rising of the fore body, the midship bend shall be in the middle of the three other parts.

The floor of the after balancing frame is to be placed at one third of the length of the keel, where the narrowing of the after body begins, and its length on the flat shall be two thirds the flat of the midship bend.

The floor of the forward balancing frame is to be placed at half of one third of the keel, where the narrowing of the fore body begins, and its length on the flat shall be three quarters the flat of the midship bend.

The depth in hold of the vessel shall be fixed at half the breadth at the midship bend, counting from the keel to the beam of the gundeck in a straight line.

The stern transom or wing transom shall be two thirds the breadth at the midship bend, and shall be fastened two and a half feet below the head of the sternpost, at the height of the lower sills of the gunroom gunports. His Majesty desires that in future the sterns of his ships shall have a round tuck above the wing transom and not a square tuck, as has been the practice heretofore[1].

With regard to the height of breadth or breadth extreme, His Majesty desires that it shall be precisely observed henceforth to place the height of breadth directly at the waterline.

The wales shall be so laid that they are cut into by no more than two ports.

Vessels of less than fifty guns shall have neither orlop nor walks[2]*.*

Henceforth there shall be six and a half feet between gunports, and care shall be taken not to place one above another, so that the smoke from the lower deck guns do not blow in through the upper deck ports[3]*. His Majesty desires that henceforth there be no more than five feet allowed between decks, counting from the plank to the under side of beam.*

In carrying out the building, care shall be taken that the upper works curve gradually in, from the height of breadth to the under side of the plankshеer, so that the breath shall be narrower at the top than at the height of breadth at the midship beam.

From the wing transom to the top of the taffarel the stern of the ship shall be so formed that the beam below the top of the taffarel shall be two thirds of the length of the wing transom.

And with regard to the carved work of the stern, His Majesty forbids the use of figures carved in relief, such as has been the practice heretofore, taking care to employ only light ornamentation, such as will not weigh the ship down.

Ships of fifty guns and below shall have no gallery or balcony at the stern.

His Majesty desires that the use of winding galleries on the quarter shall be entirely done away with, permitting only projections at the side such as are called quarter-galleries, which shall extend two and a half feet from the side at their widest point, running up from the gunports of the gunroom to below the top of the taffarel and opening into the cabins within.

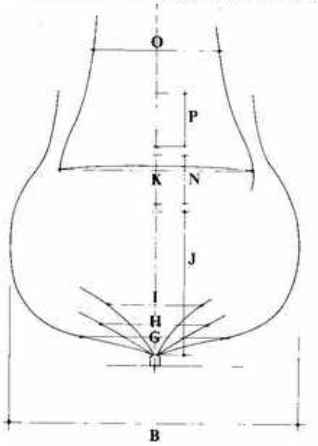
The after castle shall run forward to between the capstan and the mainmast and shall be five feet and a half in height from the plank of the deck to under side of beam.
The forecastle shall be five feet in height and extend aft to the chestrees[4].
The galley fires shall be placed at either side of the ship, taking care to make them lighter than they are at present.
With regard to the masts and yards, His Majesty desires that the customary practices shall be followed."

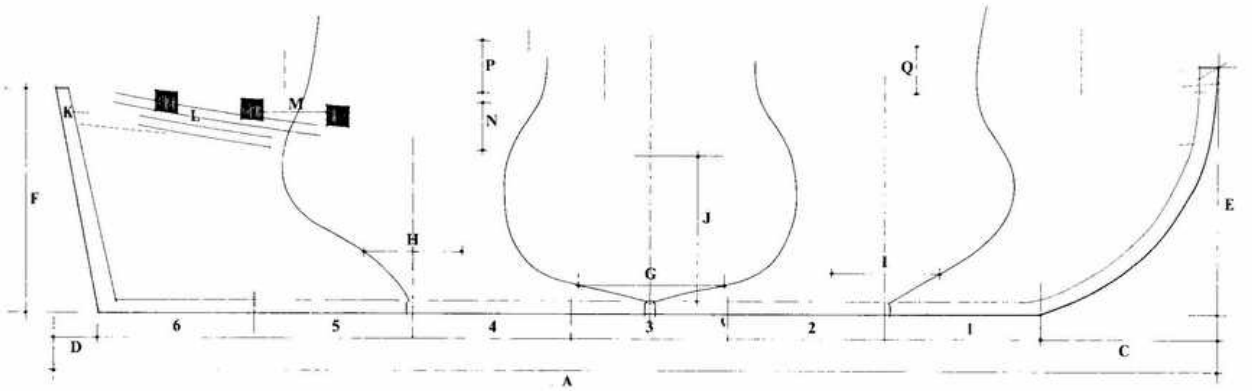
This text was drawn up with the assistance of several of the country's shipwrights, but for all that it remains a theoretical document, and in the light of contemporary knowledge it was perhaps premature to attempt to impose the characteristics which determine the design of a ship.

The Regulation of 1673, despite the fact that it was only partially implemented, nevertheless remains an important text for the study of shipbuilding in the 17th century. Moreover, the Regulation demonstrates the strong administrative will typical of Colbert.

No ship's draught or other graphic document survives for any ship in the French Navy of the 1670s[5], and I have therefore provided some drawings in their place, applicable to the period prior to 1689 (ships of the 4th and 5th Rates).

1. A decision which was to be disregarded, and it was not until the first three decades of the 18th century that the round tuck, known as the "English stern", came into general use. Note also the height of the wing transom at the lower sill of the upper deck ports, whereas in Toulon shipwrights placed it above the ports so as to form their upper sill, with the counter overhanging the sternchase ports.
2. The carpenter's walks.
3. I know of no iconographic evidence that this was ever practised.
4. Approximately one quarter of the length from stem to post measuring from the stem.
5. Notably Jean Guichard from Rochefort and Étienne and Laurent Hubac from Brest.
6. At this time the notion of plans or draughts was to all intents and purposes unknown in French Dockyards. On the other hand, between 1673 and 1680 Regulations required that *models* be made to illustrate the proportions and arrangements of the King's ships.





Regulations of 1673. This schematic drawing is the *graphical interpretation* of the dimensions imposed on the shipwrights by the Regulations of September 1673. The letters indicate the various requirements laid down.

A. Length from stem to sternpost.
B. Breadth at the midship bend, equal to 1/4 of **A**.
C. Rake of the stem, equal to 1/5 of the length on the keel, less one foot.
D. Rake of the sternpost, equal to 1/4 of the rake of the stem.
E. Height of the stem, 1 1/2 feet above the deck.
F. Height of the sternpost, 2 1/2 feet less than that of the stem.
G. Flat of the floor at the midship bend, half of the breadth extreme. Situated at a point 5/12 along the keel, starting from the fore end.
H. Floor at the fining of the after-body, placed at a point 2/3 along the keel, starting from the fore end. Length of the floor 2/3 that of the flat of the floor of the midship bend.
I. Floor at the fining of the fore body, placed at a point 1/3 along the keel, starting from the fore end. Length of the floor 3/4 that of the flat of the floor of the midship bend.
J. Depth in hold equal to half the breadth extreme*.
K. Wing transom, length equal to 2/3 of the breadth extreme. Placed 2 1/2 feet below the head of the sternpost.**
L. The wales must not intersect more than two gunports.
M. Distance between ports 6 1/2 feet.
N. Headroom between decks 5 feet.
O. Deck transom (aftermost beam) of the after castle 2/3 the length of the wing transom.
P. Headroom beneath the after castle 5 1/2 feet; the after castle finishes between the mainmast and the main capstan.
Q. Headroom beneath the forecastle 5 feet; the forecastle finishes at the chestrees.

*The depth in hold was measured at this time from the upper face of the keel to the lower face of the midship beam.
**According to the Regulations, it was impossible to place the wing transom at the height of the lower sills of the upper deck ports, save by reducing by a significant amount the round up of the upper deck aft or else by increasing the round up forward.
Also visible on this drawing are the horizontal lines of deck, from which the headroom between decks can be taken off, making due allowance for the thickness of plank on the deck and the thickness of the beams of the deckhead.

1674. Regulation of October 6th, treating the general policy of the Royal Dockyards. This is a particularly important text, dealing with everything to do with the building of ships, their service, fitting out, etc. In all there are fourteen headings, each with up to twelve articles. The fifth heading concerns shipbuilding, of which the third article confirms the provisions of the Regulation of 1673. The sixth heading covers ordnance, and in the eighth article lays down the proportions for brass and iron guns, for all calibres from 4 to 36 pounds. The text is detailed enough to allow accurate drawings to be made of the 12-, 8-, 6- and 4-pdr guns, which are the calibres used to arm frigates.
A further document completes the 1674 Regulations, laying down an inventory of all the stores and spares for each rate of ship[7]. Under the heading of gunner's stores is a detailed list of ordnance, with an itemised breakdown, albeit theoretical, but a very necessary complement to the Regulations of 1673.

1689. Establishment or Edict dated April 15th. This is without doubt the "Great Edict" of the French Navy, founded for all that on the earlier Regulation of 1674 which it tends to eclipse.
The full text is monumental, covering twenty-three books, each divided into headings, which in turn are broken down into separate articles. In principle, everything to do with the King's Navy is covered by the Edict of 1689, which remained in force, at least theoretically, until 1765, when a new Establishment was formulated under the initiative of the Comte de Choiseul.
The thirteenth book deals with shipbuilding, and heading II in particular lays down the three principal dimensions for each of the five Rates. Thus ships of the Fourth Rate were to be 120 feet long, 32'6" feet in breadth, and with a depth in hold of 14'6" feet. Fifth Rates were to be 110 feet long, 27'6" feet in breadth, with 14 feet depth in hold (all these dimensions being taken in the usual manner). By comparison with the Regulation of 1673, the Edict of 1689 is considerably less restrictive, since it only lays down the principal dimensions, which was not the case with the earlier text.

As far as ordnance is concerned, no dimensional characteristics are given, since a special Establishment was to be fixed[8]. It is however laid down that for the Fourth Rate one third of the guns are to be brass, one quarter in the case of Fifth Rates.
A new regulation concerning rigging, stores and munitions for fitting out and storing ships completes the Edict, providing information for each Rate as to the number of guns, whether brass or iron, and their calibres.
I have appended two tables summarising the information given in the various texts of the 1670s and in the Edict of 1689. Since the Regulations of 1673 do not lay down the principal dimensions, I have used instead the tables proposed by Dassié[9] for ships armed in accordance with that defined in 1674, respecting the proportions defined in 1673.
The two tables, and the sketches on the preceding pages are sufficient to define with sufficient accuracy the Fourth and Fifth Rates or two-decked frigates, insofar as they are laid down in the various official texts discussed.

7. Provisions which in essence remained in force until the 19th century (see *74-G.S.*, vol. II).
8. If such an Establishment was ever drawn up, which seems unlikely, it was never published.
9. F. Dassié was Drawing Master to the Gardes de la Marine in Toulon; in 1677 he published what can be considered to be the first treatise on naval architecture (*L'Architecture Navale, contenant la manière de construire des navires*: Polak N° 2247). He was probably assisted by J. Guichard, the Rochefort shipwright.

Regulation of 1674

	Lower Deck	Upper Deck	Fo'csle/ Q'deck	Length	Br.	Depth in Hold
4th Rate 40 guns	4x 18-pdr 6x 12-pdr 10x 8-pdr	6x 6-pdr* 12x 6-pdr	2x 4-pdr	120'0"	30'0"	15'0"
5th Rate 30 guns	4x 12-pdr* 12x 8-pdr	4x 6-pdr* 10x 6-pdr		108'0"	27'0"	13'6"

Edict of 1689

4th Rate 44 guns	4x 18-pdr* 16x 12-pdr	8x 8-pdr* 12x 8-pdr	4x 4-pdr*	120'0"	32'6"	14'6"
5th Rate 36 guns	6x 8-pdr* 12x 8-pdr	6x 6-pdr* 12x 4-pdr		110'0"	27'6"	14'0"

The dimensions for 1674 as given by Dassié. Length from stem to post, breadth to inside of plank, depth in hold from the upper face of the keel to the horizontal line of deck at the midship beam, all dimensions in French feet.
*Brass guns.

Let us now continue our examination of two-decked frigates by looking at the annual lists of the French Navy, an indispensable source for analysing the Navy's strength. The Lists are relatively summary for the period 1671 to 1695, but from 1696 to 1746 there is a gradual increase in the numerical data supplied. I have included a number of reproductions of these lists in the Appendices, which gives a clear idea of the importance of these sources.
The classification of frigates into the 4th or 5th Rates does not always appear to be justified, and it is possible to see, from one List to another, movements of vessels between Rates. *In short, I have preferred to make two lists, one for two-decked frigates of the first Order, armed with 12-pdrs on the upper deck, and another for those of the second Order, armed with 8-pdrs on the upper deck. I have retained the same distinction for two-decked frigates with only a half tier of guns on the lower deck, a design which made its appearance at the beginning of the 18th century.*
The annual Navy Lists show that, with one isolated exception, no more ship-frigates of the second Order were built after the end of the first decade of the 18th century, so that the 8-pdr calibre became "available". Ship-frigates of the first Order continued to be built up until the middle of the 18th century, the 12-pdr calibre then being taken up, like the 8-pdr, by the "modern" frigates, as we shall see in Chapters III and V.
After this brief look at the various official texts and at the Navy Lists, we can now go on to examine the two Orders of two-decked ship-frigates.

Frigates of the 1st Order (12-pdrs on the gundeck)

Laid down	Name when launched	Builder	Place of building	Length	Breadth	Depth in hold	Lower deck	Upper deck	Fo'csle/ Q'deck	Total	Struck from lists	Notes
1640	*le Soleil*	J. de Viot	Indret							38	1673	1671 *le Marquis*
1646	*le Mazarin*	E. Hubac	Brest							40	1672	1671 *le Bon*
1661	*le Mercœur*	E. Rodolphe	Toulon	114'0"	30'0"	14'0"				36	1686	1671 *le Trident*
1661	*l'Infante*									34	1673	1671 *l'Escueil*
1661	*le Jules*									36	1673	1671 *l'Indien*
1662	*le Mancini*	G. Rodolphe	Toulon	114'0"	30'0"	14'0"				36	1686	*Beaufort* – '71 *Neptune* – '72 *Maure*
1663	*le Triomphe*									44	1674	1671 *le Courageux*
1664	*le Duc*	E. Hubac	Brest	122'0"	33'6"	15'0"				42	1677	1671 *le Comte*
1664	*le Flamand*									40	1673	1671 *l'Arc-en-Ciel*
1666	*le Tigre*	J. Guichard	Soubise							36	1689	
1666	*le Toulon*	C. Audibert	Toulon							44	1696	1671 *le Joli* – *'78 le Fidèle*
1667	*le Cheval Marin*	L. Coulomb	Toulon	120'0"	34'0"	12'4"	20x 12	20x 8	4x 4	44	1728	
1667	*la Sirène*	F. Pomet	Toulon	114'6"	32'0"	14'0"				44	1684	
1667	*le Provençal*	G. Rodolphe	Toulon							40	1691	1671 *le Mignon* – '78 *le Capable*
1667	*le Dunkerquois*	Debast	Dunkirk							44	1688	1671 *le Brusque*
1667	*le Galant*	E. Hubac	Brest	118'0"	32'0"	14'6"	12-pdrs			44	1689	1678 *l'Opiniâtre*
1668	*le Havre*									40	1696	1671 *l'Alcyon*
1670	*l'Assuré*		Dunkirk							46	1688	1671 *le Français*
1670	*les Grâces*	J. Saboulin	Bayonne							48	1695	1671 *le Fendant*
1670	*l'Artois*	J. Saboulin	Bayonne							52	1685	1671 *Maure* – '78 *Content*
1670	*le Basque*	J. Saboulin	Bayonne							40	1694	1671 *Brillant* – '78 *Triton*
1670	*la Galante*	C. Audibert	Marseilles	105'0"	32'0"	14'0"	16x 12	16x 8		32	1697	1671 *l'Aventurier*
1670	*le Constant*	Hendrick	Dunkirk							46	1693	1671 *l'Oiseau*
1673	*l'Hercule*			123'0"	32'0"	14'6"	24x 12			46	1678	
1673	*le Changeant*	F. Chapelle	Toulon							44	1691	1673 *l'Éole*
1673	*le Brutal*	Hendrick	Dunkirk							40	1689	1675 *le Croissant*
1673	*le Faucon*	J. Guichard	Rochefort	112'0"	28'6"	12'0"	6x 12, 12x 8	8x 6	4x 4	40	1708	Mixed calibres on gundeck
1673	*l'Actif*	P. Chaillé	Le Havre	105'0"	32'0"	14'0"	18x 12	18x 8		36	1696	1675 *l'Étoile*
1673	*l'Indien*	L. Coulomb	Toulon							44	1691	
1674	*l'Hazardeux*	P. Mallet	Rochefort							38	1694	
1676	*la Serpente*	F. Chapelle	Toulon							40	1690	1676 *Laurier* – '78 *Ferme*
1676	*la Fidèle*	P. Brun	Brest	102'0"	31'0"	13'0"	20x 12	20x 6	4x 4	44	1698	1677 *le Comte*
1676	*la Favorite*	P. Chaillé	Le Havre	111'0"	28'0"	9'0"	20x 12	20x 6		40	1709	'76 *Palmier* – *Soleil d'Afrique*
1678	*le Lion*	E. Salicon	Le Havre							44	1689	'78 *Marin-Écueil*
1679	*le Léger*	E. Salicon	Le Havre							40	1692	
1680	*l'Emporté*	Hendrick	Dunkirk	118'0"	32'0"	14'0"	20x 12	22x 6	4x 4	44	1704	
1680	*le Solide*	Hendrick	Dunkirk							44	1693	
1684	*le Gaillard*	E. Salicon	Le Havre							48	1689	
1688	*le Trident*	F. Coulomb snr	Toulon							44	1695	
1688	*le François*	E. Salicon	Le Havre	123'0"	33'0"	11'0"	22x 12	24x 8	4x 4	50	1735	
1689	*l'Alcion*	Hendrick	Dunkirk	107'0"	28'0"	13'0"	20x 12	20x 6		40	1717	
1690	*l'Adroit*	E. Salicon	Le Havre	114'0"	32'0"	16'6"	22x 12	22x 8		44	1703	
1691	*le Poli*	P. Masson	Rochefort	110'0"	28'6"	12'0"	20x 12	20x 6		40	1717	
1691	*l'Opiniâtre*	H. Mallet	Rochefort	110'0"	28'6"	12'0"	20x 12	20x 6		40	1699	
1695	*le Volontaire*	F. Coulomb snr	Toulon	112'0"	30'0"	11'4"	20x 12	20x 6	4x 4	44	1702	
1695	*le Mutine*	P. Le Brun	Brest	120'0"	30'0"	15'0"	20x 12	20x 6		40	1707	
1696	*l'Avenant*	B. Pangalot	Marseilles?	109'0"	27'6"	13'0"	10x 12, 12x 8	20x 6		42	1704	Mixed calibres on gundeck
1696	*le Triton*	B. Pangalot	Brest	123'0"	31'6"	11'0"	20x 12	20x 6	4x 3	44	1702	
1697	*le Thétis*	H. Mallet	Rochefort	122'0"	33'0"	12'3"	22x 12	22x 6		44	1705	
1697	*la Dauphine*	Cochois	Le Havre	124'0"	31'0"	14'0"	20x 12	20x 6		40	1702	
1698	*l'Adélaïde*	F. Coulomb snr	Toulon	115'0"	31'0"	13'4"	22x 12	22x 6		44	1714	
1699	*la Renommée*	A. Tassy	Bayonne	126'0"	31'0"	16'0"	22x 12	20x 8	6x 4	48	1723	
1700	*l'Amphitrite*	R. Levasseur	Dunkirk	122'0"	34'0"	14'6"	22x 12	20x 8	4x 4	46	1722	1705 *le Protée* Dr. MM
1704	*la Parfaite*	F. Coulomb snr	Toulon	120'0"	32'0"	15'0"	22x 12	16x 6	2x 4	40	1718	
1705	*le Griffon*	P. Coulomb	Lorient	124'6"	33'0"	14'6"	22x 12	22x 6	6x 4	48	1757	
1705	*la Vestale*	F. Coulomb snr	Toulon	120'0"	32'4"	15'6"	22x 12	16x 6	2x 4	40	1725	
1707	*l'Amazone*	B. Pangalot	Brest	118'0"	31'6"	13'6"	8x 12	26x 8	8x 4	42	1748	
1722	*l'Argonaute*	Hélie jnr	Brest	122'0"	32'0"	15'0"	22x 12	24x 6		46	1747	
1722	*la Parfaite*	Hélie jnr	Brest	122'0"	32'0"	15'0"	22x 12	24x 6		46	1746	

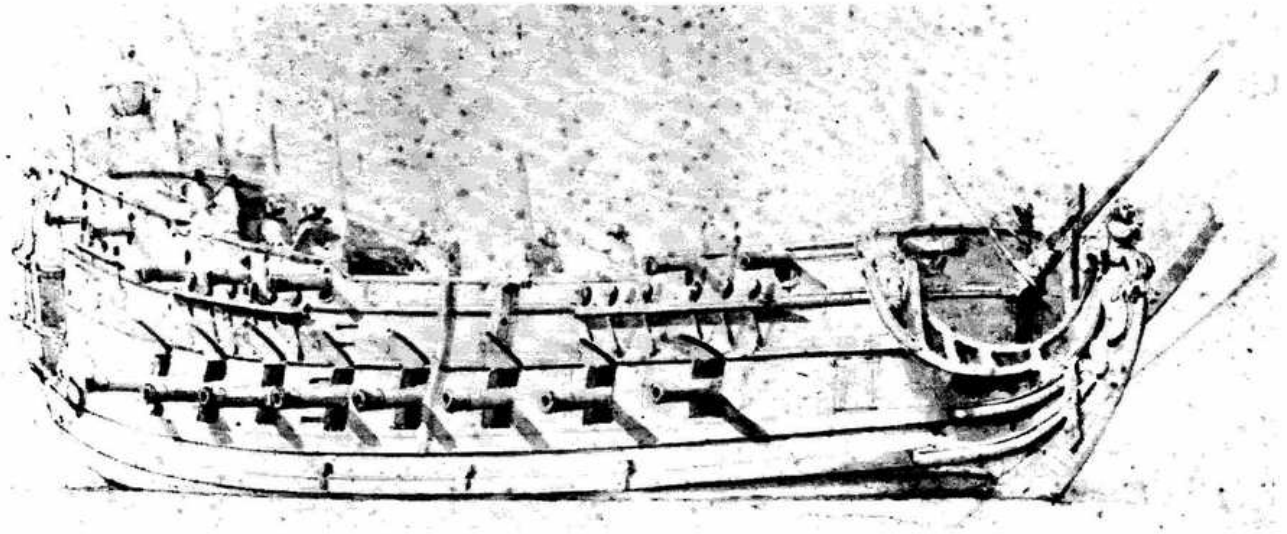
Laid down	Name when launched	Builder	Place of building	Length	Breadth	Depth in hold	Lower deck	Upper deck	Fo'csle/ Q'deck	Total	Struck from lists	Notes
1722	*la Néréïde*	J. Ollivier	Rochefort	122'0"	33'8"	13'2"	20x 12	22x 6		42	1743	Dr. SHM – SHM
1724	*le Jason*	G. Poirier	Le Havre	124'0"	33'0"	15'6"	22x 12	24x 8	4x 4	50	1747	Dr. MM
1726	*la Gloire*	G. Poirier	Le Havre	122'0"	32'6"	15'6"	22x 12	24x 6		46	1740	
1728	*le Rubis*	G. Poirier	Le Havre	130'0"	34'8"	15'0"	22x 12	24x 8	4x 4	50	1747	
1728	*le Zéphir*	F. Coulomb	Toulon	115'0"	30'6"	13'6"	4x 12	22x 8	2x 4	28	1762	AT
1733	*l'Aquilon*	J.A. Levasseur	Toulon	127'0"	35'0"	17'0"	24x 12	24x 6		48	1757	
1738	*l'Auguste*	Geffroy	Brest	128'0"	34'6"	15'3"	22x 12	24x 8	6x 4	52	1746	
1740	*l'Atalante*	J.A. Chapelle	Toulon	115'0"	31'0"	15'0"	12x 12	22x 8		34	1761	
1741	*la Diane*	F. Coulomb	Toulon	115'0"	30'4"	11'11"	4x 12	22x 8	2x 4	28	1758	
1744	*l'Aurore*	P. Morineau	Rochefort	128'0"	33'10"	16'2"	22x 12	24x 6		46	1753	Dr. AR
1745	*l'Étoile*	P. Chaillé jnr	Le Havre	128'6"	37'0"	11'10"	8x 18	30x 12	12x 4	42	1747	
1747	*la Junon*	P. Chaillé jnr		136'0"	30'6"	16'6"	30x 12	20x 6		50	1757	
1750	*la Rose*	J.A. Chapelle	Toulon	120'0"	31'10"	14'0"	8x 12	22x 8		30	1758	Dr. AT
1756	*l'Abénakise*	R.N. Levasseur	Quebec				8x 18	28x 12	2x 6	38	1757	Dr. NMM

*The depth in hold is measured from the upper face of the keelson to the lower face of the midship beam – length from the outside of the stem to the outside of the post – breadth to outside of plank at the midship bend. All dimensions in French feet and inches.
This list includes two untypical vessels, the *Étoile* and the *Abénakise*, armed with half tiers of 8 18-pdrs on the lower deck, but for all that too small to be considered as ships. Another exception is the *Junon*, originally built as a 60-gun ship, but she proved unstable, her armament was reduced, and she was classed as a frigate.
MM: Musée de la Marine, Paris – SHM: Service Historique de la Marine, Vincennes – AR: Rochefort Dockyard Archives – AT: Toulon Dockyard Archives – NMM: National Maritime Museum, Greenwich.

Frigates of the 2nd Order (8-pdrs on the gundeck)

Laid down	Name when launched	Builder	Place of building	Length	Breadth	Depth in hold	Lower deck	Upper deck	Fo'csle/ Q'deck	Total	Struck from lists	Notes
1646	*le Dragon*		Brest								1674	
1656	*la Française*		St-Malo								1673	1671 *l'Éole*
1657	*l'Étoile*		Rochefort						4x 4	34		
1658	*l'Écureuil*		Concarneau								1676	1671 *l'Orage*
1660	*le Lion Rouge*		Marseilles							34	1673	1666 *Lion d'Or* – '71 *Vigilant*
1660	*le Sauveur*									34	1677	1671 *le Lion*
1661	*le St-Joseph*		La Ciotat							34/20	1690	1671 *le Dur* – '78 *le Poli*
1664	*l'Hermine*		Dunkirk							34	1680	1671 *le Capricieux*
1664	*l'Hirondelle*									34	1679	
1666	*le Bayonnais*		Bayonne							32	1675	1671 *l'Adroit*
1669	*le Laurier*		Brest	90'0"	24'0"	11'0"	20x 8	8x 4		28	1678	
1669	*le Tourbillon*	E. Hubac	Brest	90'0"	24'0"	11'0"	20x 8	8x 4		28	1696	1678 *le Pétillant*
1670	*les Jeux*	J. Guichard	Rochefort	106'0"						34	1687	
1670	*la Victoire*		Brest	92'0"	24'0"	11'0"	20x 8	8x 4		28	1673	1671 *l'Arrogant*
1670	*la Trompeuse*	G. Rodolphe	Toulon							40	1694	1671 *Triton* – '78 *Mercure*
1670	*la Bouffonne*	G. Rodolphe	Toulon								1682	1671 *Drosle* – '78 *Gaillard*
1670	*le Dur*	E. Hubac	Brest							28	1693	1671 *l'Éveillé*
1670	*le Périlleux*	E. Hubac	Brest							34	1692	1671 *le Joli* – '78 *Hardi*
1671	*l'Entreprenant*	E. Hubac	Brest	94'0"	25'2"	9'4"	16x 8	16x 4		30	1710	1674 *le Dragon*
1671	*l'Entreprenant*	J. Guichard	Rochefort							30	1696	1673 *le Vigilant*
1671	*l'Actif*	E. Hubac	Brest							34	1694	1672 *l'Émérillon*
1672	*le Marquis*		Brest							28	?	
1672	*la Mignonne*		Marseilles							32	1694	1671 *Bizarre* – '91 *Colosse*
1673	*le Caché*		Brest							30	1684	1674 *le Galant*
1673	*le Dauphin*	H. Mallet	Rochefort							32	1690	1675 *la Perle*
1673	*l'Éclair*	J. Guichard	Rochefort							32	1716	'75 *Soleil d'Afrique* – '78 *Lion*
1676	*la Fée*	E. Hubac	Brest	103'0"	25'2"	12'3"	14x 8	16x 4		30	1698	1690 *la Jalouse*
1676	*la Gracieuse*	P. Chaillé	Le Havre							36	1690	1676 *l'Adroit*
1678	*l'Hercule*	E. Hubac	Brest	112'0"	28'0"	10'0"	20x 8	10x 6		30	1704	
1678	*le Marin*	H. Mallet	Rochefort	107'0"	27'0"	9'0"	18x 6	12x 4		30	1704	
1679	*l'Hirondelle*		Brest							28	1688	
1679	*le Sérieux*	L. Coulomb	Toulon	103'0"	27'6"	11'10"	20x 8	18x 4		38	1704	1690 *le Croissant*
1679	*Soleil d'Afrique*	H. Mallet	Rochefort	103'4"	26'0"	10'6"	20x 8	10x 4		30	1699	
1687	*la Gaillarde*	P. Masson	Rochefort	109'0"	28'6"	11'0"	20x 8	12x 6		32	1711	
1688	*les Jeux*	Hendrick	Dunkirk				18x 6	18x 4		36	1689	
1689	*les Jeux*	Hendrick	Dunkirk	100'0"	26'8"	8'6"	18x 6	18x 4		36	1706	
1689	*le Tigre*	Hendrick	Dunkirk	100'0"	26'8"	8'6"	18x 6	18x 4		36	1715	
1689	*la Badine*	P. Masson	Rochefort	108'0"	28'6"	10'6"	20x 8	12x 6		32	1705	

Laid down	Name when launched	Builder	Place of building	Length	Breadth	Depth in hold	Lower deck	Upper deck	Fo'csle/ Q'deck	Total	Struck from lists	Notes
1692	*l'Aigle*	F. Arnaud	Bayonne	111'0"	27'0"	10'6"	18x 8	16x 6		34	1712	
1692	*le Favori*	P. Masson	Rochefort	110'0"	27'3"	12'0"	20x 8	10x 6		30	1702	
1695	*l'Oiseau*	L. Hubac	Brest	112'0"	28'0"	13'6"	20x 8	10x 6		30	1704	
1707	*l'Atalante*	Cochois	Le Havre	116'0"	31'10"	10'9"	22x 8	18x 6		40	1729	
1707	*la Valeur*	Dejumeaux	Bayonne	114'0"	31'0"	11'8"	22x 8	20x 6		42	1719	
1707	*l'Astrée*	M^{e} Blaise	Brest	94'0"	26'0"	10'0"	6x 6	20x 6		26	1717	
1728	*la Flore*	F. Coulomb	Toulon	105'0"	29'8"	12'0"	4x 8	22x 6		26	1761	
1749	*la Pomone*	P. Coulomb	Toulon	117'0"	30'10"	14'0"	8x 8	22x 6		30	1760	Dr. AT



Ship-frigate of the 2nd order. This pen-and-wash drawing carries the indication that the vessel in question is *Les Jeux*. There were three such vessels in the French Navy. The first, built in 1670, was sold in 1687 to the East India Company; the second, built in 1688, was captured in 1689; and the third, built in 1689, was captured in 1706.

This drawing is by one of the Van de Veldes, either Willem the Elder (1611-1693) or Willem the Younger (1633-1707). In principle, we can exclude the third vessel, captured in 1706. The drawing is thus either of the 1670 vessel, or that built in 1688, captured during the War of the League of Augsburg. It is not known whether the 1670 *Les Jeux* was also captured at around this time, but in all events the existence of a Van de Velde painting implies a vessel seen in England.

All three *Jeux* were classed as Fifth Rates, which we have elected to call frigates of the 2nd order. The *Jeux* of 1670, built at Rochefort by Jean Guichard, was armed with 34 guns, but nothing is known about the calibres. The 1688 vessel was armed with 36 guns, and since she was built at Dunkirk by Hendrick it is reasonable to suppose that she was similar to the *Tygre*, built by the same shipwright in the same year; the *Tygre* is known to have been armed with 36 guns, 18 6-pdrs and 18 4-pdrs.

Thus, without wishing to be categorical, it seems reasonable to suppose that the drawing is of the second *Jeux* of 1688. However, the armament shown does not comply exactly with what is indicated in the annual lists. The gundeck does indeed have nine ports, but only eight are armed and the foremost port is very close to the stem and should really be considered as a bowchase port only. The upper deck armament is also significantly different. There are three guns on the port side forward, one of which is a bowchase port permanently armed. Beyond the mainmast are three more guns, and a stepped deck probably explains the positions of two further guns placed somewhat higher in relation to the wales.

From the Van de Velde drawing therefore we would judge the armament of the *Jeux* to be composed of 16 6-pdrs on the gundeck, 12 4-pdrs on the forecastle and quarterdeck, with four other smaller pieces (3- or 2-pdrs), giving a total of 32 guns.

The overall impression of the vessel is pleasing to the eye, with relatively little sheer forward and a much more extreme sheer aft, but it is possible that this has been somewhat exaggerated by the artist; the sheer of the decks is almost identical to that of the wales, so that none of them are cut into by the gunports. The figure, a child apparently at play, evidently represents the vessel's name, and it is worth noting the cheeks of the head running forward as an extension of the lower wales, the single gammoning, the two head rails and their head timbers. There is however a certain confusion in the representation of the cathead and its supporter. The gammoning can be seen practically abutting the beakhead bulkhead and the run of the mainstay round the bowsprit! Abaft the fore channels can be seen the chestrees, and if we are to judge from the height of the bulwarks there are no gangboards. The walk of the stern-gallery does not extend round the quarter, but there are quarter-galleries. The taffarel appears to be very large, and is crowned by a stern-lantern of imposing dimensions.

The penury of contemporary French iconographic material makes this representation of a 17th century ship-frigate by such a talented artist all the more interesting. And although the identification must be treated with caution, the reproduction in this chapter of this contemporary portrait seems amply justified.

Frigates of the 1st Order. Let me start by repeating that the essential characteristic of these vessels is that they are armed with 12-pdrs on the gundeck. In the 17th century, in the majority of cases, this amounted to ten guns on each side. In the 18th century, there was a tendency to increase the number of guns to twelve on either side.

The armament of the upper deck "hesitates" between the 6-pdr calibre and the 8-pdr, the former predominating in the 17th century, the latter in the 18th.

Secondary armament of the quarterdeck was by no means general, but when it was present, it ran to no more than four 4-pdrs.

At the beginning of the 18th century a new formula was adopted for certain frigates, whereby the number of guns on the lower deck was reduced to a half tier of guns only.

In his dictionary, Blaise Ollivier also quotes cases of frigates armed with a broken tier of guns on the gundeck, interrupted amidships where the longboat was hoisted out, the boat being stowed on this deck[10].

An examination of the annual Navy Lists reveals that the formula of mixed calibres on the gundeck, as laid down by the texts of the Regulations of 1673 and 1674 was not in fact implemented, any more than the provisions of the Edict of 1689. Wisely, the Builders preferred to employ only 12-pdrs on the gundeck (lower deck).

It is also apparent that there were significant differences in length, the Builders rarely respecting the dimensions laid down in the 1689 Edict, sometimes exceeding them, sometimes remaining below.

I have set out a table below which helps to explain, if not justify, what might otherwise be considered as a personal caprice on the part of the shipwrights, in an attempt to "personalise" their designs among the plethora of dimensions which can be observed. The following table indicates for frigates pierced for 10, 11 or 12 guns on each side, the maximum and minimum lengths which are imposed. The breadth is determined by these lengths, and in turn dictates the depth in hold.

Frigates of the 1st Order (12-pdrs on the gundeck)

Pierced for 10 guns	Maximum		Minimum	
10 ports	10x 2′4″ =	23′4″	10x 2′4″ =	23′4″
9 spaces betw. ports	9x 7′3″ =	65′3″	9x 6′6″ =	58′6″
Stem to first port	2½x 7′3″ =	18′1″	2¼x 6′6″ =	14′7″
Last port to post	1½x 7′3″ =	10′10″	1x 6′6″ =	6′6″
		117′6″		102′11″
Pierced for 11 guns				
11 ports	11x 2′4″ =	24′9″	11x 2′4″ =	24′9″
10 spaces betw. ports	10x 7′3″ =	72′6″	10x 6′6″ =	65′0″
Stem to first port	2½x 7′3″ =	18′1″	2¼x 6′6″ =	14′7″
Last port to post	1½x 7′3″ =	10′10″	1x 6′6″ =	6′6″
		126′2″		110′10″
Pierced for 12 guns				
12 ports	12x 2′4″ =	28′0″	12x 2′4″ =	28′0″
11 spaces betw. ports	11x 7′3″ =	79′9″	11x 6′6″ =	71′6″
Stem to first port	2½x 7′3″ =	18′1″	2¼x 6′6″ =	14′7″
Last port to post	1½x 7′3″ =	10′10″	1x 6′6″ =	6′6″
		136′8″		120′7″

For 10 gunports per side, the 1674 text stipulates 120 feet, as does the 1689 Edict, with however two 18-pdrs on either side.
According to the annual Navy Lists, the average length was in fact 115 feet.

The lengths in the foregoing table are calculated as follows: breadth of a 12-pdr gunport: 2′4″ – distance between ports: 7′3″ maximum, 6′6″ minimum. Distance from the stem to the fore side of the foremost gunport: maximum 2½ times the distance between ports, minimum 2¼ times. Distance from the sternpost to the after side of the aftermost gunport: maximum 1½ times the distance between ports, minimum 1 times.

For frigates pierced for 10 guns on either side, the length can vary from 102′11″ to 117′6″. The Navy Lists give an average length of 115 feet approximately.

For frigates pierced for 11 guns, the length can vary between 110′10″ and 126′2″. The Lists give an average of about 122′6″.

For 12 ports on either side, the length can vary between 120′7″ and 136′8″.

Frigates of the first Order the ratio of length to breadth is on average 3.75. A small number of frigates have a ratio nearer 3.9 to 4.0.

There is no real evidence for any significant lengthening over time, the average values being comparable for both the 17th and the 18th centuries; and the ratio of 4.0, as laid down in the 1673 Regulations, is not respected; it is worth noting that this value was reduced to 3.69 in the Edict of 1689.

The ratio of breadth to depth in hold varies between 0.4 and 0.5, apart from certain extreme cases; it is possible that these are due to a measurement taken from the orlop, or else a scribal error. The 1673 text stipulated a depth in hold equal to half the breadth (to inside of plank?), but this ratio was reduced in the Edict of 1689 to 0.446, apparently sanctioning officially the average proportions already adopted by the shipwrights.

Under the circumstances, I thought it was worth transcribing here a number of dimensions which appear in a table dated 1681 and taken from a remarkable manuscript preserved in the collections of the *Musée de la Marine* (Cat. N° J.355).

There are a large number of pages which relate to the smaller two-decked vessels, which we have classed as frigates[11]. Their reproduction seems justified on the one hand because so little is known about such vessels, and on the other hand to make up in part for the lack of iconographic material.

10. Possibly he is referring to the *Parfaite* and the *Vestale*, built at Toulon in 1704-5 by François Coulomb (1654-1717).
11. We have chosen to call them "ship-frigates", by analogy with the expression "frigate-built ships", in use at a still earlier date.

Fourth Rates (1681)

Length from stem to post	120′ 0″	118′ 0″
Length of the tread of the keel	102′ 2″	101′ 2″
Breadth to inside of plank	32″ 0″	31′ 9″
Depth in hold from keel to gundeck beams	15′ 0″	14′ 9″
Height of the stem	24′ 0″	23′ 6″
Height of the sternpost		23′ 0″
Rake of the stem	14′ 0″	13′ 0″
Rake of the sternpost		3′10″
Breadth at the wing transom		21′ 6″
Flat of the floor at the midship bend		15′ 9″
Deadrise of the midship bend		0′ 7″
Rise of floor aft		11′ 6″
Rise of floor forward		5′ 9″
Height of the deck forward		15′ 4″
Height aft	greater than amidships by	3′ 0″
Headroom between decks*		5′ 5″
Tumblehome amidships at the gunwale		6′ 4″

The three principal dimensions are close to those laid down by the Edict of 1689. The ratio of length to breadth is 3.72-3.75, and the ratio of breadth to depth in hold 0.46-0.47.
*Plank of the deck to underside of beam.

Fifth Rates (1681)

Length from stem to post		110′ 0″
Length of the tread of the keel		94′ 6″
Breadth to inside of plank		27′ 6″
Depth in hold from keel to gundeck beams		14′ 0″
Height of the stem		21′ 0″
Height of the sternpost		21′ 0″
Rake of the stem		12′ 0″
Rake of the sternpost		3′ 6″
Breadth at the wing transom		18′ 4″
Flat of the floor at the midship bend		13′ 9″
Deadrise of the midship bend		0′ 7″
Rise of floor aft		10′ 6″
Rise of floor forward		5′ 3″
Height of the deck forward		14′ 4″
Height aft	greater than amidships by	2′ 6″
Headroom between decks		5′ 4″
Tumblehome amidships at the gunwale		5′ 6″

*

Frigates of the 2nd Order. These are characterised by their armament of *8-pdr guns* on the gundeck. The last ship-frigates of this type with two tiers of guns were built during the first decade of the 18th century, the design formula being thereafter abandoned (with the single exception of the *Pomone* of 1748). Since we have already examined the official texts of 1669, 1670, 1671 and 1673 relating to frigates of the 1st and 2nd Orders, we will not go over the same ground again here. However, note that the Regulations of 1674 lay down the number of guns as 30, with a breakdown by calibre. As was customary at this time, the gundeck was to be armed with mixed calibres, a combination of 8- and 12-pdrs. The shipwrights ignored this provision, preferring instead to retain a single calibre, the 8-pdr (or else, in a small number of cases, the 6-pdr).

These frigates are pierced for nine, ten or even eleven guns on either side on the gundeck. The upper deck is generally armed with 6-pdrs. Such details as we have for these vessels indicates that there was considerable variation both in their armament and in their dimensions, and one only has to consult the Navy Lists to see to what extent this was the case.

The Edict of 1689 officially sanctioned the use of the single 8-pdr calibre on the gundeck, but on the other hand it specified a mixture of 6-pdrs and 4-pdrs on the upper deck. The total number of guns was increased from 30 to 36 in 1674, with the gundeck pierced for eight guns on either side rather than seven. The length was fixed at 110 feet.

In the manuscript by Blaise Ollivier (B.251) already quoted, he defines the frigates of the second Order as follows:

36-gun Frigates. *A 36-gun frigate should be 124 feet in length from stem to post. The guns may be arranged in one of two ways, either with 8 to 10 8-pdrs on the gundeck and 26 to 28 more 8- or 6-pdrs on the upper deck*, or else the vessel should be built with but a single gundeck and an orlop, with 28 8-pdrs on the upper deck and 8 4-pdrs on the quarterdeck.*

It is this latter formula which we will examine in Chapter III, devoted to the 8-pdr frigate. The table which follows illustrates the provisions of the Regulations of 1674 and the Edict of 1689 with regard to vessels of the Fourth and Fifth Rates.

Regulations of 1674

	Lower deck	Upper deck	Fo'csle/ Q'deck	Length	Breadth	Depth in hold
4th Rates	4x 12*	6x 6*	2x 4	120′0″	30′0″	15′0″
40 guns	6x 12	12x 6				
	10x 8					
5th Rates	4x 12*	4x 6*		108′0″	27′0″	13′6″
30 guns	12x 8	10x 6				

Regulations of 1689

	Lower deck	Upper deck	Fo'csle/ Q'deck	Length	Breadth	Depth in hold
4th Rates	4x 18*	8x 8*	4x 4*	120′0″	32′6″	14′6″
44 guns	16x 12	12x 8				
	10x 8					
5th Rates	6x 8*	6x 6*		110′0″	27′6″	14′0″
36 guns	12x 8	12x 4				

The dimensions for 1674 are those given by Dassié. Length from stem to post, breadth to inside of plank, depth in hold from the upper face of the keel to the horizontal line of the gundeck at the midship bend, all dimensions in (French) feet.
*Brass guns

I have produced below a similar table to that already seen for the frigates of the first Order, giving the maximum and minimum permissible lengths for a given number of gunports. These lengths are calculated from the following dimensions: breadth of gunport for 8-pdr guns: 2′0″; distance between ports: 7′2″; distance from the stem to the fore side of the foremost port: 2¼ to 2½ times the distance between ports; distance from the sternpost to the after side of the aftermost gunport: 6½ feet.

Frigates of the 2nd Order (8-pdrs on the gundeck)

		Maximum
Pierced for 8 guns		
8 ports	8x 2′0″ =	16′ 0″
7 spaces between ports	7x 7′2″ =	50′ 2″
Stem to first port	2¼x 7′2″ =	17′11″
Last port to post	1x 6′6″ =	6′ 6″
		90′ 7″
Pierced for 9 guns		
9 ports	9x 2′0″ =	18′ 0″
8 spaces between ports	8x 7′2″ =	57′ 4″
Stem to first port	2¼x 7′2″ =	17′11″
Last port to post	1x 6′6″ =	6′ 6″
		99′ 9″
Pierced for 10 guns		
10 ports	10x 2′0″ =	20′ 0″
9 spaces between ports	9x 7′2″ =	64′ 6″
Stem to first port	2¼x 7′2″ =	17′11″
Last port to post	1x 6′6″ =	6′ 6″
		108′ 11″

*As was the case with the *Pomone*, built at Toulon in 1748-9, and armed with eight 8-pdrs and twenty-two 6-pdrs.
According to Dassié, the length was fixed at 108 feet, which seems somewhat excessive for a vessel pierced for only 8 gunports on either side as laid down in the Regulations of 1674. The Edict of 1689 specified 110 feet of length for nine gunports, and this too is excessive. According to the annual Navy Lists, the most commonly adopted arrangement was ten gunports and an average length of 108 feet, with a length to breadth ratio of 3.9, which is significantly greater than for frigates of the first Order (3.75). The text of 1674 stipulates a ratio of 4.0.

SHIP-FRIGATE OF THE 1st ORDER (Fourth Rate)

This schematic draught is drawn up from the numerical data available for Fourth Rates of 118 feet from stem to post. Note that the head of the stem reaches to nearly the same level as the upper deck. The height of the stem is fixed at 23'6"; if we add together the height of the keel at 1'2", the depth in hold of 14'9", the sheer of the deck at 7", the planking of the gundeck of 3", the height between decks of 5'5", the thickness of the beam at 9", and the planking of the upper deck at 2", we arrive at a total height of 23 feet, compared with the 23'6" of the height of the stem!

The distances between ports can vary between 6'6" and 7'3" for 12-pdrs; for 8-pdrs, between 5'10" and 7'0"; for 6-pdrs, between 5'8" and 5'10"; and for 4-pdrs, the distance is fixed at 5'8".

In my draught, I have taken the breadth of the gunports for 12-pdrs at 2'4", and a distance between ports of 7'2". The distance from the fore side of the foremost port to the perpendicular of the stem is 20 feet, while the distance from the after face of the sternpost to the aftermost gunport is 10 feet.

It would be possible to pierce this vessel for eleven guns a side on the upper deck, by reducing all these dimensions proportionately.

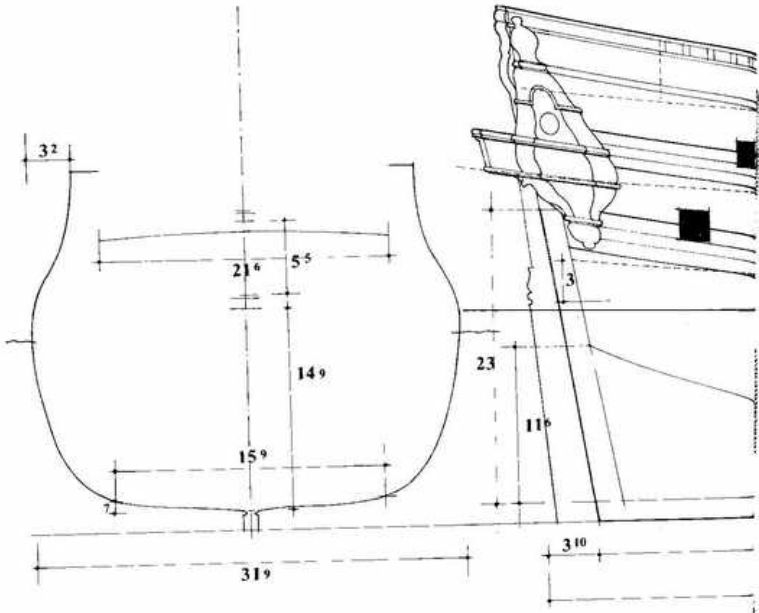
I have drawn in the load waterline, based on an assumed height of gundeck sill of 4 feet and a difference in draught fore and aft of 3 feet.

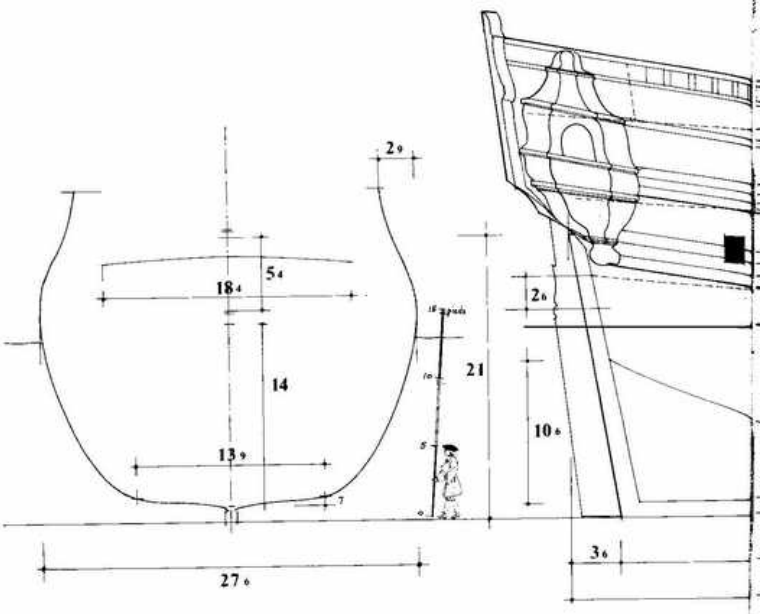
In accordance with the Regulations of 1670, there is a forecastle which runs back as far as the chestrees, which are placed forward of the mainmast at a distance equal to the breadth. An after-castle or quarterdeck finishes between the main capstan and the mainmast; there is no poop, the Captain's cabin is situated at the stern beneath the quarterdeck, and there is a stern-gallery, which does not however extend round the quarter; here there are small quarter-galleries as specified in the 1673 Regulations. On the quarterdeck are a number of deck cabins pressed up against the taffarel, but hidden by the drift rails.

The rake of the stem is equal to about 1/14th of the length from stem to post.

The foremast is stepped one mast-diameter abaft the forward end of the keel. The axis of the mainmast is 4 feet (5 lines for every foot of length) abaft the mid-point from stem to post. The axis of the mizen-mast is stepped 1/6th part of the length from stem to post forward of the perpendicular of the sternpost. The bowsprit steeves 35 degrees; the foremast is perpendicular to the load waterline, while the mainmast and the mizen are perpendicular to the keel.

Also visible on the draught is the rising line of floor, taken from the heights given for the deadrise at the midship bend and the heights of floor fore and aft. All the lines of the underwater hull are determined by the shape of the midship bend and fair lines passing through the rungheads.





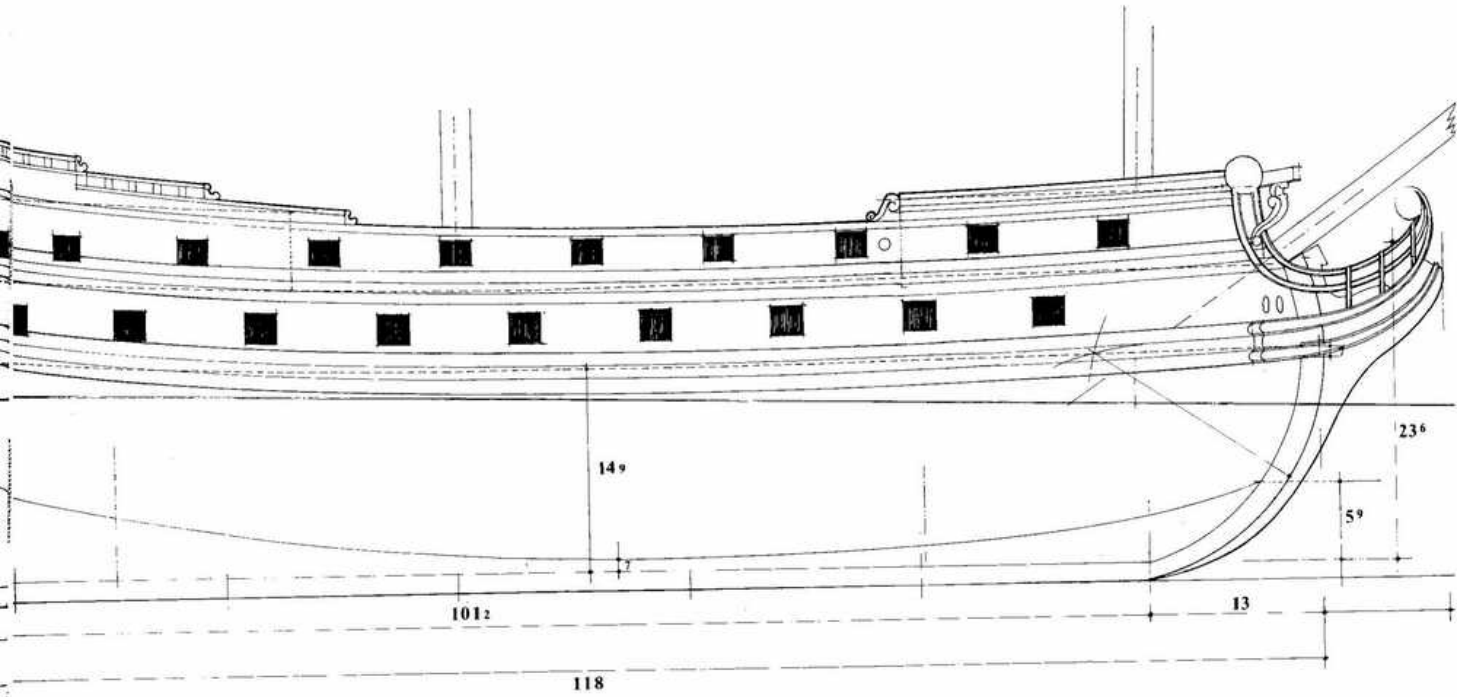
Length from stem to post	118'0"
Breadth to inside of plank	31'9"
Depth in hold* from keel to gundeck beams	14'9"
Gundeck armament	20 12-pdrs
Upper deck armament	20 8-pdrs

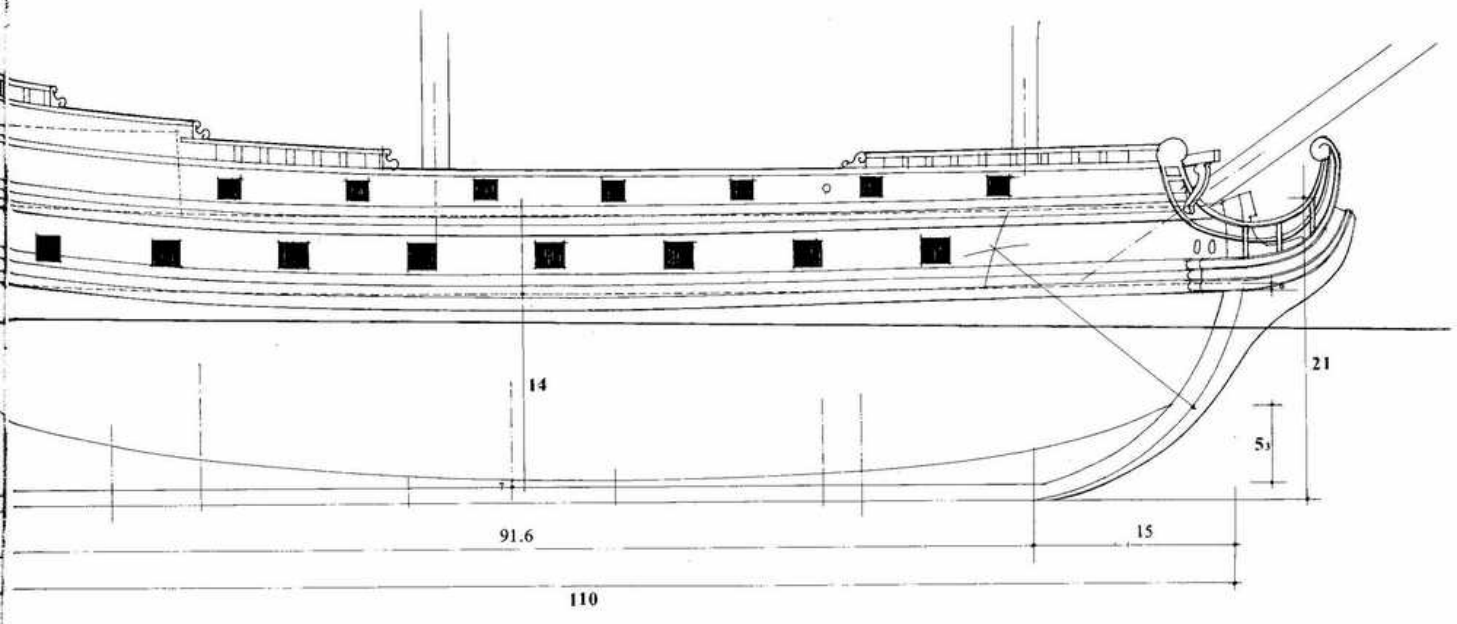
*For the depth in hold amidships (horizontal line of deck), one must deduct the round-up of the gundeck beams at the midship bend, its value varying between 2/44 and 3/44 of the length of the midship beam.

Gunports (proportions in the 17th century)

Calibre	12	8	6	4
Breadth	2' 4"	1'11"	1' 8"	1' 6"
Height	2' 2"	1' 9"	1' 6"	1' 4"
Height of sill	1'10"	1' 8"	1' 6"	1' 2"
Height of sill*	1' 6"	1' 4"	1' 3"	1' 2"

*On the upper deck or quarterdeck/forecastle. These dimensions vary slightly according to the practices of individual builders.





SHIP-FRIGATE OF THE 2nd ORDER (Fifth Rate)

I have followed the same approach with this second draught, basing it on a vessel measuring 110 feet from stem to post.
By comparison with the Fourth Rate above, note the absence of a forecastle; there is simply a quarterdeck, housing the Captain's cabin and the officers' quarters (Regulations of 1670). There is a short poop with deck cabins over the quarterdeck.

The armament is limited to eighteen 8-pdrs on the gundeck and fourteen 4-pdrs on the upper deck. This arrangement is essentially that of frigates such as *l'Aigle* (see ships list).

Length from stem to post	110'0"
Breadth to inside of plank	27'6"
Depth in hold from keel to gundeck beams	14'0"
Gundeck armament	18 8-pdrs
Upper deck armament	14 4-pdrs

The four draughts which follow, dating respectively from 1686, 1700, 1724 and 1744, make it possible to follow the evolution of the two-decked frigate of the first Order. It will be immediately apparent that such changes as there were were only minor. The only real innovation was the reduction at the beginning of the 18th century of the full lower tier of guns to a half tier.
As a general rule, as we shall see in the following chapters, the evolution of the frigate did not come about from any existing category, but rather through the adoption of new design formulae and the creation of new types of vessel.

FRIGATE OF THE 1st ORDER (1686)

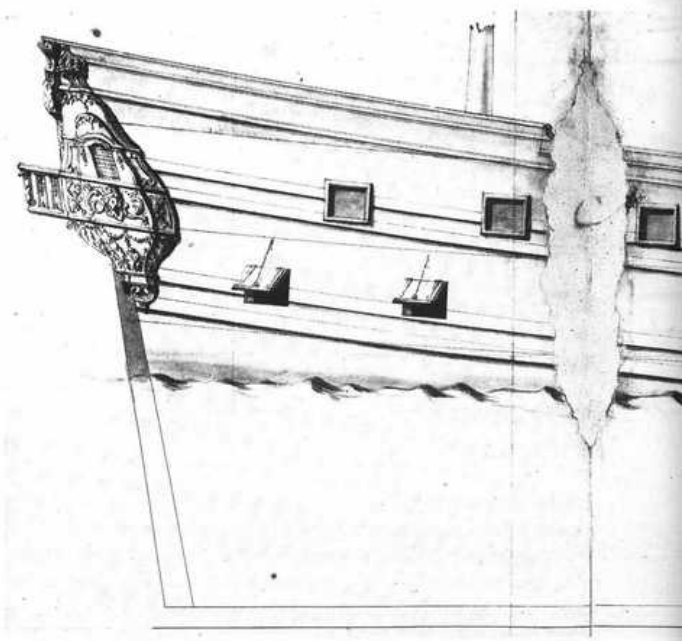
This somewhat naïve representation is of considerable interest. It is signed by the Le Havre Builder *P. Chaillé*, and is dated December 1686. Documents from such an early period are extremely rare, and illustrate the first attempts in France at graphical expression.
What is especially valuable is that this drawing tells us something about the hull volumes, by means of a series of vertical sections, which are complemented by the rising line of floor, the horizontal lines of deck, the wales and the drift rails, the positions of the masts and the detail of the gunports. There is moreover an indication of the carved-work; I have some reservations with regard to the way the beakhead is portrayed. However, despite this minor qualification, the documentary value of these drawings is obvious.
P. Chaillé had already built at Le Havre, in 1673 and 1676, two powerful ship-frigates: the *Actif* and the *Favorite*, both armed with twenty 12-pdrs on the gundeck and twenty 6-pdrs on the upper deck. There is an obvious link to be made with this draught for a proposed *40-gun frigate*, which seems however to have gone no further. A page entitled "memorandum" accompanies the draught, of which the transcription follows:

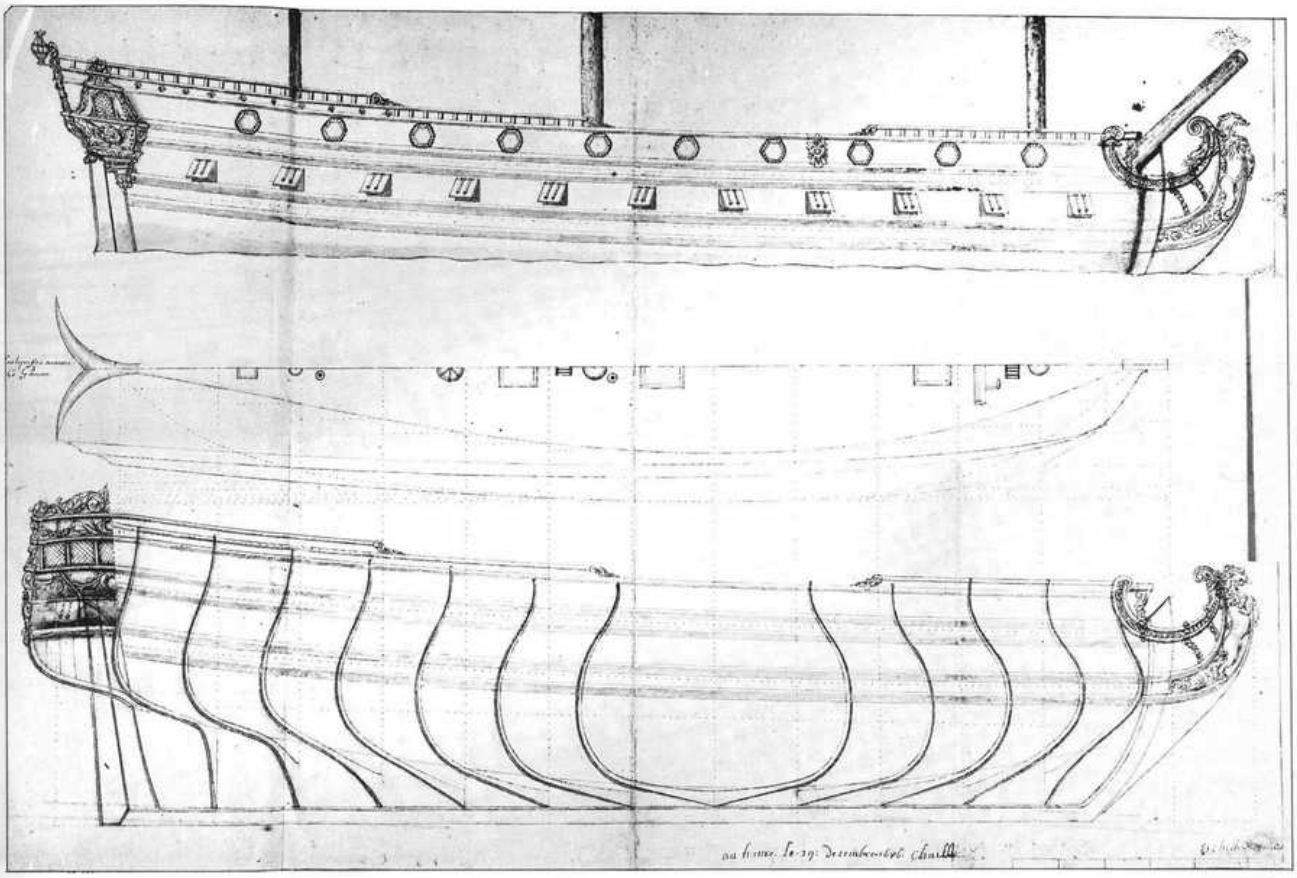
105 feet of length for the tread of the keel.
25 feet of height to the stem, perpendicular to the lower face of the keel.
9 feet of rake to the stem parallel to the lower face of the keel.
24 feet of height to the post perpendicular to the keel.
3 feet of rake to the post parallel to the keel.
117 feet distance from outside of the stem to outside of post.
30 feet of breadth extreme to inside of plank.
20 feet to the flat of the floor.
13 1/2 feet of depth in hold, measured from the keel to the horizontal line of beam.
20 feet 8 inches of breadth at the wing transom.
4 feet of tumbling home at the midship bend on either side.
2 feet 2 inches of tumbling home aft at the stern frame.
12 feet 6 inches of height of floor at the sternpost.
8 feet 6 inches of height of floor at the stem.
6 feet of headroom between decks amidships.
6 feet 4 inches of headroom between decks aft.
5 feet 10 inches of headroom between decks forward.
6 feet of headroom beneath the quarterdeck.
5 feet 6 inches of headrooom beneath the poop.
4 feet 6 inches of height of bulwarks at the gunwale.
13 feet draught of water aft, 10 feet forward when fitted out for sea.

(This latter dimension implies a height of gundeck sill of 5 feet, which is hard to believe.)
The vessel has two complete decks, a small forecastle over the upper deck forward, and a poop running forward beyond the mizen, as can be seen from the length of the upper works (30 feet approximately).
The plan of the gundeck is extremely summary, but nevertheless shows: the positions of the masts, knights of the jeers, cable hatch, main-hatch, after hatch, powder hatch, barrel of the main capstan, a pump near the mainmast, and another (probably single) near the mizen-mast.
The Builder has estimated the burthen of the vessel at 400 French tons. The manuscript is preserved in the collections of the *Musée de la Marine* (Cat. N° B.9q-7066), and provides a clear understanding of the so-called frigates of the First Order at the end of the 17th century; the paucity of sources for this period makes these draughts especially valuable.
It is worth noting that P. Chaillé has proposed an extremely narrow vessel with a length to breadth ratio of 3.9 and a depth in hold of 0.9 times the half breadth; this no doubt made up for the full underwater lines, with a midship floor 2/3rds the length of the main breadth.

L'AMPHYTRITE Frigate of the 1st Order

This ship-frigate was built in 1700, and she was re-christened *Protée* in 1705. The draught indicates the place of building as Dunkirk, and the name of her designer, Levasseur (Christian name René, 1667-1727, born in Toulon).
Note that the three principal dimensions do not correspond to those given in the annual Navy Lists, which are those given in the list on page 19. It is possible that when she was laid down it was decided to increase the dimensions shown on the draught, but this can only be supposition. Furthermore, the gundeck is listed as being pierced for 11 guns, whereas only 10 gunports are shown on the draught.
The preceding comments do not in any way diminish the interest of these draughts, but it is a pity that only the sheer draught is shown (*Musée de la Marine*, Cat. n° J 9q-7009).
The length to breadth ratio is 3.63, the ratio of depth in hold to breadth significantly less than half at 0.44 (assuming, that is, that the indication "beneath the beam" implies the horizontal line of deck at the midship bend). The rake of the stem is 14'9", corresponding to 1/8th of the length overall of 116 feet; the rake of the post is 4 feet.
The gundeck is armed with twenty 12-pdrs, the distance between ports is 7 feet, and the height of gundeck sill cannot be greater than 4 feet. The upper deck is armed with twenty 8-pdrs, while there is no armament indicated for the quarterdeck, and no forecastle shown at all. In total, the draught indicates the vessel as being armed with 40 guns and classed as a Fourth Rate.

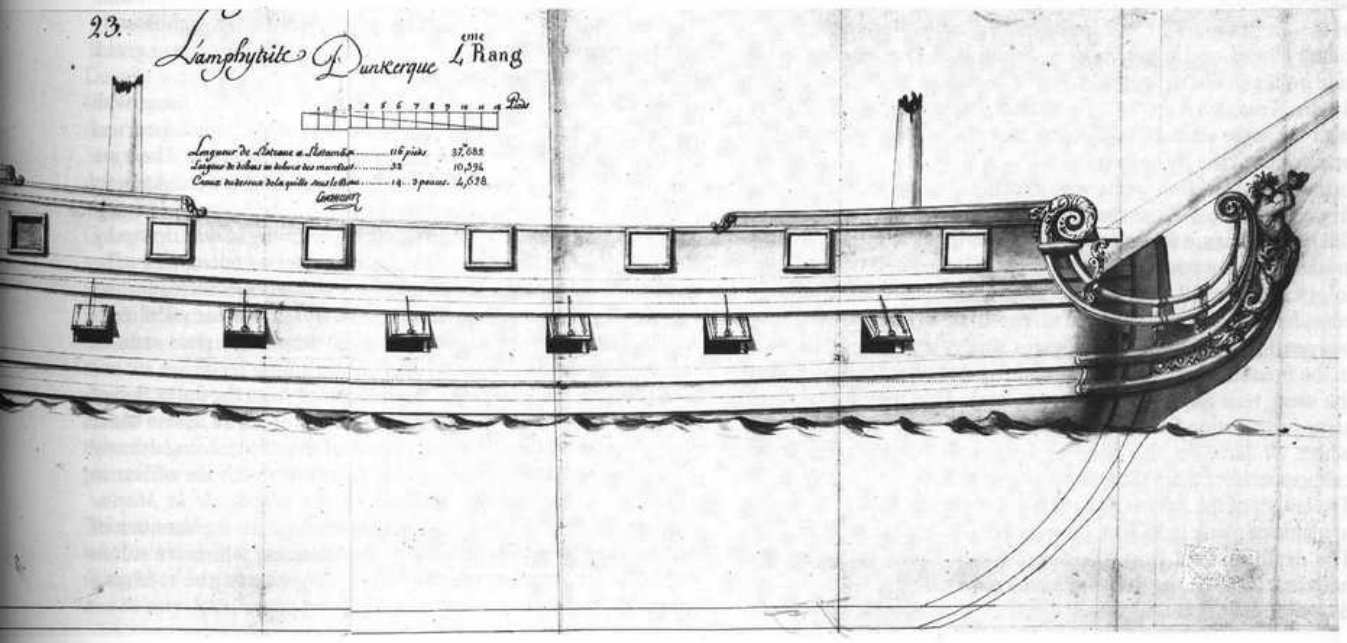


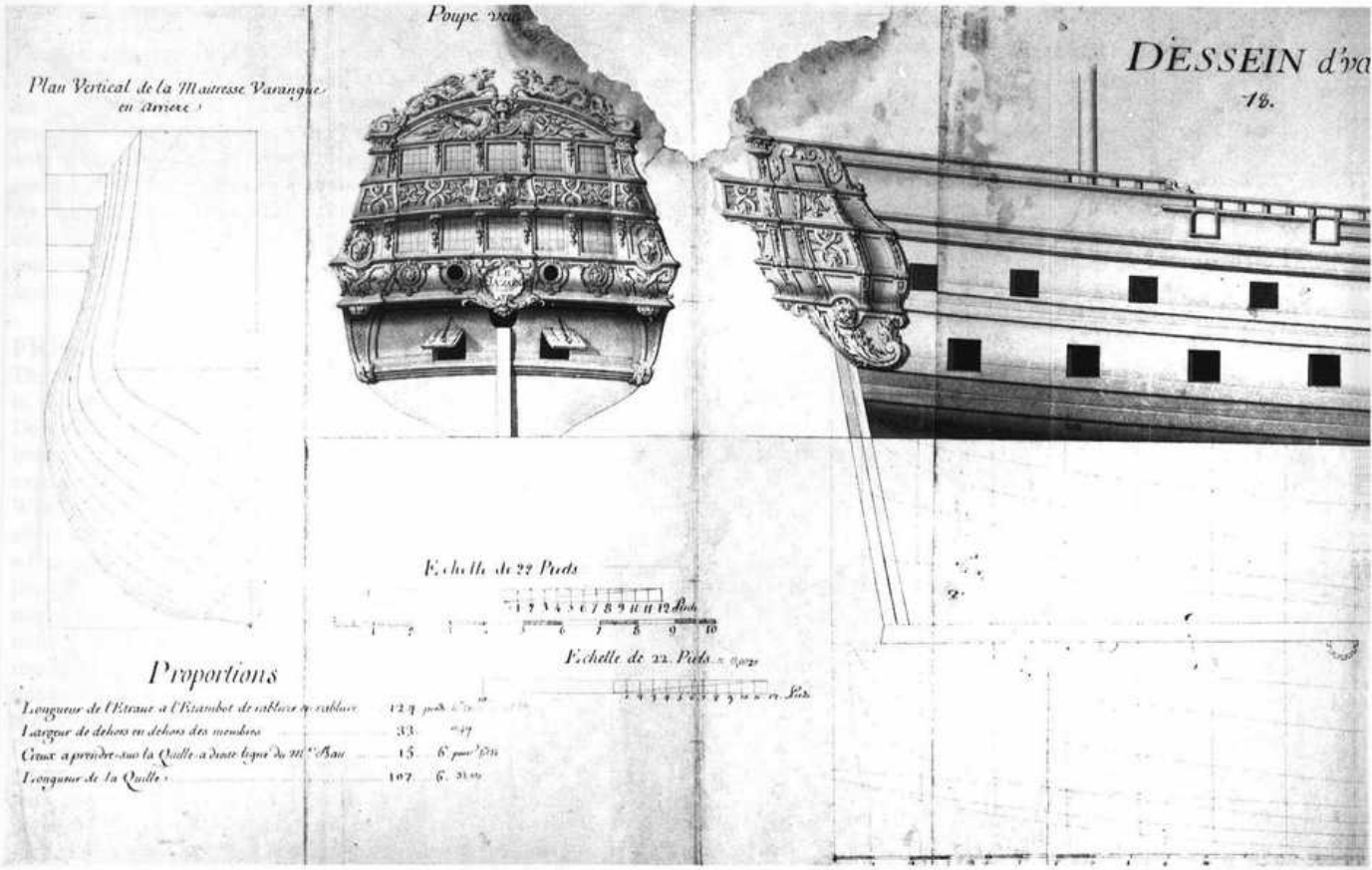


Note the four strakes of the wales, and only the lower wale is not cut into by the gunports, which is explained by the fact that the sheer of the wales is greater than that of the decks.There is one drift rail forward and three at the stern, allowing the greater height of the upper works to hide the deck-cabins.

The size of the vessel does not justify the construction of a poop, but there is a stern-gallery at the level of the wardroom. Note the typically late-17th century bottle-shape of the quarter-galleries, and the port-wreaths on the upper deck. The head-rails finish beneath the catheads*, while the trailboards between the cheeks of the head are entirely consistent with late 17th century practice (see the section in Chapter XII on the evolution of the carved-work and decoration).

*To judge by the position of the cathead there cannot be a forecastle.





LE JASON – Ship-frigate of the 1st Order

This vessel was built by *G. Poirier* at Le Havre in 1724. It is worth comparing this carefully executed draught with that done by Chaillé some forty years earlier. It is evident that the vessel is somewhat larger, this growth being consistent with the draughts of the *Aurore* of 1744 below, so that we can see that by the 18th century these large frigates were pierced for eleven guns on either side on the gundeck, with the upper deck able to be armed with 8-pdrs. True, even in the 17th century there were some frigates with the same characteristics, but this did not become common practice until the following century.

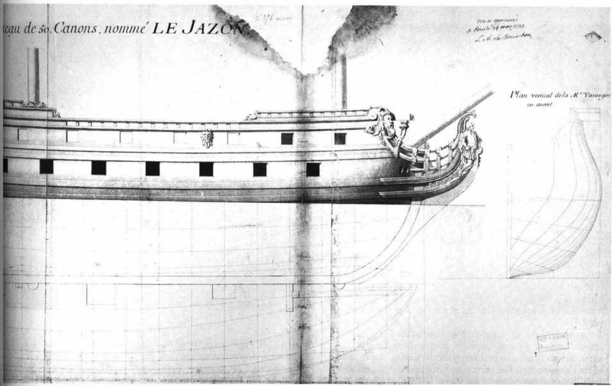
In the case of *le Jason* we have an excellent example of a powerful frigate, with most of the characteristics of a two-decked ship: two full tiers of guns, a forecastle, a large quarterdeck with secondary armament and a poop. Were she slightly longer and with 18-pdrs in place of her 12-pdrs on the gundeck, this frigate would be considered as a ship. The name is masculine in gender, indicative of a possible confusion since frigates always bear feminine names in the French Navy; other powerful frigates of the period betray the same trait (*le Rubis*, *l'Auguste*, etc). This may be taken as some justification for our invented appellation of "ship-frigates", where we have set the dividing line at all vessels armed with calibres smaller than 18 pounds weight of ball.

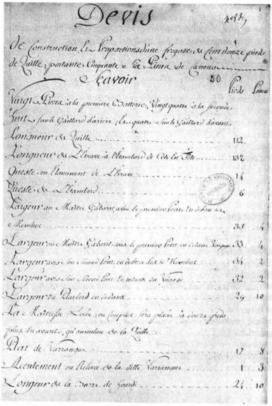
The length of the *Jason* from stem to post is 124 feet, her breadth to inside of plank is 33 feet, giving a length-breadth ratio of 3.75. The depth in hold from the upper face of the keel to the the horizontal line of the midship beam is 15′6″, equivalent to 1.06 times the half-breadth, which are very different proportions to those proposed by Chaillé: the dimensions of the *Aurore*, built in 1744, are close to those of the *Jason*: length 125 feet, breadth 33′10″, length to breadth ratio 3.7; the depth in hold of 16′2″ presents approximately the same relationship to the breadth. These values for the depth in hold to breadth ratio, significantly greater than half the breadth, were believed at the time to give a greater height of gundeck sill.

It is interesting to compare the upper works of the *Jason* with those of the *Aurore*: note on the former the double plankshеer and the open-work between, which is repeated in the waist. There are more drift-rails aft, explained by the fact that there are gunports on the quarterdeck, giving four hances.

There is no indication as to whether the draught was drawn by Poirier himself; if so, he was clearly a man of talent, as can be seen from the representation of the carved-work, which one does not usually find on shipwright's draughts. It is this peculiarity which justifies its reproduction here, despite its poor state of conservation.

The draught, like that of P. Chaillé, comes from the collection of papers preserved by a sea officer, Henry Ollivier, a Captain under the Second Empire and a descendant of the shipbuilding dynasty of the same name. Thanks to his friendship with the officer in question, Admiral Pâris, Curator of the *Musée de la Marine* between 1871 and 1894, was able to arrange for the donation of a large number of documents to the Museum, which are still in the collections. The draught of the *Jason* bears the reference number J.9q-6951.





Devis

de Construction et Proportions d'une frégate de Cent douze pieds de Quille, portante Cinquante et six Pièces de Canons

Savoir 50 — Pieds, Pouces

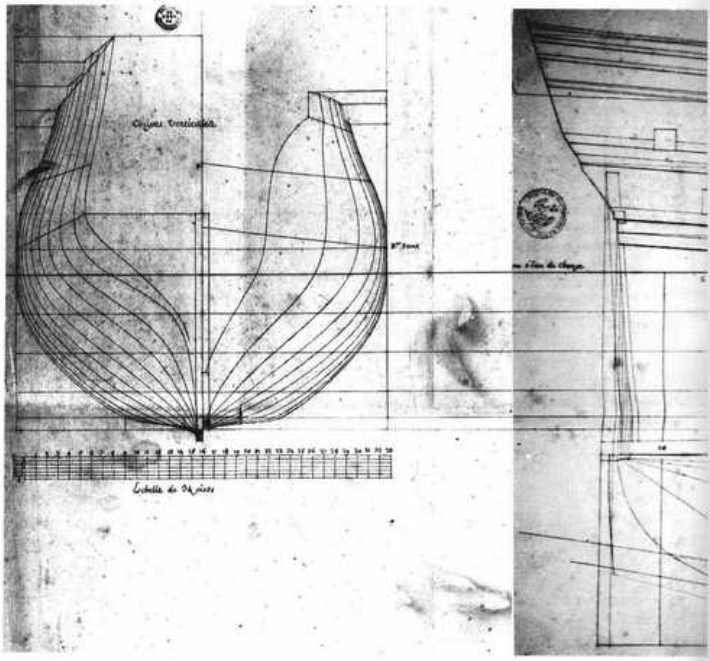
Vingt Pièces à la première Batterie, Vingt quatre à la seconde.
Huit sur le Gaillard d'arrière; et quatre sur le Gaillard d'avant.

	Pieds	Pouces
Longueur de Quille	112	
Longueur de l'Etrave à l'Etambord de Cote en Cote	132	
Queste ou Elancement de l'Etrave	14	
Queste de l'Etambord	6	
Largeur au Maître Gabarit, avec le premier Pont en dehors des Membres	35	4
Largeur au Maître Gabarit sous le premier Pont en dedans Vaigrage	33	4
Largeur avec son Second Pont en dehors des Membres	34	2
Largeur avec son Second Pont en dedans du Vaigrage	32	2
Largeur du Plat bord en dedans	29	10
La Maîtresse Levée ou Couple sera placée à douze pieds plus en avant qu'au milieu de la Quille		
Plat de Varangue	17	8
Acculement ou Relevé de la ditte Varangue	1	3
Longueur de la Barre de Hourdi	24	10

This is a very unusual proposal for a frigate armed with 56 guns! Despite a length overall of 132 feet, this frigate is only pierced for 10 guns on the gundeck. The length to breadth ratio of 3.73 does not justify the great length, which is close to that of a 50- to 56-gun ship with eleven gunports for 18-pdrs on the gundeck. The draught (*Archives Nationales*, Cat. Nº $D^1 18$) is neither dated nor signed. However, I believe it to date from between 1730 and 1740. Going by the Navy Lists, no French Navy frigate was ever built to the dimensions which appear in the summary list opposite, which does not even give the calibre of her main armament. One is left in some doubt as to the gundeck armament, which might have been intended as 18-pdrs rather than 12-pdrs. If the former, then we are faced with a small ship, incorrectly described in the caption as a frigate (in this context, I would refer the reader to an article which I wrote for *Neptunia* Nº 167 in 1987, where I described on detail the characteristics of a large number of ships pierced for eleven or twelve 18-pdrs per side on the gundeck).

This example is at the very limit for a frigate of the 1st Order, when we consider for example the *Apollon*, a 46-gun *ship* measuring 134 feet and armed on the gundeck with twenty-two 18-pdrs and twenty-four 8-pdrs on the upper deck.

L'AURORE – Frigate of the 1st Order



These draughts are preserved in the Dockyard Archives of Rochefort (Cat. N° 2 G[4]). Dated October 1742, and bearing the signature of Morineaud[1], they provide an excellent example of a powerful two-decked frigate, armed with twenty-two 12-pdrs on the gundeck and twenty-four 8-pdrs on the upper deck, which must be considered as *the absolute maximum for a frigate still classed as a Fourth Rate. By comparison, the minimum for a ship* at this period is exemplified by the *Apollon* (46) of 1738, which was armed with twenty-two 18-pdrs on the gundeck and twenty-four 8-pdrs on the upper deck. True, the ship was larger, equating to a displacement of 1,528 French tons, whereas the frigate displaced only 1,200 tons.

These are the proportions of the *Aurore* as indicated to the right of the draught: length from rabbet to rabbet 125 feet; rake of the stem 7′6″; rake of the post 1′10″; breadth extreme at the midship bend 33′10″; depth in hold from the upper face of the keel to the horizontal line of beam at side 16′2″; breadth at the wing transom 21′0″; draught of water aft 16 feet; draught of water forward 14 feet; height of gundeck sill amidships 4 feet.

A note indicates that the vessel was launched on April 3rd 1745, the draughts being measured as 12′6″ and 9′0″, giving a difference fore and aft of 3′6″.

The Builder further asks that the draught (which had been sent to Versailles for examination) should be returned to him in a roll and not folded![2]

It may be seen that the transverse sections of the body plan are perpendicular to the load waterline, so that the horizontal lines are waterlines. The same peculiarity can be seen on the draughts of the *Rose* overleaf. The vertical sections thus differ somewhat from those corresponding to the station frames, which are perpendicular to the keel.

The rake of the stem is equivalent to 1/17th part of the length from stem to post, which is relatively little, especially in view of the fact that Morineau, in his manuscript *Treatise*[3], advocates a proportion of one quarter systematically. The rake of the post, according to the same source, should be 1/5th of that of the stem, but here it is about 1/4.

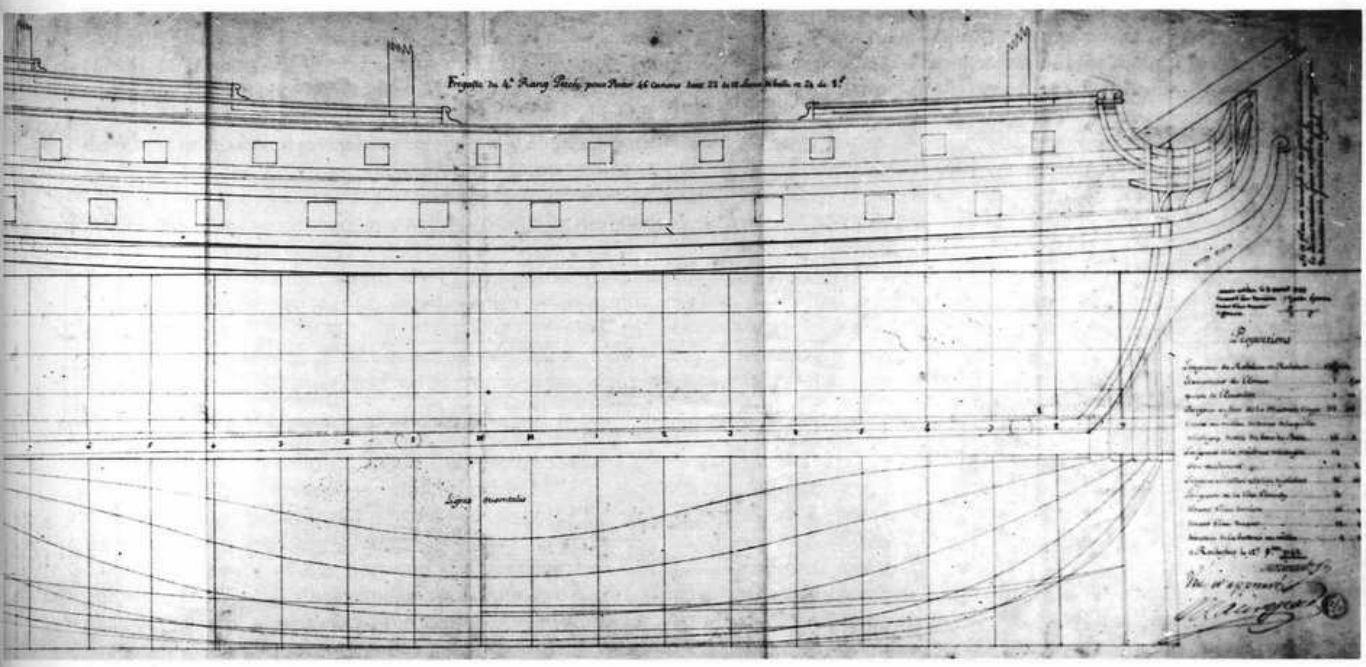
The sheer of the wales is equally pronounced fore and aft. In addition to the two pairs of wales, the waist rail can be seen running the full length of the vessel, while the fore drift rail is underlined by a second decorative rail running the length of the forecastle; aft, there are three drift rails, with three parallel rails running below them. The height of the upper works aft allows for the placing of a short poop with its own gallery. Note the presence of a small upper counter above the lower counter.

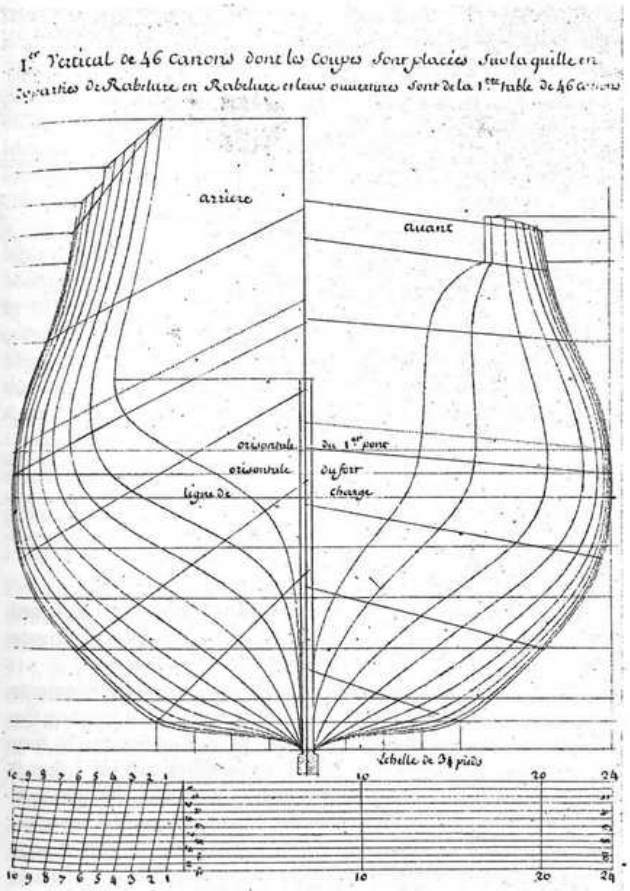
The maximum projection of the beakhead beyond the perpendicular of the stem is equivalent to 1/12th of the length from stem to post; in his treatise, Morineau describes the method for drawing out the various timbers of the head. Note the position of the two head rails running in the same vertical plane, this in accordance with 17th century practice. This in turn means that the upper part of the head timbers must be considered as verticals (see J. Boudriot, *Le Mercure*).

Morineau, in his Treatise, gives a great deal of information on the various ships which he designed. He devotes several pages to a 46-gun two-decked frigate, and although the name *Aurore* is not mentioned, the general description and the dimensions correspond, with the exception of the draughts fore and aft, which are given as 16′3″ and 14′6″, as opposed to 16′0″ and 14′0″, as indicated on the draught. A considerable amount of additional information is provided, in particular as regards the scantlings of the various timbers. On this page however, I have merely reproduced the body plan (page 104 of the manuscript in question). As can be seen, the vertical sections are drawn perpendicular to the keel, and are set out as twenty stations placed equidistant along the length taken at the load waterline and from rabbet to rabbet. The first station of the fore body corresponds to the position of the beakhead bulkhead, which Morineau always situated at a distance abaft the perpendicular of the stem equivalent to 5½ lines for every foot of length overall. The beakhead bulkhead is thus placed forward of a point corresponding to 1/20th part of the length. By the same token, the last station of the afterbody is that of the fashion piece, canted at an angle of 21 degrees to the keel and situated abaft the 19th station line. In short, it is apparent that the "transposition" of this section into a vertical demands a familiarity which, although entirely normal for shipwrights of the time, is considerably less so for the modern student of shipbuilding.

The body plan also shows the ribbands. The first, called the *floor* or *runghead ribband*, corresponds to the heads of the floor timbers, emphasising their rising line. At the position which corresponds to the vessel's maximum breadth is the *height of breadth ribband*, and the other ribbands are drawn in between this line and the rungheads. Sometimes there is an additional "false" ribband between the rungheads and the keel. Two or three ribbands corresponding to the rails of the upper works are also shown. The plan shows the midship bend, the draught, the line of the height of breadth, the horizontal line of deck at the midship bend, with its sheer fore and aft.

Morineau describes his own method for drawing out the midship bend and the establishment of the ribbands so as to arrive at the contour of the various station frames. I have not thought it necessary in the context of this book to transcribe all these explanations, the reproduction of the body plan being sufficient. As for the rake of the stem, Morineau fixes it at 1/14th part of the length overall, and the arc of a circle describing the underwater part of the bow is equivalent to 1/6th of the length. The rake of the sternpost is equal to 1/5th of that of the stem.

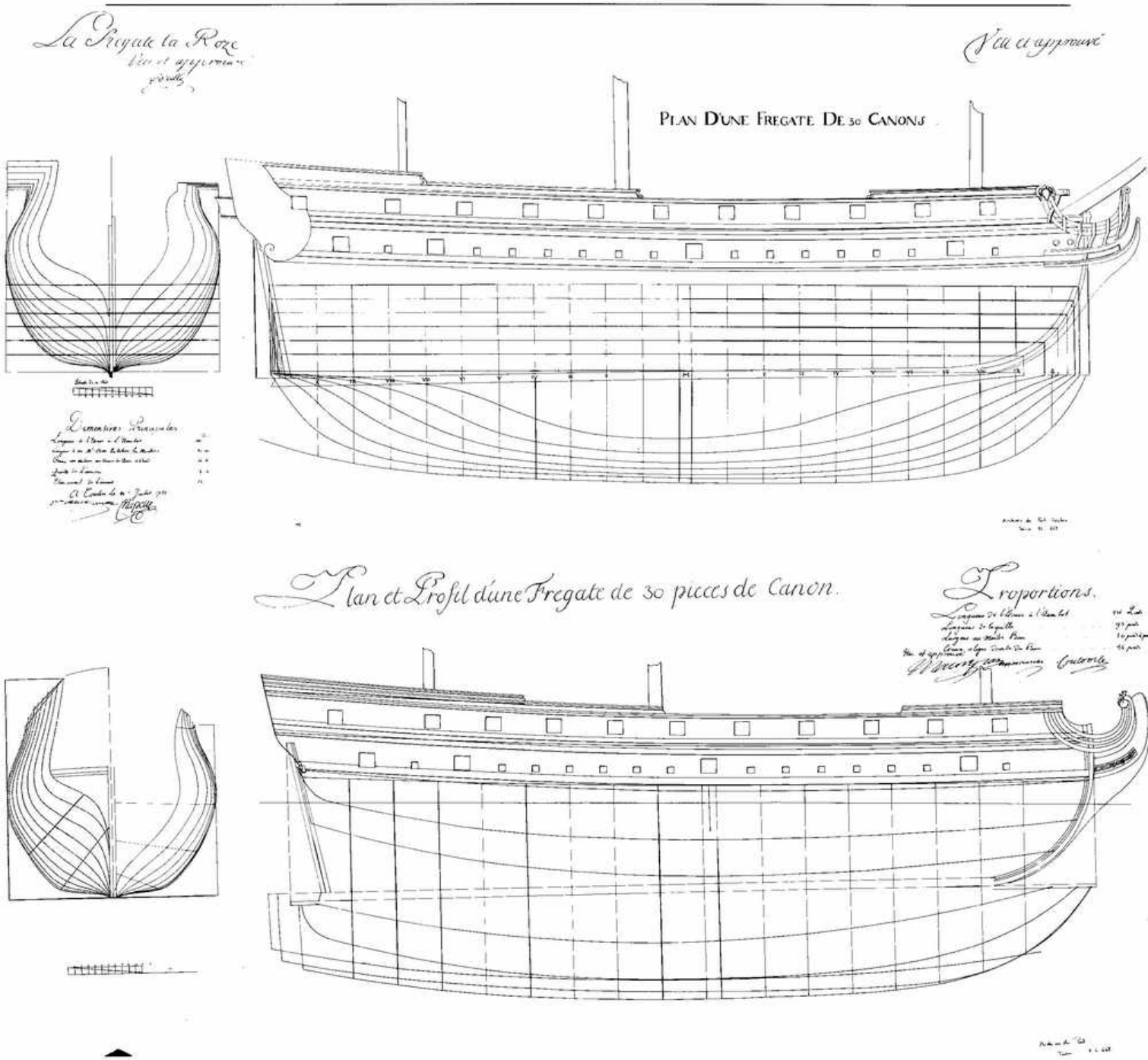




Morineau applies these rules of proportion to all the vessels described in his treatise.

A final interesting point is that Morineau also gives the displacement of the frigate, at a draught of water forward of 14′6″ and 16′3″ astern, of 1,200 (French) tons, the weight of the 8- and 12-pdr guns amounting to 105 tons 1,645 lbs.

1. Spelt here with a final "d", but as a rule he leaves this off.
2. The draughts had to receive the approval of the Minister, in this instance Maurepas. See *74-G.S.*, vol. 1.
3. Pierre Morineau, *Traité de Construction*, c. 1740, Archives Nationales, Fonds Marine, Cat. N° G.246. An incomplete (?) version of the manuscript also exists at the National Maritime Museum, Greenwich. We hope to publish this manuscript in due course.



LA POMONE – Frigate of the 2nd Order

This is another example of a frigate with one and a half tiers of guns, similar to *La Rose* above, but armed only with 8-pdrs on the gundeck and 6-pdrs on the upper deck, justifying her smaller dimensions overall: length 114′0″ – breadth 30′4″ – depth in hold 14′0″. Both frigates carry however the same number of guns (30). *La Pomone* is a late example of the use of 8-pdr guns on the gundeck, but she is nevertheless classed in the 2nd Order, even though her gundeck is only armed with a half tier of guns.
Built in Toulon in 1748-9 to the draughts of F. Coulomb (1691-1751), she was lost in 1761. Her draughts are preserved in the Archives of Toulon Dockyard (Cat. N° 1 L 442).

LA ROSE – Frigate of the 1st Order

These draughts are preserved in the Archives of Toulon Dockyard (same dossier: Cat. N° 1 L 442). This is a rare example of a frigate with only a half tier of guns on the gundeck.
This formula, which has some analogies with the arrangements to be found in certain armed transports[1], consists of limiting the number of gunports cut on the gundeck, in this instance to four 12-pdr ports. The very low height of gundeck sill, at 3 feet 9 inches, must have made it very difficult to use the gundeck armament in anything of a seaway, especially on the lee side. Hence the idea of doing away altogether with the weight of guns whose use was at best precarious. This new arrangement of a half

tier of guns on the gundeck was tried in the following vessels, all of the 1st Order: *l'Amazone* (1707), *le Zéphir* (1728), *l'Atalante* (1740), *la Diane (1744), and La Rose* (1751). To these can be added one further somewhat unusual case, that of the *Étoile* of 1745, which was armed with eight 18-pdrs on her gundeck, all the other vessels being given between four and eight 12-pdrs. For the frigates of the 2nd Order, there are only three known cases: *l'Astrée* (1707), *la Flore* (1728), and *la Pomone* (1749); note that the first case cited was armed only with six 6-pdrs on the gundeck, the second with four 8-pdrs.

The draughts of *La Rose*, dated July 1751, bear the signature of her designer Chapelle. It is unclear however whether this was François Chapelle (1686-1770) or his son, Joseph Véronique Charles Chapelle (1716-1792). It is possible that a study of the handwriting by comparison with other manuscripts might elucidate this detail.

La Rose was launched on October 22nd 1752. Her principal dimensions were as follows: length from stem to stern 120′0″ – breadth at the midship bend to inside of plank 31′10″ – depth in hold to upper face of beam 14′4″ – rake of the post 3′6″ – rake of the stem 15′0″.

Note the presence of oar ports on the gundeck between the gunports. The upper deck is armed with twenty-two 8-pdrs which make up the real armament of the vessel. At the stern, the gap between the last and second-to-last gunports corresponds to the space occupied by a cabin, and there is a gallery leading off the great cabin.

In accordance with common practice at the time, the body plan illustrates the sections as perpendicular to the load waterline rather than the keel, which explains the separate indication at each station of the height of the keel. Note that there are two midship bends, separated simply by a space (as opposed to filling frames). The horizontal sections are true waterlines, their planes being parallel to the load waterline. There is no indication of ribbands on any of the three views.

Measurements taken off the plan indicate a draught of water forward of 12′6″, 14′5″ aft. If the displacement of the hull was calculated, which is unlikely[2], it is not indicated on the draught.; it can however be reckoned to be of the order of 1,000 French tons (of 2,000 French pounds/978 kgs); according to Pierre Morineau, the frigate *le Zéphir* quoted above displaced 917 tons.

In 1756 *La Rose* was one of five frigates forming the squadron commanded by de la Galissonnière, which distinguished itself at Minorca. However, no Sailing Quality Report has survived, so that we have no means of knowing the sailing qualities of *La Rose*.

1. In storeships and transports any ports in the between decks serve as air-ports, ballast-ports and such like, and even if they present similar characteristics to gunports with lids, they cannot in fact be armed.

2. In his manuscript *Treatise*, Pierre Morineau indicates a number of empirical formulæ for calculating displacement. Blaise Ollivier was the first French shipwright to calculate the volume of the hull on the basis of geometrical data, in 1729 when designing the *Fleuron* (see J. Boudriot, *Le Navire Marchand, Ancien Régime)*.

Frigates of the 1st Order (*per* Ollivier and Morineau)

Blaise Ollivier, in his manuscript *Treatise on Shipbuilding* in the form of a dictionary (*Service Historique de la Marine* Cat. N° 314, published in 1992 by Éditions Oméga, Nice), describes the frigates of the 1st Order as follows: "*They are 120 to 122 feet in length from stem to stern. Their breadth is 3 inches 2 or 3 lines for every foot of length, their depth in hold is about 5 1/2 inches for every foot of their breadth.*

"*The flat of the floor at the midship bend is equal to half the breadth, or six inches less than this, the deadrise is of 12 to 24 inches. The length on the keel, rake of the stem and of the sternpost are determined as in ships of war. Their breadth at the wing transom is 7 inches 6 to 8 lines for every foot of their breadth extreme, the tumbling home at the midship bend is one fifth of their breadth, and their breadth at the taffarel is equal to 2/3rds or three quarters of the breadth at the wing transom. Their lines are finer than those of ships, but their upper works are similar.*

"*There are two decks in frigates of the 1st Order which run from bow to stern, a forecastle, a quarterdeck, and a short poop; there are 10 or 11 gunports on either side on the gundeck for 12-pdrs and 11 or 12 on the upper deck for 6- or 8-pdrs.*

"*Such frigates have a beakhead at the bow and a counter at the stern; their quarter-galleries are decorated with carved-work; most also have a stern-gallery, which differs however from those of ships in that it is at the level of the upper deck and does not continue round the quarter.*"

In a second manuscript entitled "*Treatise of Shipbuilding, by Mr Ollivier Surveyor of the Navy to serve as instruction for his children*" *(Musée de la Marine*, Cat. N° B.251), Blaise Ollivier defines frigates of the 1st Order as follows:

"***46-gun frigate**. I refer here to a frigate armed with 22 12-pdrs on the gundeck and 24 6-pdrs on the upper deck. I have stated that recently the maximum length of frigates of this strength has been 122 feet. However, such a frigate is too short with a length of only 122 feet. All those which I have seen built have their lower deck guns too low in the water, as much because they are too heavy in their upper works as because they are too small overall. Such a frigate must necessarily be given a length of 130 feet from stem to stern. The eleven gunports on the gundeck are 2′4″ wide for 12-pdr guns, and should be cut 7′6″ one from the other. The foremost port at the bow should be 19 feet from the perpendicular of the stem, and the aftermost port 10 feet from the perpendicular of the post.*

"***40-gun frigate**. I refer here to a 40-gun frigate armed with 20 12-pdrs on the gundeck and 20 6-pdrs on the upper deck.*

"*Such a frigate should be 126 feet from stem to stern, for she would have insufficient height of gundeck sill were she to be built smaller. The gunports on the lower deck should be pierced 7′10″ one from the other. The foremost port should be 21 feet from the perpendicular of the stem, and the aftermost port 11′2″ from the perpendicular of the post. That will give a vessel more than large enough to carry but 20 12-pdrs and 20 6-pdrs, but it must be so if a sufficient height of gundeck sill is to be achieved. It would be better to avoid building such frigates.*"

This latter manuscript is undated, but Blaise Ollivier refers in the text to the fire which broke out at Brest Dockyard on December 25th 1742. It was no doubt written therefore between 1743 and 1746, when Ollivier died. This unfinished manuscript omits to give the dimensions for either the breadth or the depth in hold.

In yet another manuscript by the same author (*Musée de la Marine*, Cat. N° B.276), which can be dated 1739-40, since no mention is made of the 124-gun ship *Royal-Louis*, laid down in 1740), Ollivier gives dimensions of 39½ lines per foot of length for the breadth of frigates (ratio 3.645), and 66 lines per foot of breadth for the depth in hold (0.458).

Pierre Morineau, in his *Treatise on Shipbuilding* to which we have already referred, describes in considerable detail frigates of the 1st Order armed with 46 guns, of which here are a few extracts:

"***46-gun frigate**. Such frigates have two decks with two complete tiers of guns, a quarterdeck which runs no further forward than the after hatch, a forecastle 30 feet in length measured from the outside of the stem, a small poop 7 or 8 feet in length sufficient to provide quarters for two junior officers and the two warrant officers. They are pierced for 11 guns on either side, with 12-pdrs on the gundeck and 8-pdrs on the upper deck.*

"The fore side of the foremost gunport on the gundeck should be 15 feet 5 inches from the outside of the stem, its breadth 31 inches measured abaft this point. The after side of the aftermost gunport should be 10 feet forward of the outside of the sternpost, its breadth 31 inches forward of this point. The gunports between should be 7' 5" one from the other. Adding together these distances and the breadth of the ports, we arrive at a length from outside of stem to outside of post of 128 feet.
"The breadth at the midship bend to inside of plank should be 3 inches 2 1/4 lines for every foot of the length.
"The depth in hold as measured from the upper face of the plank of the gundeck to the upper face of the keel should be 11 1/4 lines for every foot of breadth."

40-Gun Frigates. As an alternative, Morineau also gives the specification for a second type of two-decked frigate, but this time with a half tier of guns on the gundeck consisting of three 12-pdrs on either side at the bow and 4 more at the stern, with thirteen 8-pdrs per side on the upper deck. The total number of guns is thus reduced to 40 (of a total weight of 91 tons 1,155 pounds), and with a displacement at the same draughts fore and aft of 1,107 1/8 tons.
Yet another variant given by Morineau is for a 40-gun frigate with only six 12-pdrs on either side on the gundeck forming a half tier (3 forward and 3 aft), the upper deck armed with twenty-eight 8-pdrs. The fore side of the foremost port is 13'6" from the stem, the width of port 29 inches, distance between ports 6 feet. At the stern, the aftermost port is 9'6" from the sternpost. With fourteen 8-pdr ports per side on the upper deck, the overall length comes to 126'0", thus slightly shorter than the 46-gun vessel, in view of the reduction in width of port and distance between ports.

*Morineau gives a width of port of 31 inches for 12-pdrs, while Ollivier restricts it to 27 or 28 inches. The Regulations of 1762 established the width at 30 inches.
The usual calculation for finding the depth in hold is done from the upper face of the keel to the horizontal line of beam at side. Morineau's method requires that not only must the camber of the beam be known, but also its thickness and the thickness of the planking of the deck!

ADDITIONAL DOCUMENTS

The first Navy Lists from the 1670s give the names of the vessels, their tonnage, the number of guns, the administrative region to which they are attached, the date of building, expected service life (!), and the draught of water aft. None of this information tells us very much about the ships themselves, the indication of tonnage is unreliable, and the expected service life is valueless. From 1682 onwards, three further items of information were added: the place of building (not necessarily the same as the region to which they are attached), the name of the Builder, and finally, three or four words summarising their handling under sail ("very fine sailer" – "good sailer" – "poor sailer"). Reproduced opposite is one example of these Lists, dating from 1676.

Starting in 1696 the Lists became much more complete*; while there are a number of errors and inconsistencies, the Lists nevertheless contain the three principal dimensions, whereas hitherto only the draught of water aft had been included! Also appearing in the Lists are the number and calibre of the guns. Regrettably, this format for the annual Navy Lists was abandoned in 1747. I have taken as an example opposite a page from the 1746 List. Thereafter, more or less detailed Lists were issued for certain years, but without any consistent regularity. Only patient research in the archives make it possible to supplement the information given or compensate for its complete absence.
The capture of certain vessels in the same year that they were built explains in many cases the complete absence of archival references to them; this is especially true of the Revolutionary period, for which the archives which have survived are particularly scarce.

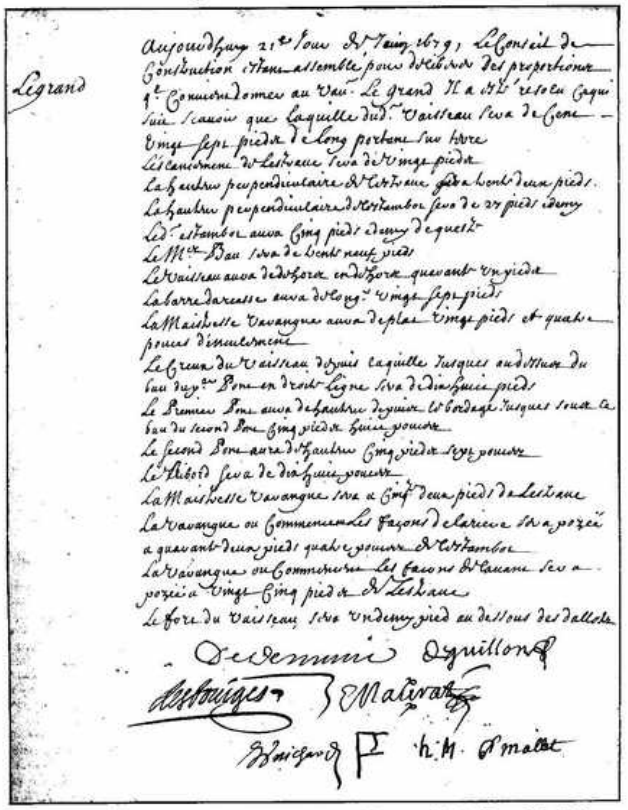
*The annual Navy Lists give the length from stem to stern, the breadth to outside of plank and the depth in hold measured from the keelson to the lower face of the beam amidships.

FREGATES LEGERES	Port & Canon	Departement & Aage	Duree	Pieds d'Eau	Mois de Vivre	Officiers	Officiers mariniers	Matelots	Soldats	Nombre de l'Equipag.	Solde par mois	Vivres par mois	Armement pour un mois
La Serpente, Idem 18 rames,	500 38	Toulon 1674	50.	13.	6.	6.	45	95	60.	200.	3482	1835.	5317.
La Rieuse, Idem 18 rames,	500 38	Toulon 1674	50.	13.	6.	6.	45	95.	60	200	3482	1835	5317.
La Bien-aymee, Idem 18 rames,	300 20	Toulon 1672	45.	10.	6.	6.	33.	60	27.	120.	2514	1126.	3640
La Trompeuse, Idem	300 24	Havre 1675	50	12	8.	5.	14	21.	15.	50	1188	470.	1658
La Iolie, Idem,	280 24	Havre 1675	50.	12	8.	5.	14	21.	15.	50.	1188	470.	1658
La Maligne, Idem	280 24	Havre 1670	30.	12	10.	5.	14	21.	15.	50.	1188	470	1658
La Friponne, Idem,	250 22	Rochef 1670	30.	9.	7.	5.	14	21.	15.	50	1188.	470.	1658
La Bouffonne, Le Dangereux,	150 18	Havre 1670	30.	9.	7.	5.	14	21	15	50.	1188	470	1658.
L'Aurore, La Normande,	150. 18	Brest 1670.	30.	9.	6.	5.	14	21.	15	50	1188	470	1658
L'Embuscade, Idem,	150. 18	Rochef 1670	30.	12	10	5.	14.	21.	15.	50	1188.	470	1658
La Favorite, prise par l'Eveillé	80 12	Rochef 1670.	20.	10.	7.	5.	14.	21.	15.	50	1188.	470	1658
La Fole, prise sur la Digue	60 10	Rochef 1670.	20.	12.	7.	5.	14	21.	15.	50.	1188	470.	1658.
La Mignonne, Idem	60. 8	Dunke 1672	40.	9.	4	5.	14.	21.	15.	50.	1188.	470.	1658
La Sans-peur, La Christine, galiote	120 10	Havre. 1666	15.	8.	10.	5.	14.	21.	15.	50	1188.	470	1658
La Gentille, La S. Jean, galiote	120 10	Toulon. 1666	15.	8.	10.	5.	14.	21	15.	50	1188	470	1658
La Railleuse, Idem Caiche	80 8	Brest 1671	30.	9.	10.	5.	14.	21.	15.	50.	1188.	470.	1658
La Mocqueuse, prise hollandoise. 17?	50 6	Brest. 1672.	30.	8.	6.	5. [illegible]	14. [illegible]	21. 544	15. 357.	50. 1220	1188. 26117.	470. 11580	1658 37497

IIII.e Rang.	Département	Lieu de leur Construction	Nom du Charpentier	Age	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Equipage [illegible]	Equipage [illegible]	1.re Batterie Nombre	1.re Batterie Calibre	2.e Batterie Nombre	2.e Batterie Calibre	3.e Batterie Nombre	3.e Batterie Calibre	4.e Batterie Nombre	4.e Batterie Calibre	Total [illegible]	Total [illegible]	Vivres qu'ils peuvent porter	Qualitez
Le Rubis	Rochefort	Havre	Poirier	1728	131	34 6	16. 8	17. 6	730	240	320	22	18	24	8	6	4	....	....	52	46	7	Navigue gouverne et porte bien la voile alerte
Le Jason	Rochefort	Rochefort	Poirier fondu par Geslain 1743	1716	125	34	16	17. 0	700	210	300	22	12	24	8	6	4.	....	....	52	46	6	Idem alerte
l'Alcion	Rochefort	Toulon	L. Vassaux	1724	132	36. 4	18	18	700	230	300	24	18	22	8	4	4	....	....	50	40	6	Bon de Compagnie porte la voile et gouverne bien alerte
Le Tigre	Rochefort	Toulon	B. Coulomb	1724	131	38	16. 6	17	800	230	300	22	18	24	8.	4	4	....	....	50	40	6	Bon voilier
Le Diamant	Brest	Toulon	F. Coulomb	1729	136.6	37	17. 6	18. 4	800	300	350	26	18	24	8	....	....	....	....	50	46	6	Bon de Compagnie a besoin d'un radoub
L'Aquilon	Brest	Toulon	L. Vassaux	1730	127	34	17	19. 7	660	200	300	22	12	24	6	....	....	....	....	46	40	6	Idem
L'Aurore	Brest	Rochefort	Morineau	1744	139	35	16. 6	17	800	200	290	22	12	24	6	....	....	....	....	46	40	6	A besoin d'un radoub considérable
L'argonaute	Brest	Brest	Helie	1722	120.6	32	15	16	500	200	270	22	12	24	6	....	....	....	....	46	40	6	Idem
La Parfaite	Idem	Idem	Idem	1722	121.	32	15	16	500	200	270	22	12	24	6	....	....	....	....	46.	40	6	Idem..
La Gloire	Rochefort	Rochefort	Poirier	1724	129	32. 5	15. 9	17. 6	600	240	300	22	12	22	8	....	....	....	....	44.	40		Navigue et gouverne bien

Shipbuilding Councils and Master Shipwrights

The Regulations of March 1671 were the moving force behind the setting up of Shipbuilding Councils, whose role was to supervise everything to do with shipbuilding in the Dockyards[1]. The Councils were supposed to meet twice a week. The *ex officio* members were the Admirals, Vice Admirals, Intendants and Commissioners General, Rear Admirals, and the Port Captains. The Council had to have at its disposal the dimensions and proportions or moulds for all warships and storeships of the French and foreign navies[2]. Sea officers and Commissioners might be co-opted in a consultative role. The first task entrusted to the Council was the inspection and examination of all the ships in port. The Council was then required to enquire as to the qualities of these ships from officers who had served in them. Once these enquiries had been written up in due form, the members of the Council were required to work together to draw up a specification for each vessel, containing the measurements, proportions and moulds, and setting out the actions to be taken to remedy any defects which might have been discovered. Thus the task assigned to the Council was nothing less than a veritable "apprenticeship"[3].



Example of a specification drawn up for the 80-gun ship le Grand, laid down at Rochefort in 1679. At the bottom of the page can be seen the mark FP of the Master Shipwright of the Dockyard, François Pomet, and the initials of the Master Carpenter Honoré Mallet. Although considered to be excellent shipwrights, it is apparent that neither could sign their names! (*Rochefort Dockyard Archives*)

At the beginning of each year, the King would give orders as to the number and type of vessels to be built. The Council would issue instructions to the shipwrights to draw up their proposals. At the time, these were little more than a few sheets giving a series of numerical data[4] concerning the hull and the spars. The shipwrights were to submit their proposals to the Council for examination and criticism, and the the approved proposals were returned to them, sometimes with appropriate modifications, for execution.

The text of 1671 required that a "good shipwright" should be embarked on every ship, to observe everything to do with his domain while at sea and to keep a journal! The Captain, moreover, was to keep another journal in which he was to enter up his comments on the handling at sea of the ship under his command. The Council was to summon the Captains, if required, in order to obtain a better understanding of the individual qualities of the ships under its jurisdiction.

The 1671 text went on to recommend that ships should be built longer and less beamy, that their lower guns should be kept high, that the headroom between decks should be reduced, and it altered the text of 1670 by abolishing three-deck ships under 70 guns. The distance between gunports was fixed at 7 feet; the height of the upper works was to be reduced, ships were to be built stronger in the floors and be sufficiently flat to allow them to stand high and dry at low tide and draw less water generally. Finally, the use of nails as opposed to treenails was raised as a matter for discussion.

The intention of the legislation was to place the shipwrights under the control of the Shipbuilding Councils; for all that, even if some of the shipwrights were illiterate, they were nevertheless men of experience, and they retained the initiative in formulating their own proposals, so that it may be supposed that the intervention of members of the Council was not necessarily the deciding voice[5].

The great Edict of 1689 retained in essence all the provisions in this regard of the Regulations of 1671.

A series of texts or ministerial decisions taken throughout the period of the Ancien Régime gives an idea of the evolution of the role of the Shipbuilding Councils and above all, of the Shipwrights.

1674. The Regulations confirm the responsibilities of the Council and create the post of Master Shipwright (*premier maître charpentier*) in each of the three Royal Dockyards (Brest, Toulon and Rochefort).

1680. Creation at each of the Dockyards of a school of shipbuilding theory, intended primarily for the instruction of midshipmen (*Gardes de la Marine*) and of apprentice shipwrights.

1684. Creation of the post of Inspector of Shipbuilding (*inspecteur des constructions*), charged with the instruction of shipwrights, and assisted by sub inspectors.

1689. The Great Edict merely confirms the earlier provisions.

1691. Creation of a new post with the title of Surveyor of the Navy (*ingénieur général de la marine*)[6].

1700. By around this date the term "shipwright" (*charpentier*) disappears in favour of the term "Builder" (*constructeur*).

1717. Creation of the post of Head of Shipbuilding and Repairs (*chef des constructions et radoubs*) in each of the great Royal Dockyards, and permission to the incumbents to style themselves "Esquire" (*Sieur*).

1727. Abolition of the aforementioned title, and extension of the right to use the style Esquire to all Builders.

1739. The title of Surveyor of the Navy resuscitated and awarded to Duhamel du Monceau. The post of Inspector of Shipbuilding having become largely honorary, it is abolished, while the Councils of Shipbuilding no longer meet any more than sporadically.

1740. The term "Master" as in Master Shipwright having a manual connotation, it is abolished in favour of First Builder, Ordinary Builder and Assistant Builder (*premier constructeur, constructeur ordinaire, sous-constructeur).*

1741. Creation, under the initiative of Duhamel du Monceau, of the so-called *Petite École* in Paris, for the theoretical training of future shipwrights.

1748. Closure of the Paris school of shipbuilding.

1765. A new Edict replacing that of 1689. The title of Engineer (*ingénieur*) is accorded to all Builders. The Paris school is reopened, and henceforth all future shipwrights are obliged to attend the school.

1776. A new Edict replacing that of 1765, and questioning the role of the "engineer-shipbuilders". Creation of a Navy Council with responsibility for all the activities of the Dockyard. The Shipbuilding Councils are merged into the Navy Council.

1779. Creation of the post of *Ingénieur-constructeur général.*

1784. Creation of the post of Director of the School of Naval Construction (the incumbent being the Chevalier de Borda).

1786. A new Edict, fixing the numbers of *ingénieurs constructeurs* and recognising their role.

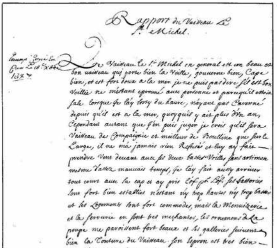
1786. The Paris school opened to future shipwrights from merchant yards.

1800. Creation of the Corps of Naval Engineers (*Génie Maritime).*

This summary chronology gives an overview of the development of a professional body of men. At the beginning, they were humble shipwrights, working on the slips, but with a series of promotions they gradually established themselves as one of the most scientific bodies in the land. It is obvious that such an ascent was only made possible through the acquisition of scientific knowledge applied to the design of ships[7].

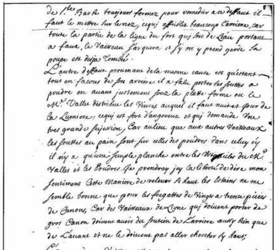
1. At this time: Brest, Toulon and Rochefort.
2. The Intendant and the Commissioner were charged with obtaining these documents. There is reason to doubt whether in fact they were ever assembled, and in all events it is certain that no such fund of material has survived in the archives.
3. It is difficult to imagine flag officers at this time, with rare exceptions, being interested in a subject such as naval architecture. Only the Dockyard officers and the commissioners are likely to have been remotely qualified to lend themselves to such an "apprenticeship".
4. In France at this period the use of any graphical representation was exceptional, if not entirely unknown.
5. However, the form is everything, and the Regulations of 1671 were, by their serious tone, at least a reassurance that the design and building of the King's ships would not be entrusted to "vulgar" artisans free of any control.
6. The function was exercised by an eminent scientist, Renau d'Éliçagaray.
7. See the paper delivered by J. Boudriot at the 1987 Journées d'Archéologie Navale and published in *Neptunia* nº 169, entitled *La conception des vaisseaux royaux sous l'Ancien Régime.*

Report on the ship *le Saint-Michel*, dated 1687, and drawn up at the end of a commission by her Captain (*Rochefort Dockyard Archives*).


Rapport du Vaisseau Le St Michel.

Le Vaisseau le St Michel en general est un beau et bon vaisseau qui porte bien la voille, gouverne bien, Cape bien, et est fort doux a la mer. je ne puis pas dire s'il est bon voillier ne m'estant eprouvé avec personne et parcequ'il estoit sale lorsque je l'ay sorty du havre, n'ayant pas Carenné depuis qu'il est a la mer, quoyqu'il y ait plus d'un an, Cependant autant que j'en puis juger je crois qu'il sera Vaisseau de Compaignie et meilleur de Boulline que sur le Large, il ne m'a jamais rien Refusé et luy ay fait prendre vent devant avec ses deux basses Voilles sans artimon mesme d'assez mauvais temps, je l'ay fait aussy arriver tout court avec la cap et ay pris [illegible] ses batteries sont fort bien establies n'estant ny trop hautes ny trop basses et les Logements sont fort commodes, mais la Menuiserie et la ferrurie en sont tres mechantes, les ornements de la poupe me paroissent fort beaux et les galleries suivent bien la Conture du Vaisseau. son Esperon est tres bien fait surtout le Lion est admirable. ses mats sont bien et c'est a celuy qui le Commandera a voir s'il les veut en avant ou en arriere ceque je n'ay pas eu le Temps de Remarquer, il ne luy faut pas plus de deux Cent [illegible] de Leste et veut estre a dixhuit pieds et demy d'arriere et quinze et demy d'avant, Voyla les bonnes qualitez que je luy ay remarqué dans le peu de Temps que je l'ay monté Voyey les mauvaises.

Ses Estains sont trop haut et trop ronds cequi fait deux mechans effets outre qu'il n'en est pas si beau de L'arriere, le premier est que cela luy relevant trop ses facons il faudra pour aller chercher du soutien par consequent la poupe est fort noyee et ses sabords


de 1ere Barre toujours fermez pour remedier a ce deffaut il faut le mettre sur le nez, cequi affoiblit beaucoup l'arriere, car toute la partie de la ligne du fort qui sort de l'eau portant a faux, le Vaisseau s'arquera si l'on n'y prend garde sa poupe est deja tombée.

L'autre deffaut provenant de la mesme cause est qu'estant tout en facons de son arriere il a falu porter les soutes a poudre en avant justement sous la platte forme ou le Mr Valler distribue les Vivres, auquel il faut nuit et jour de la Lumiere, cequi est fort dangereux et qui demande une tres grande sujetion, Car au lieu que aux autres Vaisseaux les soutes au pain sont sur celles des poudres, dans celuy cy il n'y a qu'une simple planche entre les [illegible] du Mr Valler et les Poudres. Je prendray icy la liberté de dire mon sentiment cette maniere de relever si haut les Estains ne me semble bonne que pour les fregattes de Vingt a trente pieces de Canons, Car des Vaisseaux de Ligne qui doivent porter de gros Canon doivent aussi du soutien de L'arriere aussy bien que de L'avant et ne le doivent pas aller chercher sy haut;

L'avant de ce Vaisseau est aussy trop gros et trop plat cequi nonseulement le desfigure, mais encore luy prejudicie pr la durée et la Navigation pour la Durée parceque pr faire caller cet avant afin de luy relever l'arriere comme j'ay dit, il faudra le charger de boullets de Canon et autres choses tres pesantes, Or il est seur que plus la charge d'un Vaisseau est Eloignée du milieu de ses plattes Varangues qui doit estre le point de gravité et passer la ligne de direction plus il travaille et par consequent s'affoiblit. pr la navigation parceque ce gros qui devroit estre sur l'eau venant a s'enfoncer quand on le Chargera tout j'ay dit aura plus de peine a fendre l'eau et a passer cela n'a pas besoin de demonstration

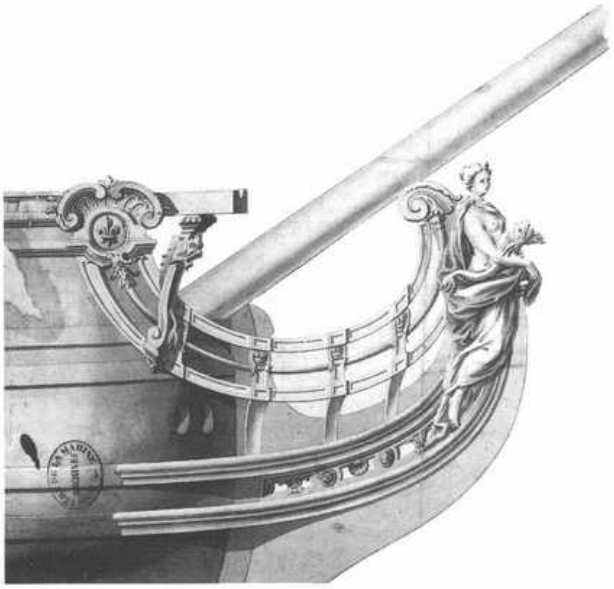
A Rochefort ce Vingtquatrieme novembre 1687

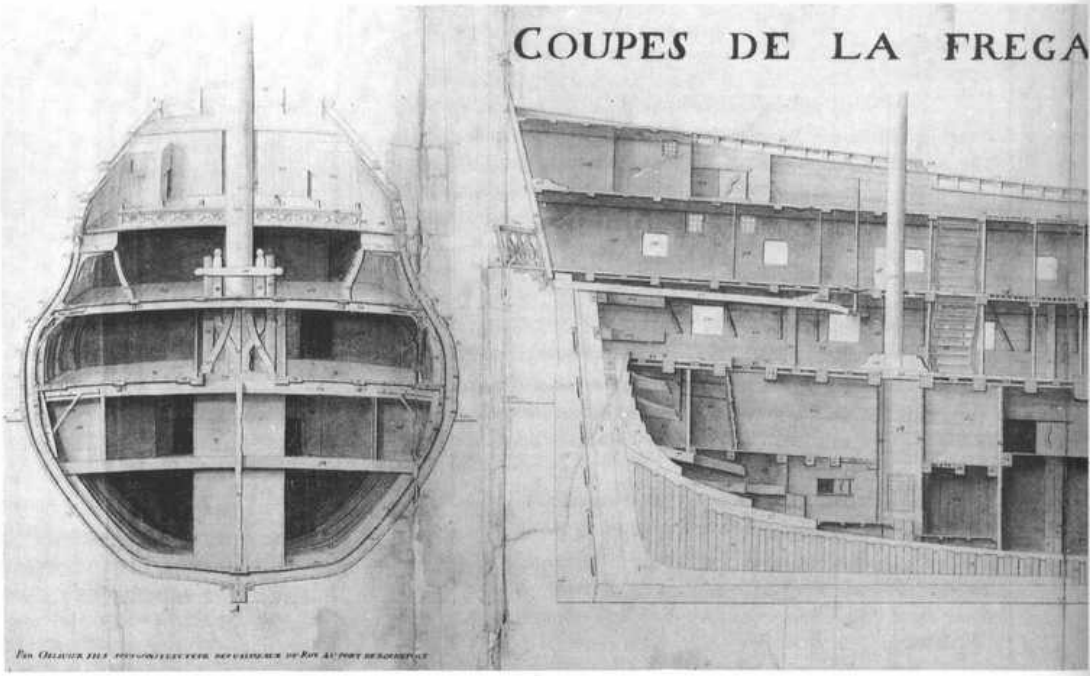
LA NÉRÉÏDE
Frigate of the 1st Order

These sectional drawings of the frigate *La Néréïde* were executed in pen and wash by the young Blaise Ollivier. It is perhaps worth explaining how this came about. In the course of the year 1720 the Assistant Shipwright Joseph Ollivier, accompanied by his son Blaise, were dispatched to Rochefort. They had come from Toulon, where the family originated. Father and son had been charged with the task of supervising the building of the *St-Philippe* (74) and the *Ardent* (64), which had been designed by the Master Shipwright at Rochefort, P. Masson. However, Masson had died that year. It was this that brought the Olliviers to Rochefort, and their new responsibilities resulted in their promotion, to the rank of Shipwright for Joseph in December 1720, and to the rank of Assistant for Blaise, in January 1721. Father and son were to remain in Rochefort until September 1724, when they were transferred to Brest.

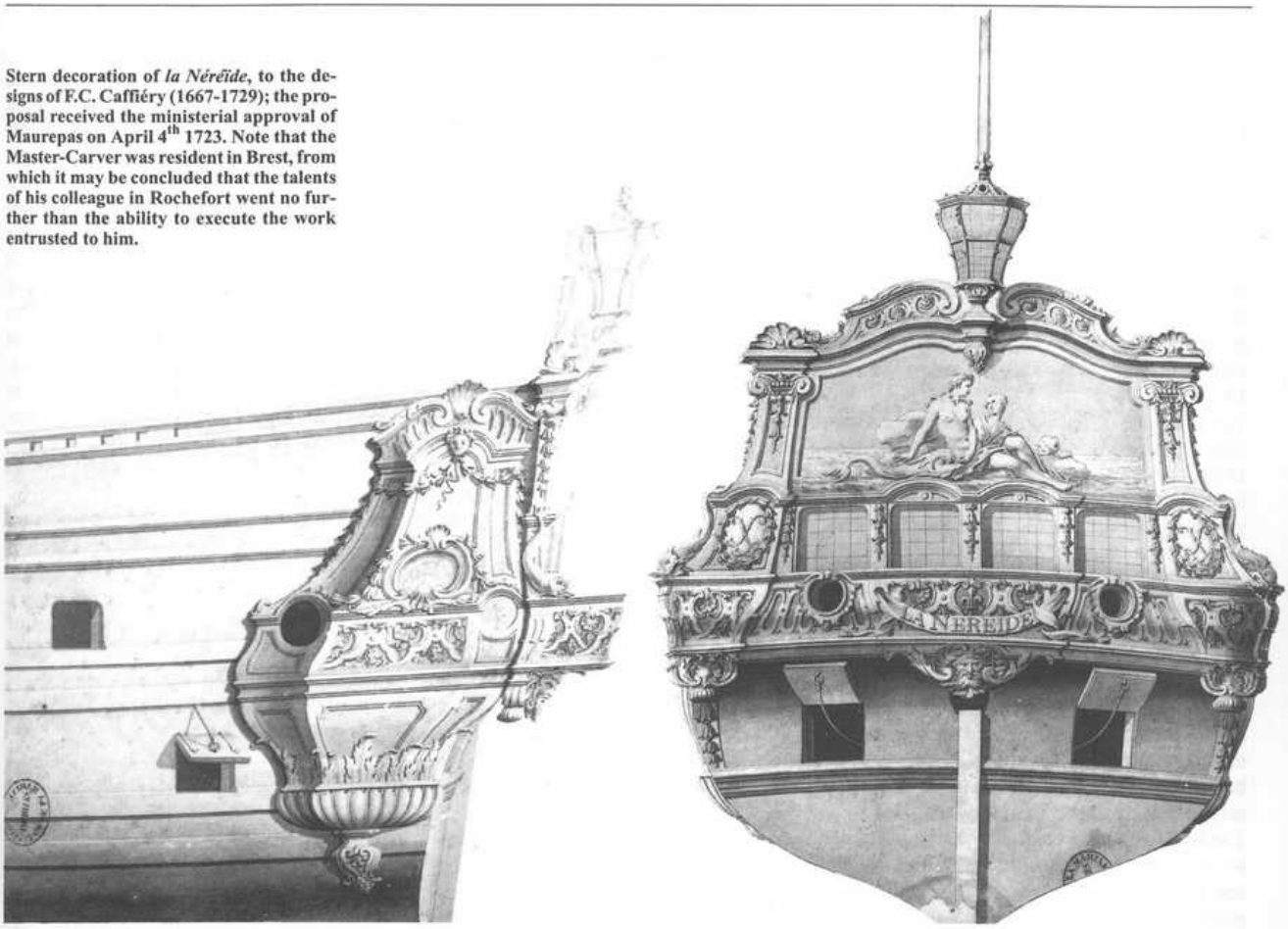
Between 1720 and 1724 the principal activities at Rochefort were concerned with the building of three ships designed by Masson (the *St-Philippe* and *Ardent* already mentioned, and the *St-Louis*), followed by *le Juste*, to the designs of Geslain senior, and two sloops-of-war. Their final task was the design and building of a powerful frigate, *la Néréïde*: laid down in 1722, she was launched on March 24th 1724.

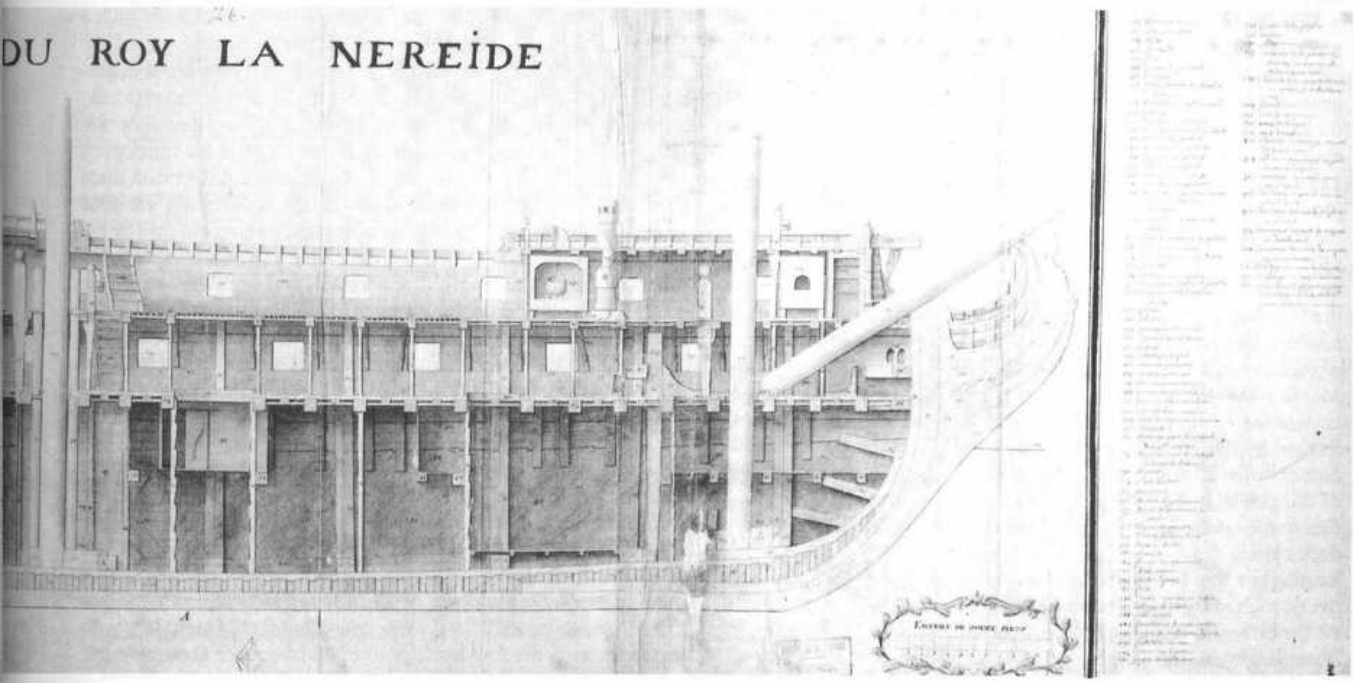
Classed as a frigate of the 1st Order, *la Néréïde* was armed with 42 guns: twenty 12-pdrs on the gundeck, and twenty-two 6-pdrs on the upper deck. Her measurements were: length from stem to post 122′0″ – breadth to outside of plank 33′8″ – depth in hold (measured from the upper face of the keelson to the midship beam) 13′2″. This very large draught, which has been drawn with great care, is signed "Ollivier junior, Assistant"; it was made in all probability during the first half of 1724. The wealth of information which it contains requires lengthy explanations on my part, and in order to simplify the task I have divided the draught up into five parts: this allows its reproduction at a scale large enough for the comments to be intelligible. At either end of this large draught can be seen a key to all the various elements which are identified by numbers on the draught: in all there are 212 such references, and I have covered all of these in my explanations. I have thus set aside some 12 pages for the analysis of this unique document by Blaise Ollivier. It is preserved in the collections of the *Musée de la Marine* (Cat. N° J 9q-6963).





Stern decoration of *la Néréïde*, to the designs of F.C. Caffiéry (1667-1729); the proposal received the ministerial approval of Maurepas on April 4th 1723. Note that the Master-Carver was resident in Brest, from which it may be concluded that the talents of his colleague in Rochefort went no further than the ability to execute the work entrusted to him.





First Section

Number **2** is the *forefoot*, scarphed with a hooked scarph to the *stem* **3**, which is composed of two timbers. The *keelson* **5** is joined by a plain scarph to the *apron* **6**, which is also of two timbers. The scarphs of these timbers give shift to the scarphs of those beneath. Extending forward from the stem are a series of timbers sometimes described as the beakhead: at **193** the *chock-piece* of the stem, joined to the *gripe* **194**. Marked **184** are the *upper and lower lacings*, extended by the *beak* **183**, while between the lacings are the *trailboard chocks* **185**, decorated with a fretted pattern. **136** marks the *gammoning knee* in the form of a hook*, with its *ekeing* **187**.

The structure of the head is composed also of three *head-rails* **188**, supported by three *head-timbers* or knees **189**. The *grating* **191** of the head is supported by the *head carling* **190**, rather than by the *cross-timbers of the head* or *ledges* **192**, an arrangement which allows the grating to be placed beneath the ledges. This may have been a practice peculiar to Rochefort at the time, a survival from the 17th century.

212 marks the load waterline, and Ollivier notes that it corresponds to a height of gundeck sill of 4½ feet, which is quite respectable for a frigate of this class.

The masts are drawn as if they were composed of single sticks; their diameter (apart from that of the mizen) varies between 20 and 22 *palms*, which is an absolute maximum, since supplies of mast-timber to the Royal Dockyards were made up of trees of between 15 and 20 *palms* diameter, beyond which it was necessary to have recourse to made-masts.

The heel of the *bowsprit* **201** rests on a *chock* **94**; on either side are two scantlings **93**, bolted at their head and heel to the beams and embracing the bowsprit; they are joined by short lengths of plank placed transversely, and the whole structure forms the *cheeks of the bowsprit step* **92**.

The bowsprit is also supported by the upper face of the uppermost *breasthook* **36**, and by the heads of the stem and of the apron, sometimes with a softwood filling-piece or a sheet of lead or copper inserted in between.

A beam **210** forms the after part of the *partners* or hole for the bowsprit where it passes down through the upper deck. Note the *collar-beam* **128** which locks it into place. The planking of the head rests on the collar-beam, which also supports the heels of the *stanchions of the beakhead bulkhead* **130**, to which planks are nailed across the outside.

129 is the *beakhead bulkhead ladder*, formed of cleats, which provide access to the head from the forecastle. At **173** can be seen the outer end of the *cathead*; the inner end or *cat-tail* can also be seen, fastened to the beams of the forecastle; the outer part rests on the beakhead toptimbers. **174** is the *cathead supporter*, sometimes called the cathead knee. Finally, at **131**, can be seen the *beakhead bulkhead rail*, which runs back as a continuation of the *planksheer* **170** of the forecastle.

Moving on to the inside of the vessel, note at **204** the *filling pieces* or *wedges* of the foremast step, the forward end of which is formed by the *hook* **26** of the floor rider, extended by a *second futtock rider* **27** and a *fourth futtock rider* **29** as far as the clamp of the gundeck. The full *floor rider* **25** is in turn extended by a *first futtock rider* **28** and a *third futtock rider* **30** as far as the upper deck clamp.

Resting in the belly of the floor timbers is the *keelson* **22**, overlaunched by the *stemson* **23**.

At the bow and crossing over the stemson and the apron are six *breasthooks* **36**; the stemson finishes at the third breasthook, the fourth is a deck hook supporting the planking of the gundeck, while the sixth is the deck hook supporting the upper deck planking and also the bowsprit; the fifth is called the *hawse hook*, and is situated just below the *hawseholes* **95**. In the bow the hold is crossed by a series of light *beams* **41** supporting the flat of the Bo'sun's storeroom for stowage of his spares. Access is by means of a scuttle abaft the foremast, with a *samson's post* resting on the keelson. A second scuttle immediately below the first provides access to the hold, the very restricted area of which at this point can serve to supplement the Bo'sun's storeroom if required. The pins of the riding bitts** run down to the bottom of the hold and rest on chocks which extend forward from the second floor rider. These pins are bolted to the *orlop beam* **38** abaft the flat of the Bo'sun's storeroom and to the second deck-beam abaft the foremast.

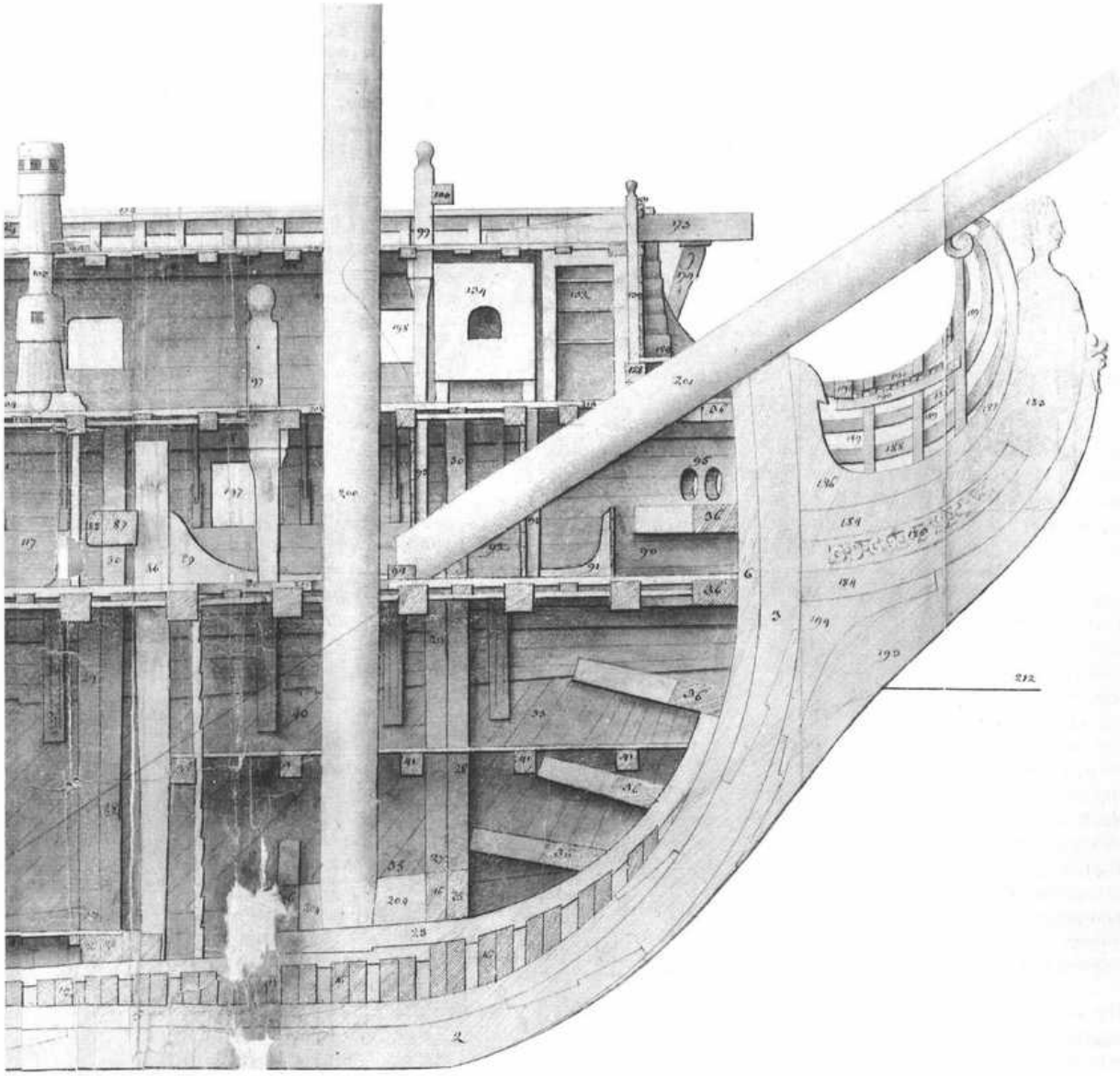
A series of *light beams* **43** support the flat of the *cable tier* **42**. The *gundeck beams* **69** are strengthened at the side of the ship by iron knees which are easier to see on the transverse section on page 49; the vertical arm is scored down into a *chock* which is fayed to the planking of the ceiling, and half a dozen bolts driven from the outside run through the whole thickness of the ship's side before being forelocked on the inside of the vertical arm of the knee. Above the oblique strakes of the ceiling can be seen four horizontal strakes including the *clamp* **68**.

Between each pair of beams can be seen a *ledge* **72**, and the *binding strakes* of the gundeck **77** are scored down over the beams and the ledges.

In the between decks and right forward is the *manger* **90**, fashioned from a number of *manger boards* supported by *standards* **91**; the manger, it will be recalled, serves to prevent any water which may come in through the hawseholes from running aft down the deck and also as a place for the cable to drain.

Abaft the manger is the bowsprit step, already described, followed by the foremast, the *partners* **207** of which are lined with wedges. Abaft the mast is the *knight of the fore jeers* **97**; with its heel resting on the gundeck and its head situated in the between decks of the upper deck, the knight is bolted to the after face of the upper deck beam abaft the foremast; a small knee strengthens this fastening. The *pins of the riding bitts* **86** must be of such a height as to leave sufficient space below the deckhead of the upper deck for the handling of the cables. The pins are strengthened by *bitt standards* **89**, fastened to the beams of the gundeck. Running between the pins is the *cross-piece* **87** and its *bolster* **88**, on the after side. In the background can be seen the quickwork on the gundeck, the openings of the gunports, and beneath them the strakes of the *spirketting*; above the spirketting are four strakes of quick-work, the uppermost strake being cut into by the top of the ports, and above these the *clamp* **118** of the upper deck; this runs the whole length of the vessel, and with the spirketting provides an important longitudinal fastening. Iron knees, of a somewhat different pattern to those of the gundeck, strengthen the upper deck beams where they meet the side; they are fastened directly to the inner planking of the hull (without chocks); we will examine them more closely on the transverse section on page 49. Between the beams of the upper deck can be seen the ledges and the carlings which support them, binding the beams together (the same arrangement applies to all the decks).

Beneath the forecastle is a *pantry* **132**, in effect a larder cupboard for the officers' table, and at **134** the *oven*, considered to be less of an encumbrance in this position than when placed abaft the main hatch on the gundeck. Abaft the oven are the pins of the *fore topsail-sheet bitts* **99**; note the small bracket which serves to fasten them to the *forecastle beams*, and between these a *ledge*;



there are no knees at this point, but instead the clamp has been made of thicker scantling. At **198** can be seen the upper deck gunports, the upper corners of which are rounded. The *fore jeer capstan* **103** has its *step* **104** nailed to the planking of the upper deck; the upper barrel appears to be fitted for five or six bars, while the lower barrel has only one bar-hole for a single short bar which serves as a belaying point for the lines being hauled on by means of the capstan.

On the forecastle can be seen the *fore topsail-sheet bitts* **99**, with their *cross-piece* **100** on the fore side of the pins. Also visible are the *pawl-block and pawls* **105** of the fore jeer capstan. The bulwarks are "open", formed simply by the *toptimbers* **21** with spaces left between. A rail is nailed to the outer face of the toptimbers, a planksheer rail is laid over the top in such a manner that tenons formed in the head of the toptimbers fit into mortices in the lower face of the planksheer.

*Later the term *hook* was used to describe the small knee-like timber joining the forward ends of the two upper rails of the head.

** From about the 1750s onwards, the bitt-pins ran down only as far as the orlop.

Second section

When examining this second "slice" of the profile of inboard works we will not comment further on items which we have already seen. Note however the assembly of the scarphs of the keel, the after timber overlaunching the forward timber on the right of the drawing, and the opposite arrangement on the left-hand side. I am unsure whether this design is a purely Rochefort trait, a relic of the 17th century, and it may be that there is a link with the traditional practice of reversing the position of the half-floors of the frames at the midship bend. Note that all the frames have half-floors, and the space between the timbers is roughly one third of their room. The drawing shows the keelson scored down over the floors, which was the usual practice, and also over the half-floors, which is less common.

Along the body of the *Néréïde* there are ten riders fayed to the ceiling, each lying over a frame to facilitate their fastening; note that they are of heavier scantling than the frame timbers, and that they are reversed in relation to the frames in that the floor rider is placed over the top of the half floor of the frame. The upper futtock riders run up above the gundeck, cutting through the waterway, which is made up of a series of pieces abutting the riders, so that it provides no longitudinal fastening to supplement that of the two strakes of the inner waterway. This disadvantage gave rise in the 1750s* to the suppression of the upper futtock riders in favour of brackets of strap iron, called iron deck standards.

The *Néréïde* being planked in the ceiling according to the so-called *Gobert system*, it is perhaps appropriate at this point to provide some explanations about this method of construction. Gobert, a former naval officer (i.e. administrative, as opposed to a sea officer), was appointed *sous-inspecteur de construction* in July 1707. Having long nursed an interest in shipbuilding, Gobert now introduced a series of innovative measures**. The most important of these concerned the internal planking of the hull or ceiling, which he perfected by means of a combination of horizontal and diagonal strakes.

The aim was to reduce hogging, a phenomenon caused by the sagging of the extremities of a ship due to their excessive weight in relation to their displacement.

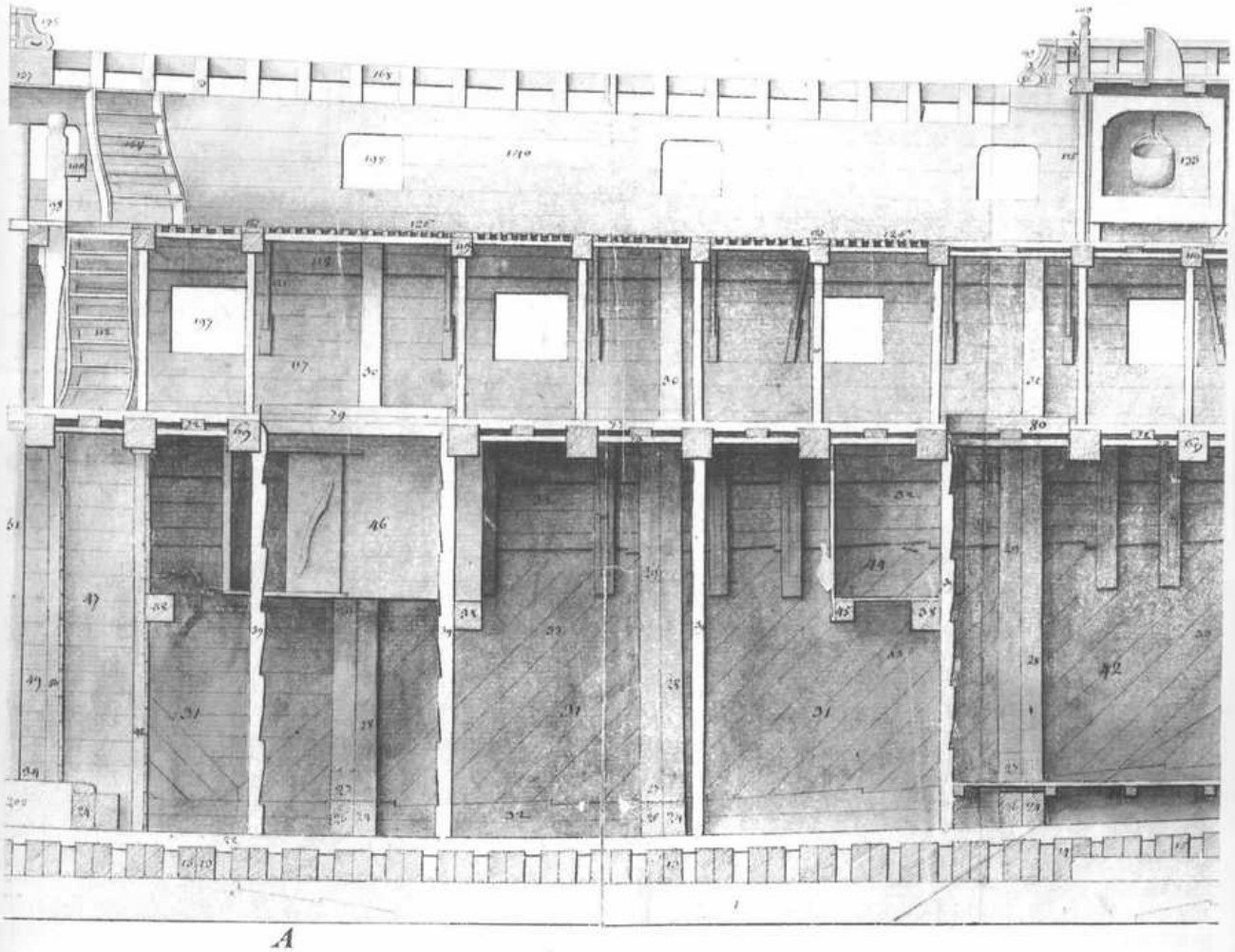
The oblique strakes of the ceiling were designed to transfer the forces imposed on the ends of the ship towards the middle. When we examine the profile of inboard works of the *Néréïde*, we can see that the bottom and the upper part of the hold are planked horizontally, but that the space between these strakes is planked diagonally or obliquely, the strakes forming an angle of about 45 degrees and raking towards the bow and the stern, so as to leave a small triangular area in the middle which is planked horizontally.

The last horizontal strake in the bottom of the hold and the first strake of the horizontal planking higher up are both hooked, so that the two types of planking are firmly locked together. All these details can be seen clearly in Ollivier's drawing.

Gobert obtained permission to try out his system in 1705, on the 70-gun ship *le St-Michel*, built at Lorient by P. Coulomb. Over the next few decades the system became general practice in the French Navy, with a number of improvements. The diagonal strakes ran up from the rungheads or from the last strake of the thickstuff in the floor of the hold, forming an angle of nearer 35 degrees with the frames, and they were butted at each end by hooked locking timbers, so that there was a strake of thickstuff at the lower and upper end of each diagonal strake to lock it in place. During the 1730s and 1740s, the effectiveness of Gobert's system of diagonal planking came to be questioned, with complaints about the need to work timbers from the solid to form the strakes at either end of the ship where the winding was extreme. By the 1750s Gobert's system was being abandoned, but it was not forgotten, for it was re-introduced a century or so later, with the extremely effective addition of heavy iron straps laid obliquely but at 90 degrees to the planking.

Prior to the introduction of Gobert's system, builders employed *footwaling* to counteract the tendency of the ship to hog; these were four or five pairs of strakes of thickstuff, three inches thicker than the ordinary planking of the hold, let down over the frame timbers with a square mortice and bolted to them. This arrangement was more common in the Mediterranean ports, while on the Atlantic seaboard it was more common to employ simple strakes of thickstuff at the rungheads (see *74-G. S.*, vol. 1), which were not scored down over the timbers. Having said that, it would appear nevertheless that footwaling of the type described was also used in the Atlantic ports in the 17th century. However, we should return to our examination of the *Néréïde*.

Orlop beams **38** can be seen in the upper part of the hold; they serve to join together the two sides of the ship, somewhat like rafters in a house; the orlop is not a continuous deck but rather a series of small platforms supporting the *sail room* **44**, and the *surgeon's storeroom* **46**, which has a sliding door. There is no need for a carpenter's walk. In the deckhead there are no carlings under the beams, the gundeck beams being supported simply by plain *pillars*, and by *samson's posts* **39** under the *cable hatch* **80** and the *main hatch* **79**. There are no bulkheads shown separating the main hold from the cable tier, nor the cable tier from the Bo'sun's storeroom, but these could not be dispensed with. To the left can be seen the *shot locker* **47** and the *mainmast step* **202**, the fore end of which is formed by a floor rider **24**. The straps and chocks of the iron gundeck knees are clearly visible in the background. On the gundeck can be seen the row of light pillars supporting the upper deck beams amidships. A series of *gratings* **126** stretches from the second beam abaft the galley to the *crew's ladder* **112**. We have already examined in the previous view the quick-work and spirketting on the gundeck and the iron upper deck knees.
Moving up to the forecastle, the *galley* is shown very summarily at **133**, but note the cylindrical copper (square coppers were adopted in 1777) resting on the casing of the galley fire, the chimneys of which face aft. The breast-beam of the forecastle is supported by *stanchions* **135**, while the breastwork is composed of smaller *stanchions* **149** and a *rail* **150**; somewhat surprisingly, there is neither a belfry nor a bell. At **195** can be seen a *hance* or scroll marking the *fore drift* or break between the forecastle drift rail and the *main rail* **168** running the full length of the vessel; this moulded plank is nailed at regular intervals to the toptimbers. The internal planking of the side consists of five strakes in the waist. There are no gangways, the height in the waist being limited. To the left at **158** can be seen the ladderway leading from the upper deck to the quarterdeck; a removable ladder (not shown) serves for the forecastle. At **157** there is a sort of landing for the ladder.



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*As was the case for example with the *Raisonnable*, a 64-gun ship built at Rochefort in 1754-5, where the upper futtock riders were replaced by deck standards of flat iron, the vertical arm of which was fastened directly to the planking of the side, and the horizontal arm let down into a chock fayed to the planking of the deck, the two arms being joined by a diagonal brace. The need for so many riders gradually came to be questioned and their number reduced. In the 17th century there were as many as one rider between each gunport, whereas by the 1780s, for a 74-gun ship for example, this had been reduced to seven or eight, and they finished at the gundeck clamp.

**For details regarding Gobert, see *Archives Nationales* $D^{1}10$. According to correspondence preserved in the *Archives Nationales* ($B^{3}156$), Gobert was apparently also the moving force behind the adoption of the steering wheel in France to replace the whipstaff, an idea which was probably introduced earlier in England (see in this context papers presented by J. Boudriot and D.H. Roberts at the *5èmes Journées d'Archéologie Navale*, Paris, 1989).

Third section

On the right of this third view can be seen the *main well* **49**, abaft the shot locker which we have already described. The *mainmast* **199** is flanked by two *pumps* **51** on either side, made entirely of wood (the so-called "Royal" pumps, with a bronze working-barrel, were first introduced in 1720 and only spread gradually to all the King's ships). The pumps discharge on the upper deck. The after end of the mast-step is formed by a hook. The well is surrounded by *stanchions* **50** to which planks are nailed, and the shot locker is separated by this bulkhead from the well proper; access to these compartments should normally be via the Surgeon's storeroom, but this has not been shown.

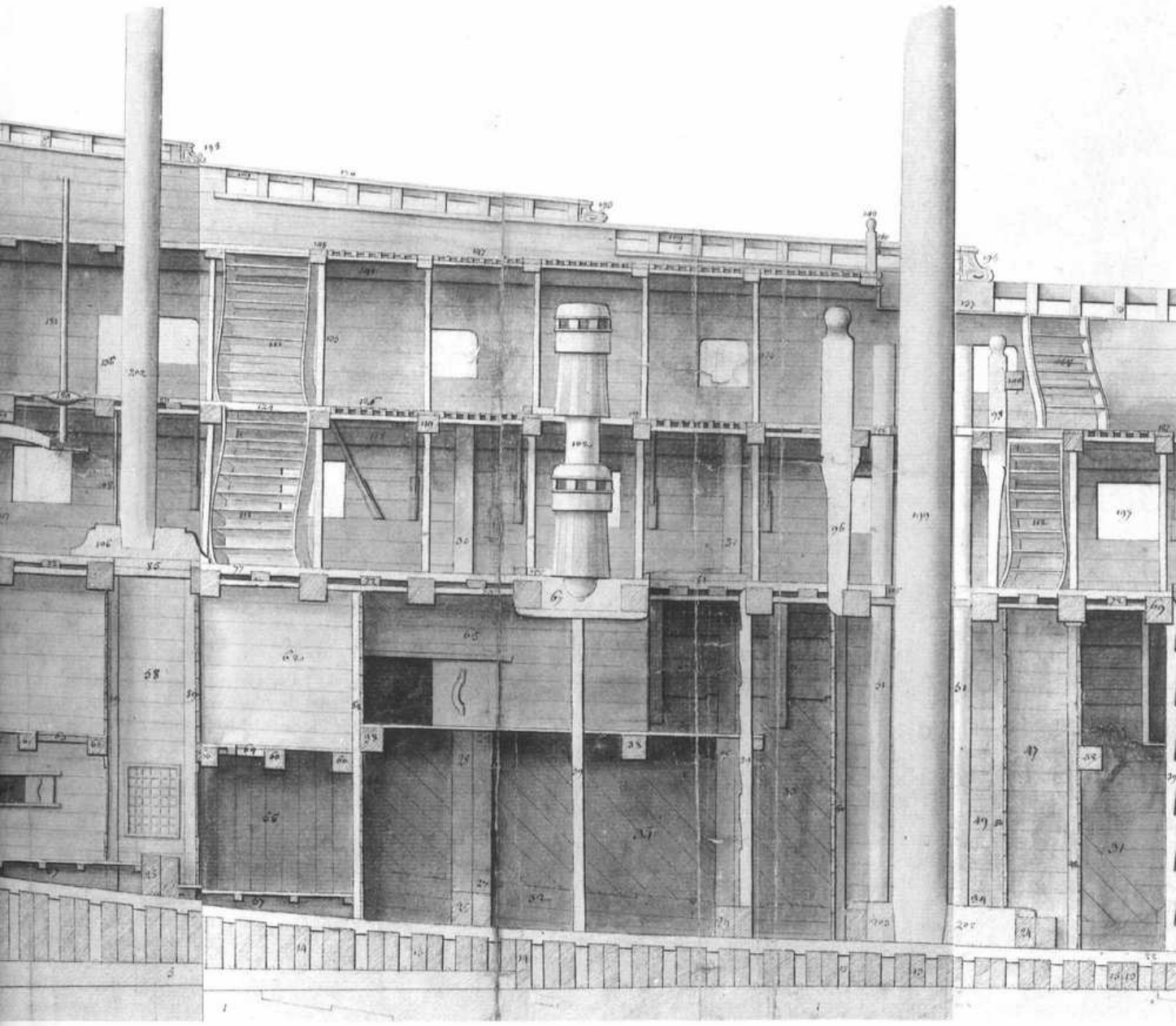
Abaft the well is the *after hold* **31** where the wine is stowed, and it runs back as far as the *magazine bulkhead* **55**. Above the wine is a flat for the issuing room, and the *Captain's storeroom* **65** leads off this area by means of a sliding door. Access to this part of the hold is by way of the *after hatch* **81** and a *samson's post* **39**, while a second pillar supports the *step of the main capstan* **67**.

On the gundeck can be seen the *knight of the main jeers* **96**, situated immediately abaft the *mainmast partners* **205**, which should be lined with wedges although these are not shown. Half-way between the jeer bitts and the *after ladder* **111** for the officers, is the lower barrel of the main capstan, with eight bars "in the English manner", in other words half-bars which do not run through the drumhead; also visible are the pawl-block and the *pawls* **105** abaft the barrel. The *pillars* **110** in the between decks at this point are hinged, so that they can be raised up against the deckhead when the capstan is being served. The after hatchway already mentioned is immediately forward of the capstan barrel. Note the presence here of a *dagger knee* or *raking knee,* designed to run clear of the gunport. There are gratings both afore and abaft the capstan.

On the level of the upper deck, forward of the mainmast, are the *main topsail-sheet bitts* **93** and their *cross-piece* **100**; the two arms of the pins join together below and run down to be stepped on the gundeck. At **157** is the small "landing" already mentioned, while a second *hance* **195** marks the after drift, where the after drift rail meets the main rail **168**.

The quarterdeck runs forward to end abaft the mainmast, clear of the pumps, and the little landing is about a foot lower; the quarterdeck breastwork is composed of *stanchions* **149** and a *rail* **150**, consisting of moulded plank, similar to that adorning the forecastle breast-beam. The upper barrel of the main capstan is identical to the lower barrel; the *spindle* **102** is common to both barrels, and hinged pillars support the quarterdeck above. There are gratings running from the breastwork to the after ladderway. There is presumably a scuttle overhead the main jeer-bitts, while that overhead the capstan must be wide enough to allow the capstan to be stepped and unstepped.

On the quarterdeck itself I will mention only the open bulwarks and the second after drift with its hance.



Fourth section

This fourth view is the last of the profile of inboard works. The *rising wood* **5** is scarphed to the *deadwood knee* **8**, the vertical arm of which finishes at the *fashion piece* **12**; further up can be seen the *helm-port transom* **11** and the *deck transom* **10**. *La Néréïde* has a square tuck, and it must be admitted that it is not obvious from this drawing how the various timbers quoted, especially the fashion piece, are fastened.

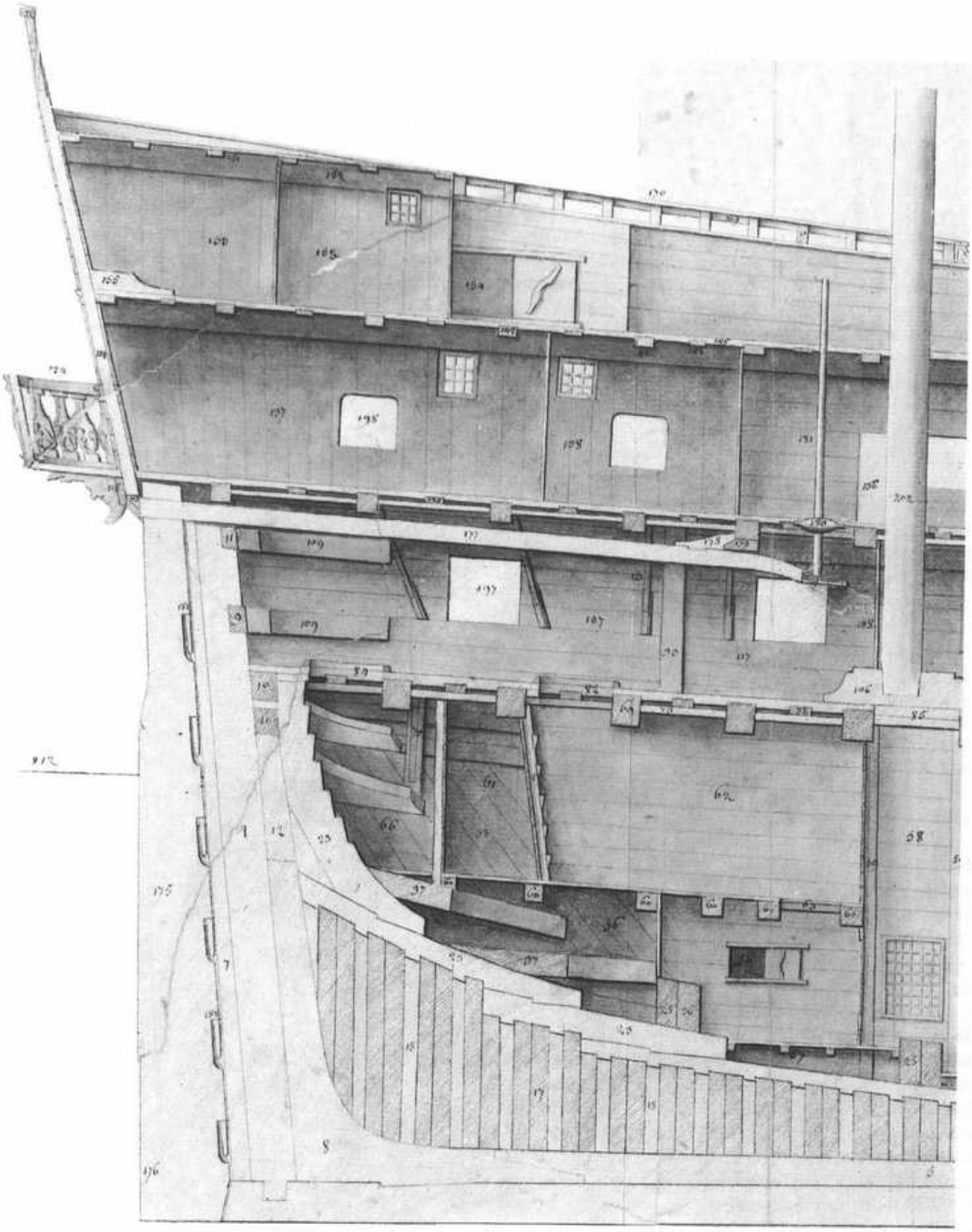
The underwater lines are evidently very pinched at the stern, if we are to judge from the height of the rising floors. Fayed to the throat of these are three timbers **23** and a triangular filling-piece forming the *sternson knee*, each timber overlaunching the other and also the keelson. The *sternpost* **4** has a large tenon at its heel, while at **7** can be seen the *false post*.

Directly below the mizen-mast is the *after well and lightroom* **58**, access to which is by way of the *passageway* **62**, leading off from which are the *bread rooms* **61**; right at the stern is the *lady's hole* **66** for the Gunner's spares. A flat composed of light beams **60** and planks forms the deck for these storerooms.

Below this flat is the *magazine* **55** for powder in barrels, and the *powder room* **56** for filled cartridges, stored in chests with sliding scuttles. At **57** is the *filling room*, and access to the magazine and powder room is by way of a *hatch* **63** in the passageway and a *scuttle* **64** for passing up the cartridges when the vessel is in action. The magazine and powder-rooms are lit by a lantern in the well, access to which is by way of the passageway. The well is constructed of four vertical stanchions, berthed up carefully with close-fitting planks, and double-glazed windows covered by mesh allow light into the magazine. Note also the *horizontal crotches* **37** and the *sleepers*; also visible, in part, are two riders.

At the level of the gundeck can be seen the *wing transom* **9** and the *transom knee* **109**, the *helm port transom* **11** and its *lodging knee* **109**; the latter is fastened to the head of the sternpost, so that the space between it and the deck transom allows sufficient room for the passage of the *tiller* **177**; the *rudder* is shown at **175**, with its *pintles and googings* **182** and *blade* **176**. The load waterline is shown by the number **212**. The *gunroom* **107** and its *bulkhead* **108** are immediately abaft the mizen-mast, stepped on the beams of the gundeck at **106**. At **178** can be seen the *shoe* or *gooseneck* of the tiller, resting on the *sweep* or *quadrant* **179**. I have described in detail the method of steering with a whipstaff in my earlier book *Le Navire Marchand sous l'Ancien Régime*, and rather than repeat myself here would refer interested readers to this latter book. Nearby can be seen the after ladderway leading up from the gundeck and reserved for the officers, already noted. Visible at **82** is the *magazine hatch*, providing access to the passageway or filling-room by means of a ladder. **84** shows the *scuttle* leading to the Gunner's spares stowed in the *lady's hole*, by means of a series of steps cut in the sternson knee.

On the level of the upper deck can be seen at **137** the *great cabin* which serves as the Captain's day-cabin; a *gallery* or stern-walk leads off this vast room; beneath the overhang of the gallery can be faintly seen the outline of the *stern counter timbers* **113**, which end at their heel in a *rail* **115**, while the *taffarel timbers* **114** run up from their head. The details of the steering gear show the *rowle* **130**, a tapered cylindrical block through which passes the *whipstaff* **131**; also visible is the *binnacle* **136** close to the *mizen-mast* **202**, the *partners* of which, **211**, which should be lined with wedges (not illustrated), are on the level of the upper deck. Lastly, the second flight **111** of the *after ladderway* for the officers can be seen, and the *deck cabins* **154** for the Master's mates. These cabins are masked by the upper works, which rise at a third drift and rail.




Escheile de douze pieds
1 2 3 4 5 6 7 8 9 10 11 12

Fifth section

The transverse section deserves just as much attention as the profile of inboard works. It is made at the midship bend, in the area of the main-hatch, looking aft towards the stern.

Over a part of the vessel's length, corresponding to the area from the break of the forecastle to the main capstan, there is no rising wood running over the keel; beyond these points it is relatively thick, in order to reduce the steepness of the floors in the narrowing of the fore- and afterbodies. This explains why the rising wood cannot be seen in this section. The lowermost planks of the hull, the *garboard strakes,* are marked **161**; above them, at **162**, there are twenty or so strakes of planking of uniform thickness, after which they gradually increase in thickness in what are called the *diminishing strakes*, as far as the first strake of the *lower wale* **163**, which stands slightly proud of the strake immediately below (the first of the diminishing strakes). The second strake of the *lower wale* **164** is the same thickness as the first, while the *black strake** between is of slightly less thickness.

The planking of the hull **171** between the gundeck ports consists of four strakes, followed by the two strakes and the black strake of the *upper wale* **165** and **166**. At the level of the upper deck there are five strakes of planking, followed at **167** by the *lower rail*, while **168** marks the *waist rail*, running the full length of the frigate, to which the lower rail is merely a complement. Note the way the heads of the toptimbers have been worked, and between them there must be filling-chocks to prevent the water running down into the spaces between the timbers.

On either side of the *keelson* **22** can be seen the *limber boards*, planks which can be lifted up to allow the limber passages to be inspected. The limber holes themselves have not been shown.

The planking of the ceiling **33** is of uniform thickness as far as the three strakes of the *stringers* **32**, which increase progressively in thickness as far as the *clamp* **63**; above the clamp is a chock.

The ends of the *orlop beams* **38** are shown simply resting on the planking of the ceiling, without any form of shelf, knee, or cleat to fasten them. Is this an omission on Ollivier's part?

The *gundeck beams* **69** have their ledges in between, which are bearded where they meet the binding strake bordering the main hatch and the chock over the clamp; the *binding strakes* **77** and the *inner waterways* **75-76** are scored down over the ledges**, while *carlings* **73** support the ledges from below and reinforce the beams. The *waterway* **74** is set into the angle formed by the deck and the vessel's side, and it is hollowed in the chine.

The fastening of the beams would be inadequate if they were simply made fast to the *clamp* **68**, and knees are used to strengthen them at this point. The shortage of suitable compass-timber in the acute angles required by these timbers encouraged attempts to form them of two pieces: trials were carried out to this effect at Toulon, on the frigates *Parfaite* and *Vestale*. Sometime around 1710-1715, S[r] Gobert proposed and was successful in having adopted *iron knees*, although they were evidently still unknown in Rochefort in 1723, since two smiths were ordered there from Brest to teach the Rochefort smiths how to forge them, and they were first employed there on the *Néréïde*.

These knees were of two types. On the gundeck they were composed of two flat iron straps, one of which was bolted to one of the vertical faces of the beam, and the other let down flush into a special chock fayed to the ceiling in the hold. These two straps form an angle of about 90°, and are welded together at the point where they meet, while a diagonal strap crosses the other ends. Knees of this type were called *triangular knees*.

The upper deck beams are kneed with so-called *Z-knees*, formed of two flat iron straps, bolted one to the beam and the other directly to the ceiling, the two parts being joined by a diagonal. Ollivier went to great pains to draw this latter form of knee. In the 1740s Z-knees were abandoned, and thereafter only triangular knees were employed, of the type shown on the gundeck of the *Néréïde*.

In the central part of the hold can be seen the berthed up compartment of the *well* **47**, the *main hatch* **79**, and a stanchion or *samson's post* **39**. At either side are the riders, of which four can be seen forward of the magazine bulkhead. Also visible is an *orlop-beam* **38**, the *Surgeon's storeroom* **46**, and in the background the *Captain's storeroom* **65** and the *breadrooms* **63**.

On the gundeck and amidships are the double ladders for the crew **112**, the *pins* **98** of the *main topsail-sheet bitts* which are forked, with the heel braced by small *standards* **112**. Behind these can be seen the *mainmast* **199**, the *pumps* **51**, and two rows of pillars. In the background is the bulkhead of the *gunroom* **108**, with the doorway on the port side. Note also the row of *upper futtock riders* **30**.

On the level of the upper deck and amidships are the main topsail-sheet bitts, and the place where the pumps discharge on the upper deck. At the side is the *landing* **157** (not shown on the profile view), the *ladderway* **158** leading up to the quarterdeck, with the planking of the landing set somewhat lower than the planking of the quarterdeck.

Abaft the mainmast can be seen the quarterdeck breastwork with its decorated frieze. The numbers **170** and **195** indicate the three after *drift-rails* and their hances or scrolls. In the background are the bulkheads of the cabins, the Second Captain's to port, with its door giving directly onto the deck. To starboard is the Captain's cabin, and since this is larger, the passageway leading to the stateroom is offset to port.

On the quarterdeck can be seen the *deck-cabins* **154** for the Master and the Bo'sun, in the middle a passageway leading to four *cabins* **153** for the officers: the *taffarel* **196** and the *stern timbers* **114** framing it rise above these cabins, forming a half-poop.

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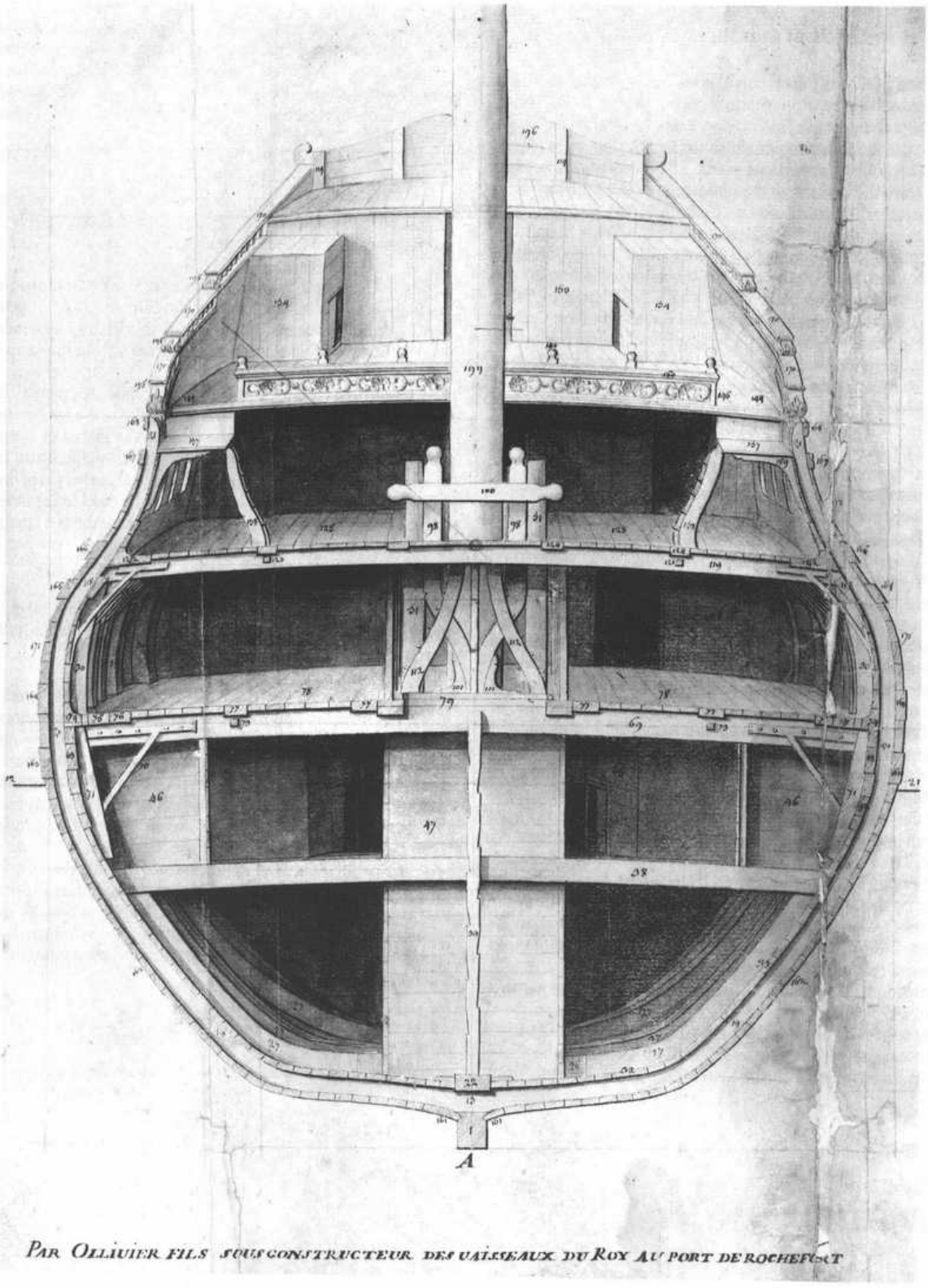
*In the 1770s the black strake was made the same thickness as the wales which made it easier to caulk. By the same token, the upper edge of the first diminishing strake was made the same thickness as the lower wale.

**An arrangement which tended to weaken these vital longitudinal members, so that an alternative arrangement came to be preferred whereby the ledges were cut into instead and bearded where they rested on the edges of the binding strakes and the inner waterways, the thickness of which was adjusted accordingly, the ledges being faired to the same thickness as the deck planking.



This concludes the examination of Blaise Ollivier's drawings; I have had to assume that the reader is broadly familiar with the structures of French ships (perhaps from *The Seventy-Four Gun Ship*). For all that, I am aware that careful reading of these pages may be something of a chore, which explains why I have preferred to place them on these supplementary pages rather than in the main body of the text. Let it not be thought however that their interest or importance is in any way diminished.

Different methods of measuring ships

Comparison of the various archival documents reveals that there are differences in the dimensions reported for the same vessel. Thus, to take one example, in the Navy List of 1746 *La Renommée* is shown with the following dimensions: length from stem to post 116′0″ – breadth to outside of plank 31′8″ – depth in hold or distance from the keelson to the under side of the midship beam 16′0″. However, Pierre Morineau gives different dimensions in his manuscript: length from stem to post 120′0″ – breadth to *inside* of plank 32′0″ (to outside of plank 32′10″) – depth in hold from the upper face of the keel to the horizontal line of the gundeck at the midship bend 15′10″ (with a thickness of rising wood of 2 inches, keelson 9 inches, and round-up of the deck at the midship beam of 9 inches, this equates to a distance from the keelson to the underside of beam of 15′8″). Finally, a definitive source: the dimensions as taken off shortly after the capture of the *Renommée* by the Royal Navy (*NMM*, Box 40, Draught 2401) show a length from stem to post of 124′0″ – breadth to inside of plank 32′6″ – depth in hold from upper face of the keel to horizontal line of beam 15′10″.

Many other examples of this kind could be quoted, all of which tend to confirm the inevitable approximation of numerical sources throughout the period of the Ancien Régime. It was only towards the end of the 18th century that dimensions came to be taken off according to a strict code of practice, notably as a consequence of the adoption of class designs.

It is true that for the earlier period a number of official texts laid down the method of measuring the King's ships. According to the Regulations of 1673, the length was to be measured from stem to post, the breadth from "outside to outside" (presumably of plank?), the depth in hold from the keel to the horizontal line of beam. The 1689 Edict preserved the same definition for the length, ordered that the breadth was to be measured to inside of plank (in other words specifying what was left unclear in the 1673 text), while the depth in hold was to be measured from the upper face of the keel to the upper face of the beam at side. These measurements were henceforth those most commonly used by builders. The Edict of 1765 brought these into question, stating that the length was to be measured from rabbet to rabbet on the gundeck (without however specifying whether the depth of the rabbet was to be taken into account), the breadth was to be measured to inside of plank, and no indication at all is given as to the measurement of the depth in hold!

The succeeding Regulations made no reference to how dimensions were to be taken.

The long series of annual Navy Lists running from 1696 to 1746 have the advantage, for the researcher, of including the three principal dimensions of all the ships. The length is taken from stem to post, the breadth to outside of plank, and the depth in hold from the upper face of the keelson to the under face of the midship beam. We are thus obliged to correct the figures given (as in the example of the *Renommée*), giving rise to an inevitable approximation. How much more helpful it would have been had the texts accorded with the 1689 Edict!

After 1746, the Navy Lists become mere summaries, leaving out the dimensions except in a few rare instances.

Other archival sources allow one to fill in many of the gaps, but all too often the dimensions given are undefined, so that guesswork becomes the order of the day.

Length. The length from stem to post is also described as the length overall, or length from head of stem to head of post, this varying from the former dimension by the distance separating the perpendicular of the outer face of the stem from the head of the stem, to the head of the sternpost.

The length may also be taken from rabbet to rabbet[1] on the gundeck (1765) – at the height of breadth – at the load waterline[2] – from the perpendicular of the stem to the rabbet of the post at the height of the wing transom – the length withinboard (inside of stem and post) on the gundeck, or again at the height of breadth, or else from the inner face of the post at its head to the inner face of the stem. What a profusion of different methods of taking the measurements, and if the definition is missing, how are we to interpret the figures given?

Breadth. There are two alternative methods, both taken at the midship bend[3], either to inside or to outside of plank. As a rule, most builders prefer the former method.

Depth in hold. It is most usual for the depth in hold to be measured from the upper face of the keel to the chord or horizontal line of the lower face of the midship beam. The measurement taken from the upper face of the keelson to the lower face of the midship beam is more particularly proper to the merchant service, although occasionally also employed for the King's ships.

All these possible variations in the methods of measuring the three principal dimensions of ships forces one to be cautious in any affirmation. It is more appropriate to talk in terms of averages, having first highlighted individual and exceptional cases. It is however logical, when talking of the length to breadth ratio, to make the calculation from the length at the load waterline from rabbet to rabbet (taking the depth of the rabbets into account), and the breadth to outside of plank.

1. The depth of the rabbets being ignored.
2. An entirely theoretical dimension, since the actual load waterline may well not be that originally intended.
3. As a rule one can take it that the midship bend corresponds with the maximum breadth.

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Chapter II
LIGHT FRIGATES

LIGHT FRIGATES

The earliest "frigates" were derived from the so-called *double-chaloupe*[1] or "shallop", a large, undecked vessel armed with a few swivel guns. Decked-in and with an increase in length, and the addition of a number of small guns mounted on carriages transformed the shallop into a *barque longue* or barca longa, which in course of time came to be known as a corvette or sloop of war.

With a further increase in dimensions, a continuous flush deck[2], a tier of guns of rather larger calibre, the addition of a quarterdeck and perhaps a forecastle as well, these vessels were transformed into the primitive archetype of the *light frigate*.

Rated after the five rates of ships, the light frigate was given only a passing mention in the Regulations of July 4th 1670: "Light frigates of 8 to 16 guns shall have but a single deck, the larger of them may have a small forecastle to protect the galley fires and one aft to protect the officers' quarters[3], running as far aft and forward as may be appropriate." This is the only official mention of the light frigate at this period, the Edict of 1689 merely specifying that all their guns should be iron.

From the 1670 text, it is worth underlining the reference to a *single deck, for it is this which distinguishes the light frigate from the vessels studied in the preceding chapter.*

Perusal of the Navy Lists reveals that up to 1670 the smallest light frigates were armed with 10 guns. Thereafter they gradually increased in strength, so that by the end of the 17th century the smallest vessels were armed with 14 guns.

The Navy Lists can however be confusing, since there are also a number of sloops of war incorrectly listed as light frigates. This is explained by what one might call a "grey area" between the smallest vessels of one class and the largest of the next class below. To cut a long story short, for the period up to 1680 we will treat as light frigates those vessels which are armed with not less than 10 guns. From about 1690 onwards, a minimum armament of 14 guns marks the break point between the light frigate and the barca longa or sloop.

A distinction should be drawn between *two types of light frigate*: those which comply with the definition of 1670, with a single flush deck, and those fitted with two decks but with the gundeck devoid of armament. The height between decks is reduced, and there may be oar-ports on the gundeck. The presence of two decks results in an increase in height of the upper works. As a rule, it is the larger vessels which are fitted with two decks, but I repeat that these should not be confused with the ship-frigates covered in the previous chapter, since the second deck cannot be armed.

For the 17th century, the armament of light frigates consists of between 10 and 18 guns of 4 or 6 pounds calibre, the former being reserved for the smallest vessels. The largest may also be armed with a few 3- or 4-pdrs on the quarterdeck. The Navy Lists give one or two examples of vessels being armed with 8-pdrs on the gundeck.

The lengths vary between 70 and 100 feet from head of stem to head of post, with a length to breadth ratio of between 3.55 and 3.90. The displacement of these vessels is of the order of 270 tons if 70 feet long, 500 tons for 100 feet of length.

By the 18th century, the upper deck armament might be composed of up to twenty-two 8-pdrs, with a secondary armament of six 4-pdrs on the quarterdeck, but this is a maximum valid for the two-decked type, only the upper deck being armed. Such vessels were more than 100 feet in length, but there were also many light frigates of more modest dimensions, armed with only 14 to 16 4-pdrs, much closer in size therefore to the barca longas.

In 1743, the shipwright Blaise Ollivier drew up a report of particular significance[4], in which he analysed critically the various types of frigates and sloops of war in the French Navy. I have included his comments *in extenso* below, since they cover not only the two-decked ship-frigates which were the subject of the preceding chapter, but also the light frigates which were the immediate precursors of the so-called 8-pdr frigate of the 18th century.

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Memorandum concerning the building of frigates, light frigates and sloops of war suited for privateering. (Blaise Ollivier, 1743)

Frigates of 40 to 46 guns. *If we are to build frigates of 40 to 46 guns armed on two decks, one with 12-pdrs and the other with 6-pdrs, it is essential that such vessels shall have no more than 3 feet 8 inches of height of bulwarks above the upper deck in the waist, that their quarterdeck shall extend no further forward than the after ladderway or at most as far as the main capstan, and that they shall have no forecastle. It is thus that we have built vessels of this force with success in the past. It is physically impossible if we increase the upper works as we have done since the peace to give them sufficient height of gundeck sill and to make fast sailers of them, for their tophamper demands a considerable weight of ballast, and the weight of this ballast demanded by the tophamper makes the vessel too heavy in the water.*

Frigates of 36 guns. *If we are to build frigates of 36 guns, they should have 10 or 12 8- or 12-pdr guns on the gundeck abaft the mainmast and 24 or 26 8-pdrs on the upper deck, taking care that the quarterdeck be not extended forward beyond the after ladderway, and that the bulwarks in the waist should rise no more than 3 feet 8 inches above the upper deck. Such frigates should have no forecastle, or if their commanders insist (for this is ever a problem with sea officers, whether or not a forecastle is advantageous in war, even though ships of 50 and even 56 guns have fought successfully without one, and this is even more true of frigates of 40 and 36 guns), the forecastle must then be made so light that it interferes in the least possible degree with the vessel's speed, and it should serve only to enable men to be positioned for boarding.*

Frigates of 30 guns. *In frigates of 30 guns there should be 6 or 8 8-pdrs on the gundeck and 22 or 24 more of the same calibre on the upper deck, and their upper works should be as for frigates of 36 guns. This arrangement will be found to be more advantageous, and especially with regard to their speediness, than the arrangement which we commonly employ, whereby we arm them with 22 8-pdrs on the upper deck and 8 4-pdrs on the quarterdeck.*

Frigates of 20 to 26 guns. *The light frigates of 26 guns which we have built since the peace with two decks and 6-pdrs on the upper deck and 4-pdrs on the quarterdeck are not at all suited for war; it is impossible for them to sail well with upper works which are raised so high. Frigates of this strength and those of 24 and 20 guns should have but one deck, those of 26 guns armed with 8-pdrs and those of 20 and 24 guns armed with 6-pdrs; and since this will be their sole armament, those of 26 guns should have a height of gundeck sill of five feet, and 4 feet 6 inches to 4 feet 9 inches in the others, so that they may use their guns in all weathers. An orlop should be installed in such frigates, placed 3 1/2 feet or 4 feet below the upper deck. This orlop, which will run from stem to stern, should be fastened down permanently and caulked from the mainmast to the stern, and the bread rooms and magazine should be beneath this orlop. The quarterdeck should run no farther forward than the after ladderway, and the forecastle no farther aft than the bitts. There should be no more than 3 feet 8 inches of height of bulwarks above the upper deck in the waist. The* Médée *and the* Panthère *are built in this manner, the former of 26 guns and the latter of 20.*
Light frigates built in such a manner have all the space necessary for berthing the crew; there is no need to clear for action; everything is at all times ready for the vessel to go into action; in a gale or in a seaway they are equal to or superior to frigates of 46 or 50 guns which can only open their upper deck ports, and by reason of their low upper works and light structures they have the advantage over them in speed of sailing.

Sloops of 16 guns. *Sloops of 16 guns should have but a single deck, a quarterdeck stretching as far as the mizen-mast and a forecastle as far as the bitts. There should be one or two oar ports between each pair of gunports. There should be no orlop in such vessels, the crew being berthed in the hold over the casks. It is in this manner that we have successfully built vessels of this force hitherto, and as such they have all the qualities demanded of them, whereas if the upper works are increased as they have been since the peace they are poor sailers.*

Sloops of 12 guns. *Even the modest upper works which we have recommended for sloops of 16 guns is too much for those of 12. Such vessels should have but a single deck, with the guns only as far as the mizen-mast, the deck being broken in the way of the mizen-mast, where the upper works should be raised 2 feet, with a quarterdeck 3 1/2 feet above the upper deck. In the event that we should build sloops of war of 10, 8, 6 or 4 guns, they should be fitted out like those of 12 guns.*

Brest, this 22nd day of November 1743
Ollivier.

The memorandum quoted above is preserved in the *Archives Nationales* (fonds marine, $D^1 10$). I thought it worth quoting in full, preserving the form of the original, and without omitting the paragraphs relating to sloops of war.

Blaise Ollivier does not explicitly condemn two-decked ship-frigates, but his criticism of them is implicit in the section relating to the light frigate armed with 26 guns, which is the subject of the next chapter. Moreover, the approval given to the 8-pdr calibre had the effect of "displacing" the 6-pdr, henceforth reserved for sloops of war only, its disappearance being marked by the building of the last light frigates armed with 20 to 24 6-pdrs.

Note also the degree to which Ollivier is obliged to reduce the height of the upper works, thereby making it possible to reduce the amount of ballast. He gives moreover the height of gundeck sill, a crucial measurement for any warship.

Blaise Ollivier condemns the light frigates of 26 guns[5] built since the peace[6], which had been fitted with two decks and 6-pdr guns on the upper deck, 4-pdrs on the quarterdeck. These vessels finished up with upper works which were much too weighty, and were prejudicial to the qualities of manœuvrability, speed of sailing and lightness which ought to be the essential characteristics of the frigate. Blaise Ollivier proposes to replace the gundeck with a light orlop placed 3½ to 4 feet below the upper deck. The height of the upper works is then reduced as much as possible, the length of the forecastle and quarterdeck limited, and no secondary armament is envisaged. In other words, this was a return to the arrangements laid down in 1670, although the new vessels were larger. According to these principles, Ollivier envisaged two types of light frigate, one armed with twenty-six 8-pdrs, the other with twenty-six 6-pdrs. Four 6-pdr frigates were built in the 1740s to the design proposed by Ollivier, and these were the last of the *light frigates*; thereafter, the 6-pdr calibre was reserved for sloops of war. It was the adoption of the 8-pdr and 12-pdr calibres which was to characterise the frigates built from then on, as we shall see in the following chapters.

1. See J. Boudriot: *Corvette La Créole*, Paris, 1990.
2. This deck was hitherto broken at the waist.
3. In other words, the quarterdeck.
4. Preserved in the *Archives Nationales*, Cat. N° $D^1 10$ (fonds marine).
5. Ollivier is referring to the *Thétis* and the *Vénus*.
6. i.e. since the Treaty of Utrecht, marking the end of the War of Spanish Succession 1702-1713.

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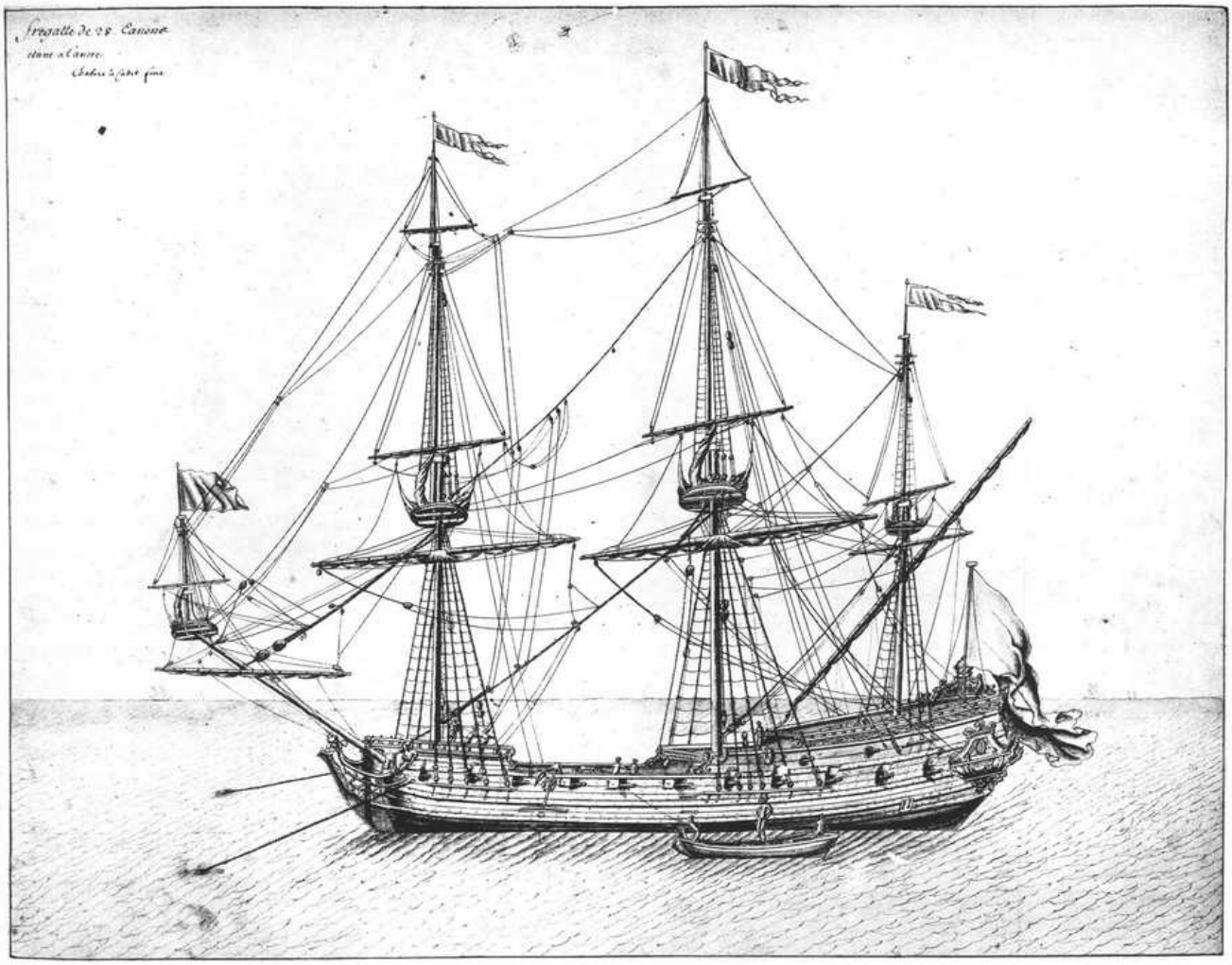


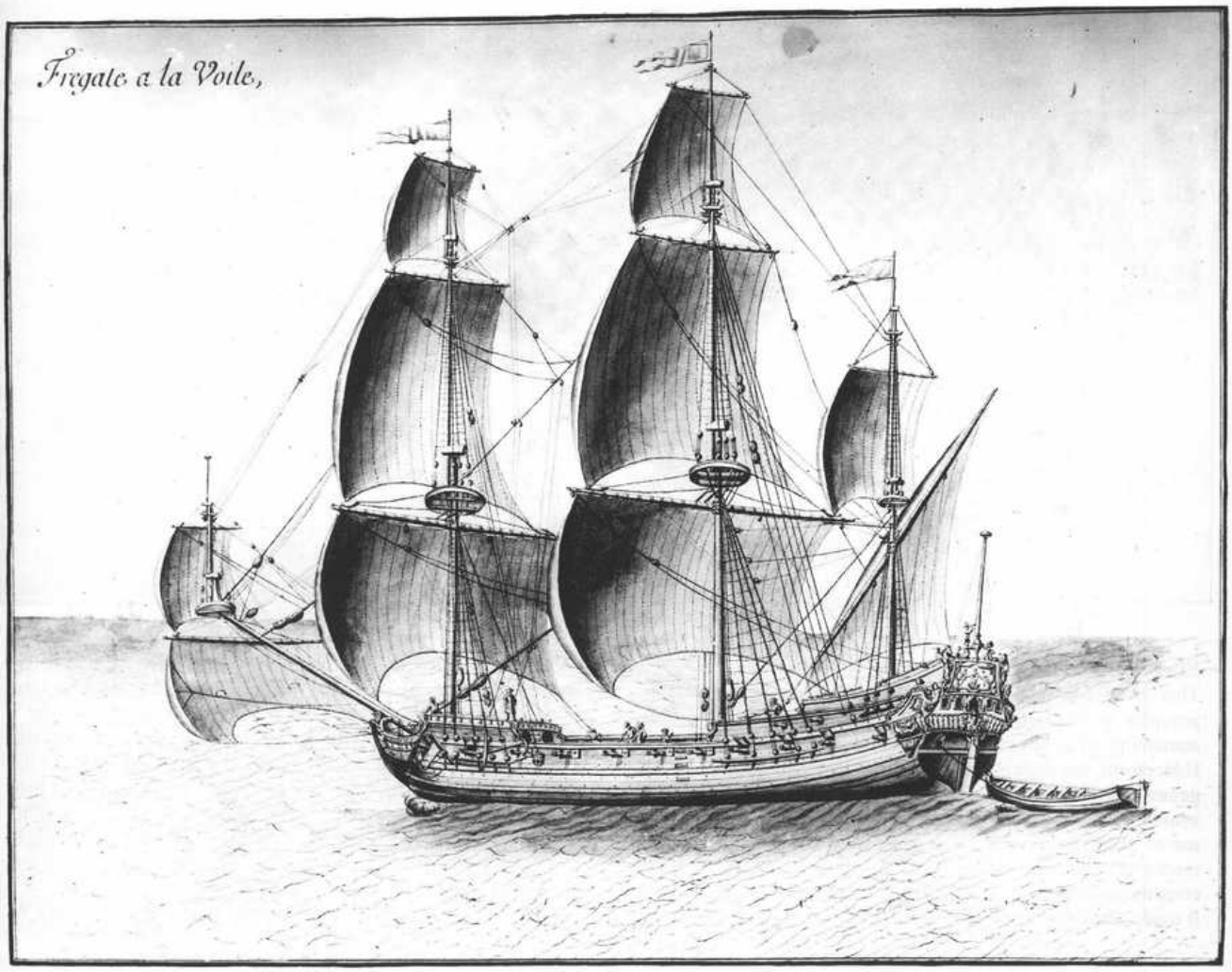
This pen and wash drawing, signed by Chabert Junior, is undated, but we can situate it at around 1670-80; it shows a large light frigate, possibly the *Gracieuse* or the *Rieuse*, built in 1672-1674 at Toulon. These vessels were armed with twenty-two 8-pdrs on the upper deck and four 4-pdrs on the quarterdeck, which accords with what is shown in the drawing, even though the caption indicates 28 guns. This frigate is two-decked, as we can see from the extreme height of the gunports and the presence of a raft-port in the stern.

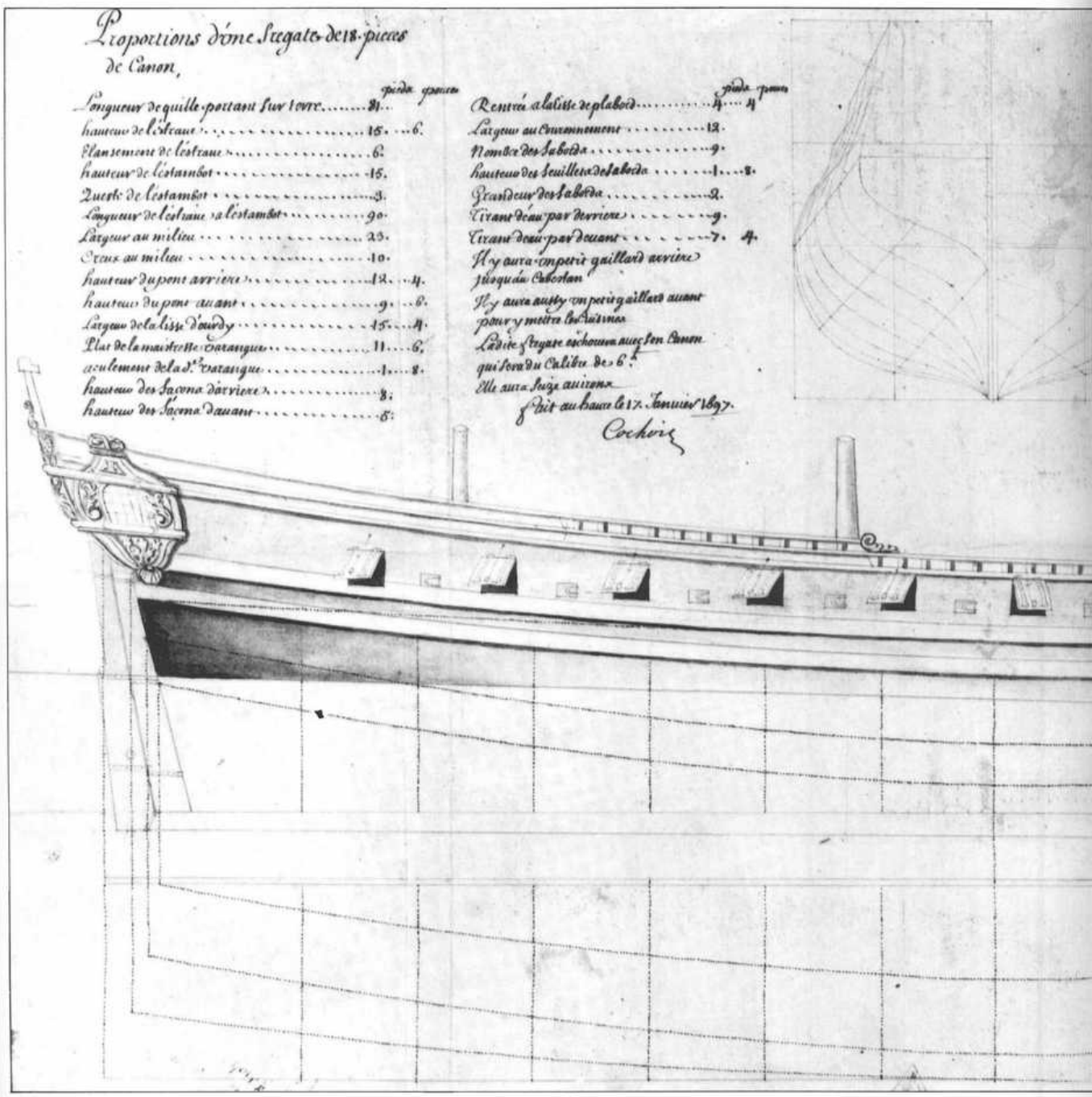
The drawing has been executed with a minute attention to detail, but the positioning of the hawseholes is for all that incorrect, and the absence of a bobstay beneath the bowsprit is peculiar, for without it the bowsprit would certainly not be able to withstand the strain of the forestay. The furled sails are correctly represented, and the same seems to be true of the various items of rigging, although only a methodical examination of the run of each line would confirm that this is true.

All the gunports are furnished with port-lids: those in the waist are closed by lids which hinge forwards like shutters. The quarterdeck breastwork is rather too high, and the artist could have been somewhat more disciplined in tracing the lines of the decks. Nevertheless, these few criticisms should not be allowed to detract from the interest of the document.

This drawing is unsigned, but the hand appears to be that of Chabert Junior. The frigate illustrated is identical to the previous one, apart from a few minor details.*
All the square sails including the mizen-topsail are set, but rather curiously the bowlines are shown only for the main-topsail; there are no brails for the topsails or topgallants, and only a feeble attempt to portray the buntlines of the courses (on the after face of the sails!).
In short, one is entitled to certain reservations with regard to the rigging. Elsewhere however, the carved work of the stern has been carefully illustrated, in a view which is missing from the preceding drawing. We will examine this again in the section devoted to the decorative carved work of frigates (Chapter XII). The escutcheon cannot be made out in detail.

*A minor detail: the port-lids in the loof open towards the stern.



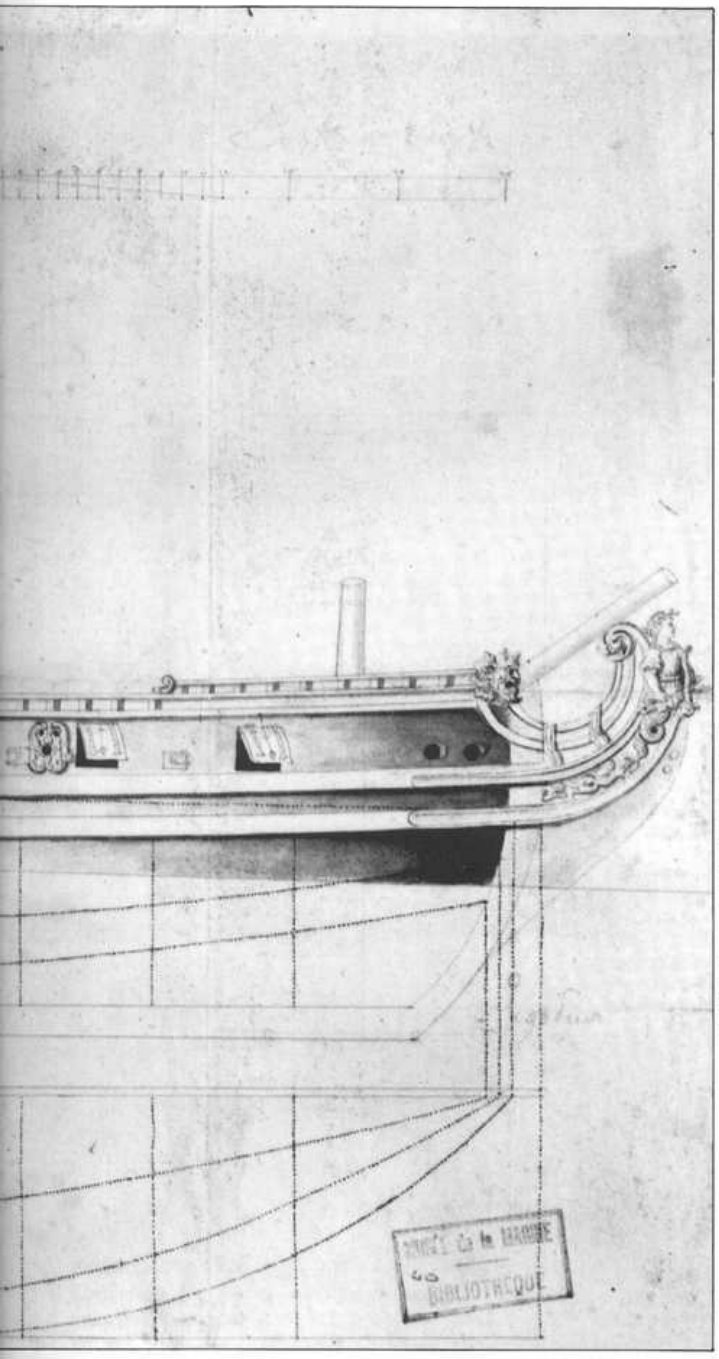


Single-decked light frigate.

This draught is relatively early, since it dates from 1697, and provides an interesting example of what was at that time still something of a novelty: the use of graphical representations. Henceforth, the drawing became a fundamental design aid. **The generalisation of this form of graphical expression is of the utmost importance in the history of naval architecture**. The use of draughts allowed ships to be "laid down on paper", and moreover provided a method of recording experience through the constitution of collections of plans. Finally, and most importantly, it made possible, in the 1720s and 1730s, the calculation of the vessel's displacement, and by the 1750s, stability too was determined in advance by means of the draught: neither of these vital calculations could have been made without the ship's draught.

This draught is signed by the Le Havre shipwright Cochois, and a body plan (not shown) indicates both the station frames and the ribbands, the latter also figuring on the sheer plan above. These early representations, precursors of the forms illustrated in eighteenth century draughts, give an excellent picture of the *light frigate*; the author has even taken the pains to indicate the carved work, and used a wash to decorate the upper works.

For a length overall of 90 feet, the rake of the stem is 6 feet, or



Proportions of a light frigate of 14 guns *which is to be fitted with but a single deck and with a length from stem to post of 80 feet, 20 feet in breadth and 9 and one half depth in hold.*

		Long	Broad	Thick
Keel	To be	70 ft	10 ins square	
To be fashioned of two timbers each 43 feet long				
Sternpost	To be	14 ft	16 ins below, 10 ins above	
Wing transom	To be	13½ ft	8-9 ins square	
Stem	To be	14 ft	16 ins	10 ins within 8 ins without
Floors	60 of	12 to 14		7-8 ins
And to be 9 ins high over the keel, 7 ins at the head				
First futtocks	120 of	8 ft	6-8 ins square	
2nd futtocks	120 of	8-10 ft	6 to 7½ ins	
Toptimbers	100 of	8 ft	6½ ins	
Deck beams	20 of	16 to 20	8 ins square	
Knees	44 of	3-4 ft in the arm		6 to 7 ins
Wales to be 2 in number on either side			10 ins	4 ins
Plank of the hull from the keel to the lower wale, to be			14 ins	2 ins
Plank of the deck of Prussia deals of				2 ins
Masts				
The mainmast to be		58 feet	14 ins	
The main-topmast		31	9½	
The main-topgallant		13	4	
The foremast		49	12	
The fore-topmast		27	7½	
The fore-topgallant		9	3¼	
The mizen-mast		39	9½	
The bowsprit		30	13	
Yards				
The mainyard		40	9	
The fore yard		32	7½	
The mizen yard		32	5	
The main topsail-yard		24	5	
The fore topsail-yard		20	4½	
The spritsail yard		26	5	

The document omits the dimensions of the topgallant-yards. Dated August 5th 1679, the document was written at Brest and bears a number of signatures, notably those of Laurent and Estienne Hubac and Levasseur, shipwrights.

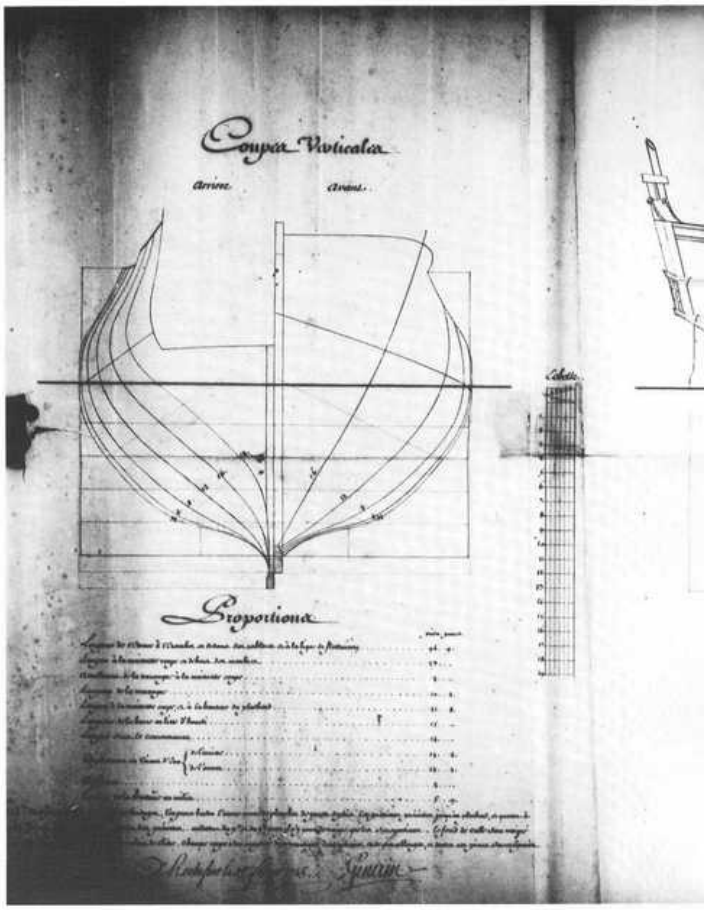
1/15th, which is relatively little for this period. The length to breadth ratio of 3.91 is considerable, and the depth in hold as defined in the Edict amounts to 0.45 of the breadth. The height of gundeck sill is 4 feet 8 inches, and the gunports are armed with 6-pdrs; there are eight oar-ports. Note the decoration of the head with the open-work topsides and the quarter-badges.

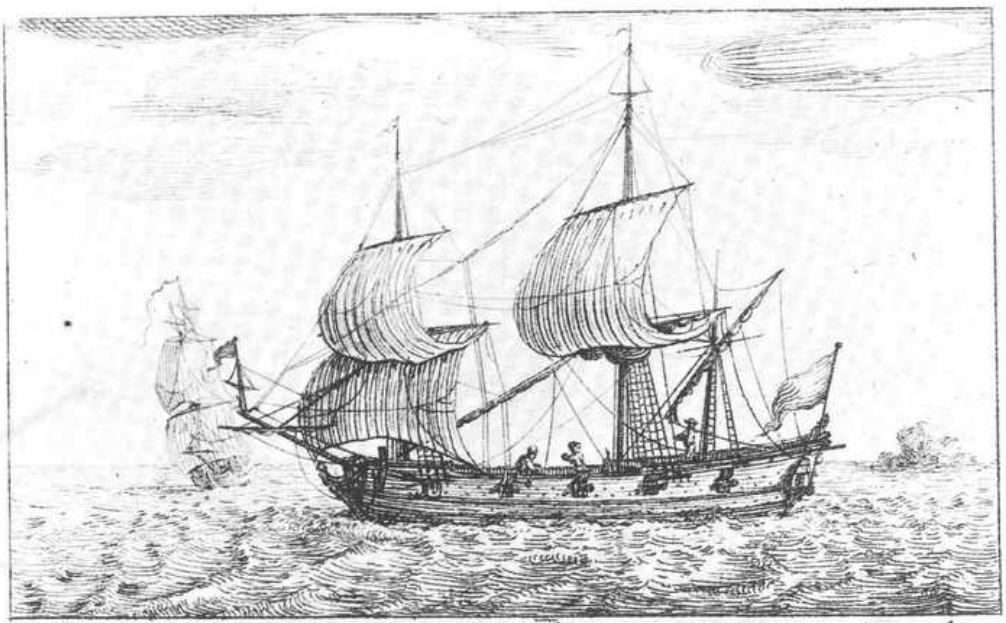
It is interesting to juxtapose with this draught a manuscript dating from 1679 relating to a light frigate (*Archives Nationales* fonds marine D¹15). Rather than reproduce the original, which is not easy to read, I have preferred to transcribe it here in full.

Two-decked light frigate. (SHM D[1]64)

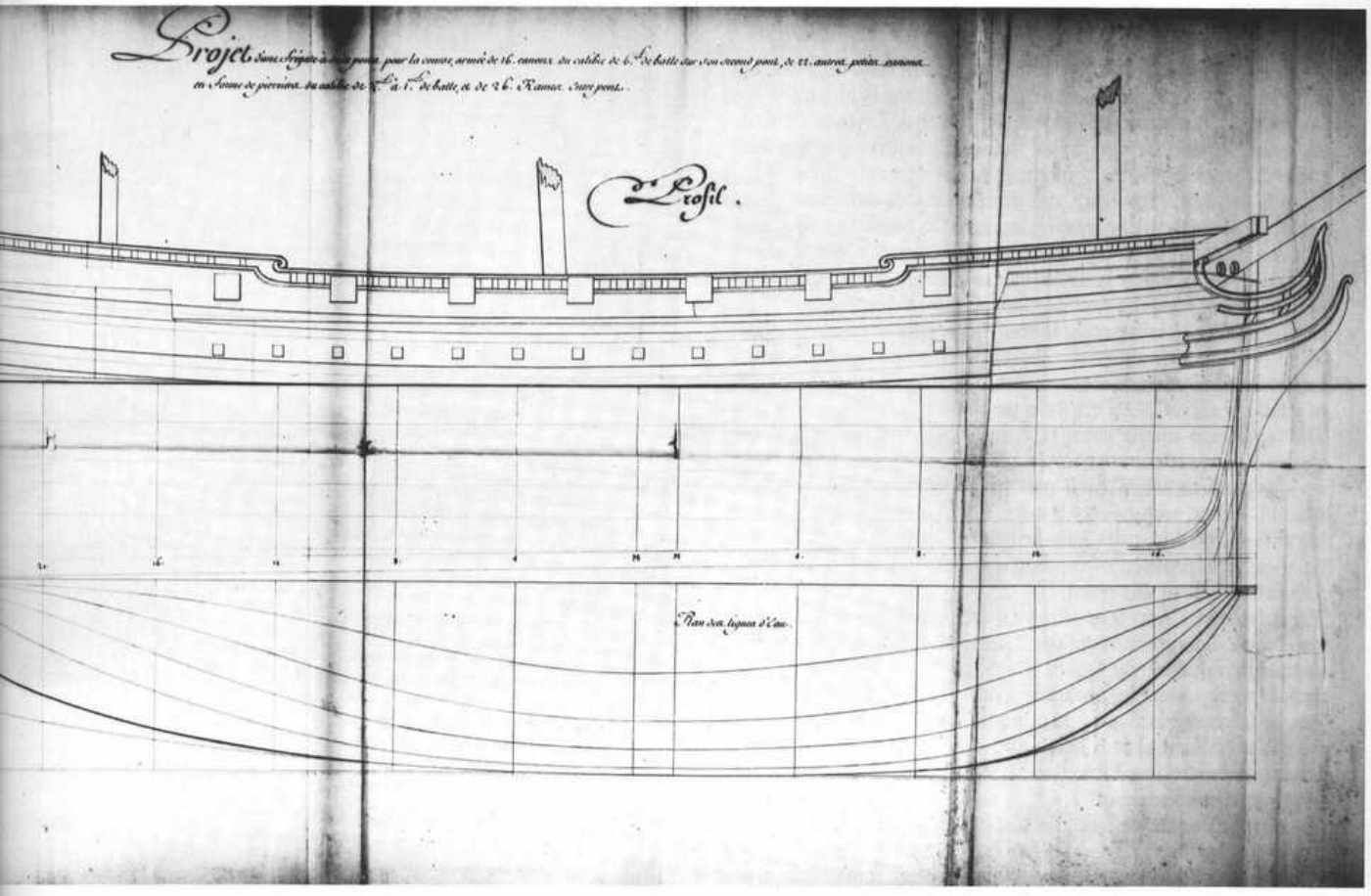
In the absence of any earlier document, here is a draught dating from February 1745, for a light frigate intended as a privateer and designed by the Rochefort shipwright *Blaise Geslain*. Its three principal dimensions are as follows: length from rabbet to rabbet at the load waterline, 96′9″ – breadth to inside of plank, 29′0″ – depth in hold to the upper deck, 16′0″. The presence of a lower deck is made evident by the depiction of oar-ports in the between decks. The upper deck is armed with a tier of sixteen 6-pdr guns, to which twenty or so swivels are added. The guns are placed in the central part of the vessel, the deck being broken fore and aft so as to allow room for a small forecastle which slopes down towards the stem in order to clear the hawseholes. The break at the after end is designed to allow sufficient headroom in the officers' quarters, but there is no real quarterdeck, despite the height of the upper works, which finish in open-work bulwarks. The underwater hull is extremely sharp, with a marked rise of floor. It would have been interesting to have known the displacement of this frigate. Blaise Geslain indicates the draughts fore and aft, as well as a height of gundeck sill of 5 feet 9 inches, but omits the displacement.

The text in the bottom left-hand corner of the draught is illegible in this reproduction, so here are the main elements: length of the floor at the midship bend, 10′2″, deadrise 2 feet (which is considerable). Breadth at the wing transom, 15 feet, breadth at the taffarel fife rail 14 feet. Draught forward 14′2″, aft 12′2″. The remaining lines of text provide various details, notably the thickness of plank, which appears to have been planned with a view to lightening the vessel as much as possible.



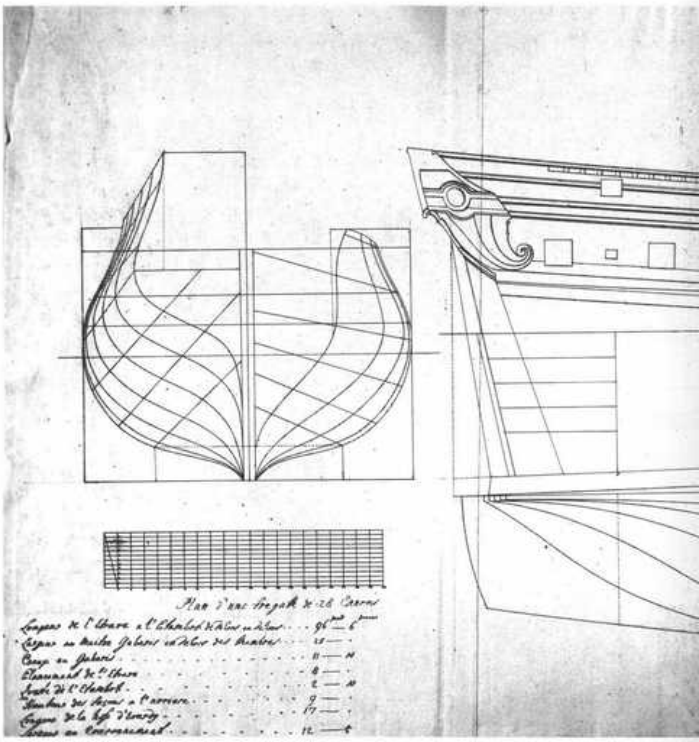


Petite Fregatte de 10. Canons pour les decouvertes et le Commerce des Isles de l'Amerique.



Reproduction of an engraving from the work by Guéroult du Pas, *Collection of views of all the different vessels of the Mediterranean and the Atlantic, with their names and employment*, published in 1710. This light frigate seems to be of very modest dimensions, but has for all that five gunports, probably for 3- or 4-pdrs. If we are to judge from the position of the ports, there is only one deck, running from bow to stern, and the depiction of the man standing in front of the mizen-mast suggests that there is a small quarterdeck at the stern. The two other figures appear to take no account of the level of the deck. Despite its small dimensions, the frigate is ship-rigged, in other words with three masts, which gives an impression of miniaturisation. The division of the sails into three tiers must have been to the detriment of her speed of sailing. A curious feature is the illustration of a minuscule sprit-topmast, which seems improbable. Note the existence of a single topgallant, the main, and the absence of a square sail on the mizen.

Light frigate of 28 guns (circa 1700-1705)



This draught is preserved in the Danish National Archives, but there is no indication of the date, the name of the Builder, or even the name of the vessel portrayed. For all that, I would date the document to the beginning of the 18th century: the gundeck pierced for ten guns has something of the characteristics of the *Nymphe* of 1703, although the dimensions do not correspond exactly and the figure bears no relation to the charming daughters of Zeus. It would seem that this draught relates to a vessel which was never built, but it is nevertheless entirely representative of the light frigates of the first decades of the 18th century.

The length from stem to post is 96′6″ – breadth to inside of plank 25′0″ – depth in hold (from the under face of the keel to the horizontal line of deck at the midship bend), 11′10″. The height of gundeck sill as taken off from the draught is 4 feet.

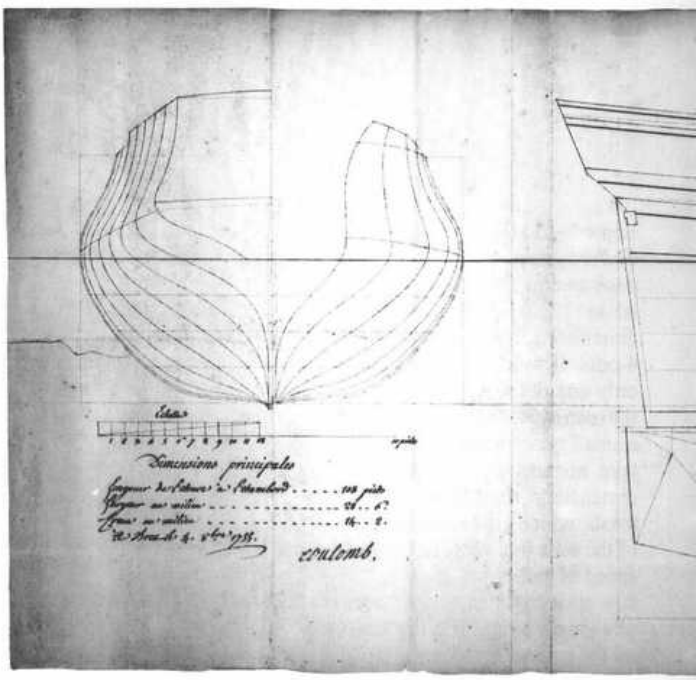
The indication of the stern is improbable, but perhaps it is a clumsy attempt to show a round tuck "of the English style". There are oar-ports between each pair of gunports on the gundeck, which is armed with twenty 6-pdrs. There is a forecastle stretching as far as the fore drift, and the head is "closed" by a beakhead bulkhead, the position of the bowsprit indicating that there is a step in the deck at this point.

The quarterdeck runs forward as far as the main jeer bitts, which stand in the open part of the waist, and the gundeck armament is complemented by eight 4-pdrs. The foremost port on the quarterdeck is much too large, probably a draughtsman's error.

The half-breadth indicates in summary fashion: the riding bitts, the cable hatch, the main hatch, the main topsail-sheet bitts, the pumps, the main jeer-bitts, the after hatchway, the capstan, the foremast and the mainmast.

The only line of deck marked is that of the gundeck; 3½ to 4 feet below that ought to be the horizontal line of the orlop. Judging by the port sills of the quarterdeck ports, they must be about 5 feet 6 inches above the horizontal line of the gundeck.

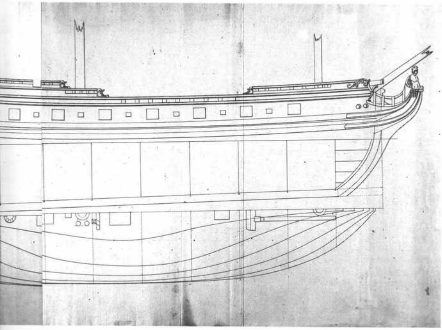
Light Frigate of 20 guns (1755)

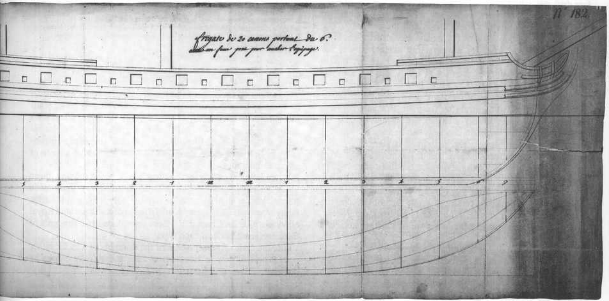


This is a much later draught, dating from the period of transition when the light frigate was not yet assimilated among the sloops of war, despite its gundeck armament of 6-pdrs.

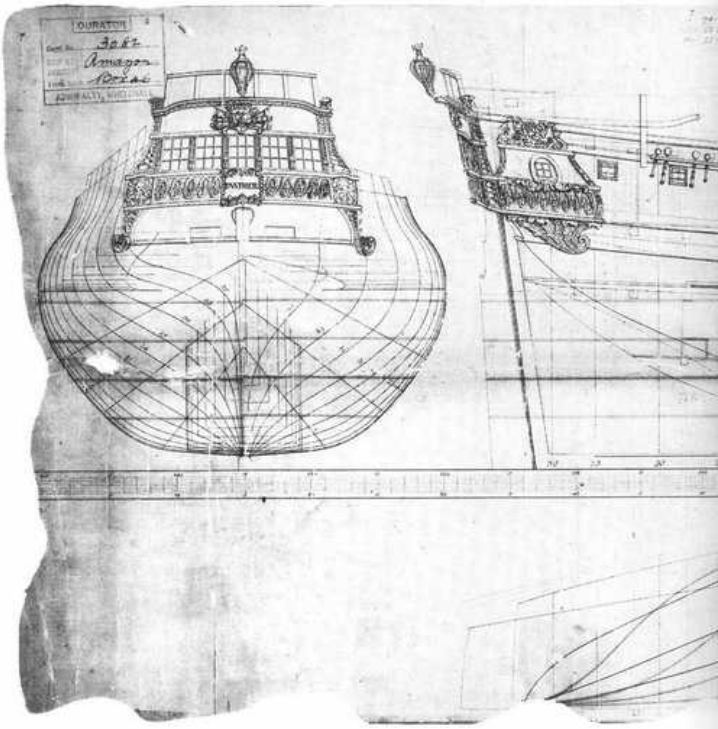
The interest of this draught, which is reproduced at the same scale as the one above, is to show the way this class of vessel, armed with twenty 6-pdrs on the gundeck and fitted for sweeps, evolved over a period of some fifty years. The length from stem to post is 108 feet (against 96′6″ for the previous example); this is a significant increase, amounting to 11%, but the ratio of length to breadth is only 3.79, compared with 3.86 for the first vessel. The height of gundeck sill, at 5′9″, is much greater, and this explains the much fuller underwater lines. The upper works have been reduced as much as possible, primarily through the removal of the secondary armament on the quarterdeck; nevertheless, the vessel retains a forecastle and quarterdeck, their length marked by the fore* and after drifts. The head appears to be open, at approximately mid-way up the height of the forecastle breastwork (not shown). The draught was made at Brest by Luc Coulomb (1713-1791), and is preserved at the *Service Historique de la Marine* at Vincennes (Cat. N° D[1]66).

*The forecastle ends in the way of the fore side of the foremost gunport.




Frégate de 20 canons portant du 6.
N° 182

THE *PANTHÈRE*



This draught illustrates the last of the light frigates. Built at Brest in 1744 to the draughts of J.-L. Coulomb, working under the direction of Blaise Ollivier, this frigate accords with the principles laid down by him. Armed only with twenty 6-pdrs, this is the "light" version, to which we can compare the *Médée* and the *Renommée* armed with 8-pdrs, the only calibre authorised for frigates from then on, the 6-pdr being reserved for sloops of war. For all that, there was a transitional period which extended no later than about 1750, during which Builders such as Pierre Morineau continued to regard as frigates vessels as small as those armed with only eighteen 6-pdrs.

The *Panthère* was captured in 1745 by HMS *Monmouth* and taken into the Royal Navy, being re-named the *Amazon*. The draught, which is preserved at the National Maritime Museum in Greenwich, was taken off shortly after her capture, and all her arrangements are thus in accordance with French practice.We will examine them, starting from the bow. The figure bears more resemblance to a lion than to a panther. There appears to be some hesitation in the depiction of the head of the vessel, so that it is impossible to say whether it is round or square. Logically, the former ought to be the case, despite the indication of a beakhead bulkhead. The bowsprit is only secured by its tenon, which engages in a morticed step, and it rests on the head of the stem. Note that the foremost beam of the deck is cut through by the bowsprit.

The diameter of the masts is markedly less at their heels than at the level of the deck, which corresponds to their given (greatest) diameter; note that the mast-steps are formed by simple blocks of timber. The fore jeer capstan has no drumhead, but simply a spindle, the head of which is shaped for the bar-holes, and the heel of the spindle rests on the cross-piece of the riding bitts. Forward of the foremast can be seen the fore topsail-sheet bitts, and abaft it are the jeer-bitts. Seven timberheads and a large range-cleat (for the anchor stopper?) can be seen rising above the fore drift-rail, which is approximately at the level of the deck of the forecastle. The upper works are as flush as possible[1], in accordance with Ollivier's ideas. Note also the oar-ports. The positions of the various hatchways in the deck and orlop conform to normal practice, save for a very large hatch between the cable-hatch and the main-hatch; it is unclear whether this is merely to provide ventilation to the orlop, where the men are berthed.

Abaft the fore-channels, at the fore drift, can be seen two sheaves, serving the purpose of chestrees for the main-tack, and between these sheaves is a sort of skid or fender, the purpose of which is unclear[2]. Forward of the main-channels can be seen the entering ladder, and a fixed-block[3]. The mainmast is flanked by four pumps, which are entirely made of wood. The main topsail-sheet bitts are at the fore side of the mainmast, but there is no sign of jeer-bitts – have they simply been forgotten?

The quarterdeck ends a little way forward of the single-barrelled main capstan. There are three kevels inside the bulwarks on the upper deck, and two smaller range-cleats on the quarterdeck[4], where there also three stocks for swivel-guns; a further stock can be seen of the forecastle.

The tiller is worked by hand, so that the mainpiece of the rudder rises to the height of the quarterdeck; there are two deck-cabins shown, for officers or warrant officers, one on either side, with the space left clear amidships for the free movement of the tiller. Beneath the quarterdeck there is a single cabin on either side, forward of the great cabin[5] which is illuminated by stern-lights. Presumably the central light is false, covering the mainpiece of the rudder. The narrowness of the quarter-galleries suggests that they are in fact merely badges.

I will conclude this commentary by adding that the *Panthère* had a displacement of 637 tons, and draughts fore and aft of 11 feet and 12 feet 8 inches respectively.

1. Just visible on the original draught in light pencil there is evidence of an intention to raise the bulwarks, carried out perhaps when the frigate was "anglicised" for service in the Royal Navy.
2. Its purpose may have been been to protect the rigging from fraying.
3. For the studdingsail tacks, the crow's-foot of the brails and the fore preventer-brace.
4. For belaying a number of heavy lines (details in the monograph of *La Renommée*).
5. Also serving as the wardroom.

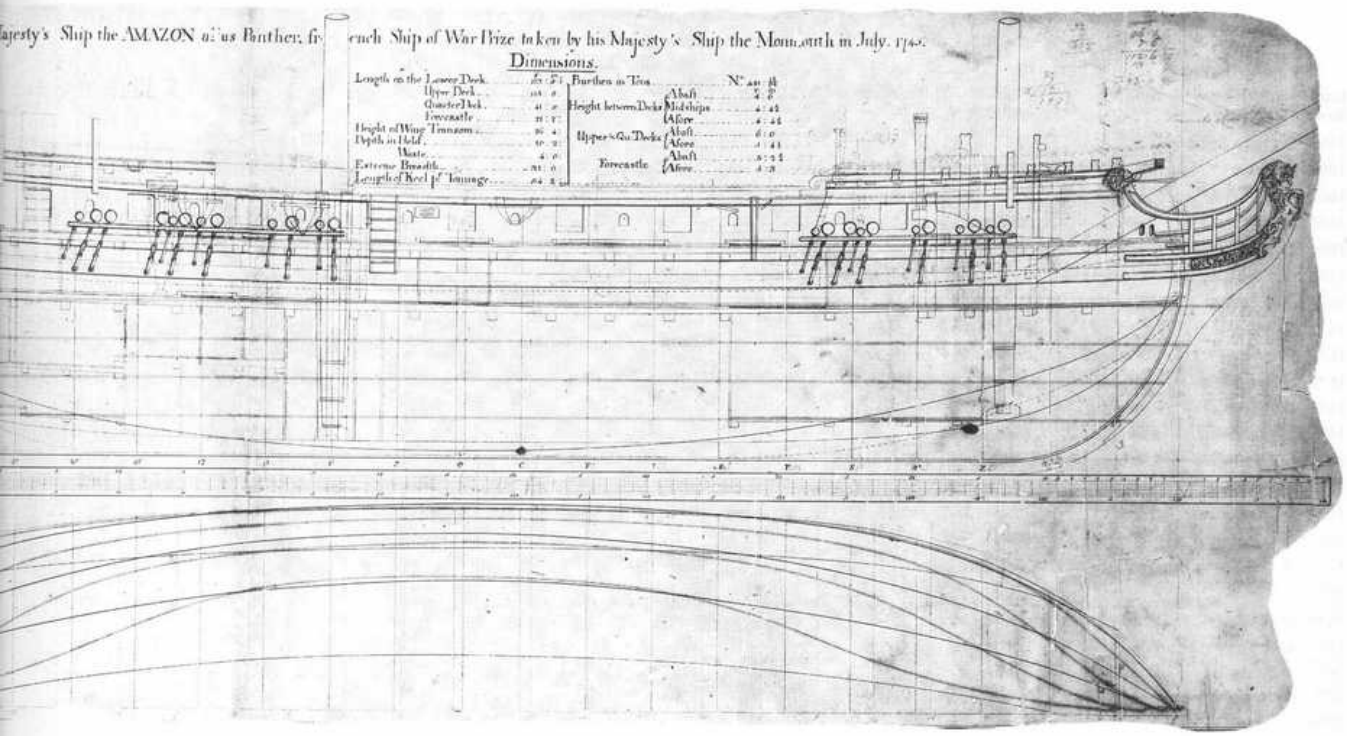
Note

Throughout this book are to be found a large number of draughts reproduced from the Admiralty Collection of the National Maritime Museum, Greenwich. During the course of the various wars between France and England, many French vessels were captured. If taken into the Royal Navy, draughts were almost invariably made*, and these today provide an invaluable source of information about the French Navy of the time.

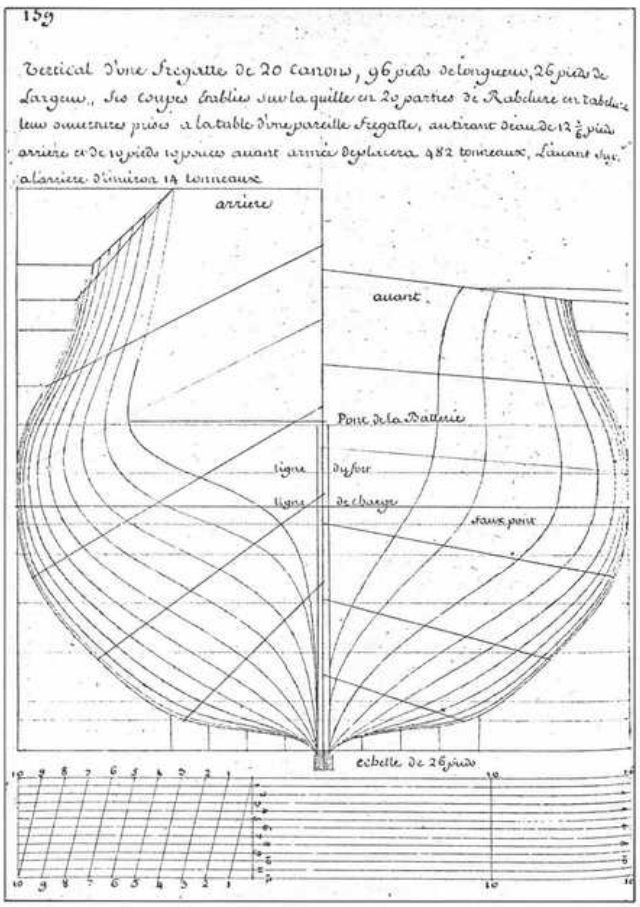
It is important to distinguish between two types of draught: those taken off shortly after the vessel was captured, and those made much later, for the latter type is reliable only for the hull forms, many other items having been modified in accordance with Royal Navy practice. In Chapter V I have reproduced two draughts of the same vessel, one of each type.

While the state of preservation of the draughts makes for rather poor reproductions in some cases, their authenticity cannot be doubted.

*Draughts were even made in some cases of vessels not taken into the Navy, and of privateers and other small vessels.



Courtesy National Maritime Museum, Greenwich



This body plan of a light frigate armed with twenty 6-pdrs is taken from the manuscript *Treatise of Shipbuilding* by Pierre Morineau; the manuscript is a precious mine of information on French shipbuilding practices of the period 1730-1760. The vessel is smaller than the *Panthère*, with a displacement of only 482 tons. The length overall of 96 feet is also 12 feet less, which is a considerable difference, but the length to breadth ratio, at 3.70 as opposed to 3.79 for the *Panthère*, is very similar: an identical ratio would have required a length of 98½ feet.

The hull lines of the *Panthère* give an impression of being fuller than those of Morineau's frigate, where the deadrise at the mid-ship bend is greater, but this is in fact belied by the coefficient of the circumscribed area, which at 0.46 is quite small in the case of the *Panthère*, against 0.51 for the Morineau vessel (draughts fore and aft of 10 feet and 11′6″, height of gundeck sill 5 feet for both vessels). By comparison, the 20-gun 6-pdr sloops designed by Tellier in the period 1790-1810 had a coefficient of 0.48 (see J. Boudriot, *Corvette La Créole*).

Morineau gives a further example of a light frigate, this time with eighteen 6-pdrs, with a length of 90 feet and a displacement of 386 tons, this being the smallest vessel designated by him as a light frigate, for he then goes on to describe as a sloop a vessel armed with fourteen 4- or 6-pdrs, measuring 80 feet in length and with a displacement of 300 tons.

Light Frigates

Laid down	Name when launched	Builder	Place of building	Length	Breadth	Depth in hold	Gundeck	Fo'csle/ Q'deck	Total	Struck from lists	Notes
1659	***la Petite Infante***								10	1678	1671 *Légère*
1663	***l'Aurore***		Brest							1675	1671 *Sybille*
1666	***la Gaillarde***								14	1675	Became fireship *Incommode*
1666	***la Dieppoise***		Dieppe						14	1675	1671 *Lutine*
1666	***la Diligente***		Brest						12	1675	
1666	***la Christine***								10	1680	1671 *Sans Peur*
1670	***la Bretonne***								22	1675	1671 *Tempête*
1670	***l'Embuscade***		Le Havre						28	1677	
1670	***l'Aurore***	E. Hubac	Brest						18	1689	1671 *Normande*
1670	***la Bouffonne***	E. Hubac	Brest	86'0"	24'0"	9'6"	16x 6	10x 4	26	1696	
1670	***la Friponne***	P. Mallet	Rochefort						16	1690	
1670	***la Maliane***	J. Guichard	Rochefort						16	1695	
1670	***la Mutine***		Brest						16	1694	
1671	***la Railleuse***								10	1680	
1672	***la Bien-Aimée***	Hendrick	Dunkirk						24	1692	
1672	***la Mignonne***	Hendrick	Dunkirk						10	1694	
1672	***la Gracieuse***		Toulon						24	1675	
1674	***la Rieuse***	Audibert	Toulon	124'0"	32'0"	13'0"	22x 8	4x 4	26	1698	1676 *Arc en Ciel*
1675	***la Jolie***	B. Chaillé	Le Havre						24	1693	
1675	***la Trompeuse***	B. Chaillé	Le Havre						24	1683	
1676	***la Sorcière***	Hendrick	Dunkirk						24	1695	1672 *Gaillarde*
1676	***la Vipère***	Hendrick	Dunkirk	83'0"	22'0"	8'6"	14x 6	4x 3	18	1703	1678 *Lutine*
1676	***la Diligente***	J. Guichard	Rochefort						28-26	1689	
1676	***la Moqueuse***		Brest						10	1690	
1676	***la Fée***	E. Hubac	Brest	103'0"	25'2"	12'3"	14x 8	6x 4	30	1698	1690 *Jalouse*
1676	***la Mutine***	P. Brun	Brest						28	1694	
1676	***la Tempête***	Saboulin	Rochefort						28	1690	
1676	***la Subtile***	E. Hubac	Brest							1694	1678 *Pressante*
1678	***la Badine***	Hendrick	Dunkirk						10	1683	
1678	***la Charmante***	Hendrick	Dunkirk						10	1696	
1678	***la Favorite***	F. Pomet	Rochefort						28	1698	
1678	***la Gaillarde***	F. Pomet	Rochefort						26	1690	
1678	***la Serpente***	Hendrick	Dunkirk						26-20	1691	
1679	***le Séditieux***	Salicon	Le Havre	91'0"	25'4"	11'0"	18x 8	8x 4	26		
1682	***l'Embuscade***	Salicon	Le Havre	98'0"	25'2"	10'6"	18x 8	10x 4	28-20	1698	
1682	***la Légère***	B. Pangalot	Brest						24	1692	
1683	***la Railleuse***	Hendrick	Dunkirk						16	1689	
1689	***le Yack***	B. Pangalot	Brest	70'0"	17'0"	7'0"	16x 4	4x 2	20	1696	
1689	***l'Aurore***	Hendrick	Dunkirk						20	1697	
1689	***la Gentille***	B. Chaillé	Le Havre	85'0"	19'0"	7'0"	16x 4		16	1696	
1689	***la Gracieuse***	B. Chaillé	Le Havre	71'0"	20'0"	6'6"	16x 4		16	1690	
1690	***la Fée***	Hendrick	Dunkirk	69'0"	19'0"	9'0"	14x 6		14	1703	
1690	***la Railleuse***	J. Houvans	Dunkirk	88'0"	23'6"	9'6"	14x 6		14	1703	
1691	***la Serpente***	Le Brun	Le Havre	71'0"	20'0"	7'6"	16x 4		16	1696	
1691	***l'Entreprenante***	Barthe	Bayonne	90'0"	24'0"	9'0"	18x 6	4x 4	22	1702	
1691	***la Diligente***	Salicon	Le Havre						34	1694	
1692	***l'Audacieuse***	Hendrick	Dunkirk	73'0"	19'0"	7'0"	16x 4		16	1707	
1693	***la Salamandre***	P. Mallet	Rochefort	81'0"	23'0"	9'6"	6x 6	16x 4	22	1703	Exceptional case
1693	***la Jolie***	Arnaud	Bayonne	80'0"	20'0"	9'0"	8x 6	6x 4	14	1702	
1695	***la Nayade***	B. Pangalot	Brest	94'0"	25'6"	11'6"	20x 4		20	1708	
1696	***la Salamandre***	Coulomb	Toulon	95'0"	27'0"	8'4"	16x 12	4x 4	20	1709	
1696	***la Friponne***		St-Malo	78'0"	20'0"	9'0"	8x 8	8x 6	16	1697	Exceptional case
1696	***la Néréïde***	B. Pangalot	Brest	83'0"	22'0"	10'6"	20x 6		20	1713	
1697	***l'Aurore***	Cochois	Le Havre	92'0"	24'8"	9'0"	18x 6	4x 4	22	1716	
1702	***la Gentille***	Cochois	Le Havre	93'0"	24'8"	10'9"	18x 6		18	1708	
1703	***la Nymphe***	Cochois	Le Havre	96'0"	25'2"	10'0"	20x 6	4x 4	24	1709	1705 *Gracieuse*
1703	***la Dauphine***	Cochois	Le Havre	102'0"	27'4"	13'0"	22x 8	6x 4	28	1706	
1703	***l'Étoile***	Cochois	Le Havre	107'0"	27'8"	13'6"	22x 8	8x 4	30	1704	
1704	***la Fortune***	R. Le Vasseur	Dunkirk	84'4"	24'0"	11'0"	18x 4	4x 3	22	1728	

Laid down	Name when launched	Builder	Place of building	Length	Breadth	Depth in hold	Gundeck	Fo'csle/ Q'deck	Total	Struck from lists	Notes
1704	*la Vénus*	Tassy	Bayonne	94'6"	25'8"	8'8"	16x 4		16	1723	
1704	*la Victoire*	R. Le Vasseur	Dunkirk	100'0"	26'4"	12'6"	20x 6	6x 4	26	1743	
1704	*l'Embuscade*	P. Chaillé	Le Havre	101'0"	26'8"	9'8"	22x 6	8x 4	30	1708	
1706	*la Naïade*		St-Malo	98'0"	23'0"	10'0"	4x 6	20x 4	24	1711	Exceptional case
1706	*le Zéphir*	R. Le Vasseur	Dunkirk	90'0"	25'0"	10'0"	18x 6	6x 3	24	1713	
1707	*la Galathée*	Cochois	Le Havre	100'0"	28'0"	11'0"	22x 6	12x 3	34	1712	
1707	*l'Astrée*	B. Pangalot	Brest	94'0"	26'0"	10'4"	6x 6	20x 6	26	1717	Exceptional case
1707	*l'Amarante*	Cochois	Le Havre	75'0"	21'0"	7'6"	12x 4		12	1720	
1722	*la Thétis*	G. Poirier	Le Havre	100'0"	27'6"	8'2"	20x 6	6x 6	26	1730	
1723	*la Vénus*	G. Poirier	Le Havre	101'9"	27'7"	11'9"	20x 6	6x 4	26	1745	
1727	*l'Astrée*	J. Ollivier	Brest	109'0"	29'0"	13'0"	22x 8	6x 4	28	1737	
1729	*la Gazelle*	G. Poirier	Le Havre	90'0"	25'6"	11'0"	18x 6		18	1748	
1741	*la Subtile*	G. Poirier	Le Havre	103'0"	28'6"	12'6"	20x 6		20	1743	
1741	*la Volage*	P. Morineau	Rochefort	113'0"	30'6"	15'3"	22x 8		22	1750	
1744	*la Galathée*	Saliconrest	110'0"	29'0"	14'6"	24x 6		24	1758		
1744	*la Mutine*	Geffroy Jnr	Brest	110'0"	29'0"	14'6"	24x 6		24	1758	
1744	*la Panthère*	J.-L. Coulomb	Brest	108'0"	28'6"	14'2"	20x 6		20	1745	Draughts NMM

Some comments are needed with regard to the preceeding list. The dimensions are those given in the annual Navy Lists, which are unusual in that they indicate the breadth to *outside* of plank, and the depth in hold from the upper face of the keelson to the under face of the midship beam. Thus only the length is measured in the manner sanctioned by the various Edicts or Regulations (from the head of stem to post).

The Lists conflict sometimes in the date of laying down, by as much three years, and the numbers of guns may also vary. Included in this listing are four vessels (marked "Exceptional case" in the *Notes* column), which are light frigates armed on two decks, but with only a few guns on the gundeck: the weakness of this lower deck armament made it inappropriate to consider them as ship-frigates of the 2nd Order.

A certain number of light frigates ended their careers converted into fireships, and these were re-named with a name more appropriate to their new calling. By the same token, it would appear from their original names that some of these vessels were from the outset destined to be fitted out as fireships.

APPENDIX (manuscript by Pierre Morineau)

On page 63 is a reproduction of a body plan taken from Pierre Morineau's manuscript *Treatise on Shipbuilding*, and it seemed appropriate to add a large part of the text relating to it in the form of an Appendix.

Light frigate armed with twenty 6-pdrs. *Length from head to head 96 feet – breadth 26 feet – depth in hold 12 feet 8 inches – displacement at a height of gundeck sill of 5 feet (port sill 1 foot 5 inches above the planking of the deck) 482 tons at a draught fore and aft of 10 feet and 11 1/2 feet.*

Beneath the upper deck there should be an orlop, running from the bow to the bulkhead of the breadrooms, which is 24 feet from the after face of the sternpost; there should be a quarterdeck coming no farther forward than so as to cover the after hatch, the fore edge of which is situated 6 feet abaft the axis of the mainmast; and a forecastle measuring 19 feet in length from the fore face of the stem.

The frigate to be steered from the quarterdeck by means of a hand tiller, so that the sternpost should rise to the height of the said quarterdeck in such a manner that the quarterdeck transom be scored into the fore side of the post 16 to 18 inches above the height of the upper deck, the wing transom to be its own thickness lower, and it is upon this transom that the timbers of the stern should be fastened, their heels scored culvertail-fashion into it.*

The fore side of the 1st gunport to be 14 1/2 feet abaft the fore side of the stem, its breadth measured 25 1/2 inches from that point aft. The after side of the aftermost gunport to be 6 1/4 feet afore the after side of the sternpost, its breadth measured 25 1/2 inches from that point forward, the eight intermediate gunports to be 6 feet one from the other, not including their breadth, so that all these distances and the breadths of the ports added together give a total of 96 feet for the length. A chase port to be cut forward of the 1st gunport in such a manner that it does not incommode the cables where they lead in through the hawseholes, the lower edge of which is to be placed 15 inches above the surface of the upper deck.

The galley fires to be established amidships and abaft the foremast but not backing one against the other, for they are to be joined fore and aft down the centre line of the vessel, the after fire to be forward of the riding bitts which are set up on the upper deck.

The breadth to inside of plank at the height of breadth of the midship bend to be 3 1/4 inches for every foot of length, giving 26 feet.

The depth in hold to be measured from the upper face of the keel to the upper face of the plank of the deck and to be 6 1/3 inches for every foot of beam, making 13 2/3 feet; the lower deck to be laid 4 feet below the upper deck from plank to plank, so that there shall remain 9 1/2 feet of height from the upper face of the keel to the upper face of the plank of the lower deck, the proportion of which should be 4 1/3 inches for every foot of the breadth.

The rake of the stem to be 1/14th part of the length overall, the sweep to describe the underwater part up to the height of breadth to have a radius equal to 1/6th of the same length. The rake of the post to be one sixth of the rake of the stem. The length of the floor at the midship bend to be half the breadth, one quarter of the breadth on either side, and at its extreme length the deadrise to be 1/17th part of all the breadth above the keel. The tumblehome of the midship bend at the height of the main drift to be 1/5th of the half-breadth of either side, and at half the height separating the horizontal line of the height of breadth and the said drift, the tumblehome to be 1/10th of the half-breadth on either side.

The length of the wing transom to be 7 inches 4 1/2 lines for every foot of breadth, its round up to be 2 1/2 lines for every foot of its length, and the round aft to be 4 lines for every foot of its length. The opening of the side counter timbers at their head to be 3/4 of the opening of the the fashion pieces over the wing transom. The round up of the deck at the post to be 3 lines for every foot of its overall length, the round up at the stem to be one quarter of the round up aft.

The counter at the height of the lower sills of the upper deck ports to project aft of the post by 3 lines for every foot of the overall length; from this projection, the stern timbers to slope 3 1/2 inches for every foot of their length to the taffarel fife rail, so that they form an angle of 16 1/2 degrees with a perpendicular to the horizon. The difference in draught fore and aft to be 2 lines greater aft for every foot of overall length. Height below the quarterdeck at the breast-beam to be 5 feet beneath the beam, and 5 1/2 feet at the stern; 4 feet 10 inches beneath the forecastle. The lower port sills to be 20 inches above the deck, the ports 25 1/2 inches wide and 21 inches high. The height of the bulwarks in the waist to be 4 1/2 feet above the deck; the waist rail to rise 6 inches more at the stern than amidships above the sheer of the wale below, and to be parallel to this wale from amidships to the bow. The fore drift-rail to be 15 inches above the waist rail affixed to the toptimbers at the sides, the after drift-rail 20 inches above the waist rail. Above this first drift-rail at the stern, a second drift-rail to be placed so as to mark the quarterdeck and running from the stern to the breastwork at its fore end, where it should be 8 inches above the first drift-rail and 10 inches at the stern, the breadth of the rail and the space below included.

The wale beneath the lower port-sills at the midships port to be 2 inches at its lower face above the upper deck, its breadth 9 inches, so that its upper face will be 9 inches below the lower port sill at the midships port; at the fore side of the aftermost port the upper face of this wale to be flush with the lower sill of this port, its breadth below, and the wale below it should be the same distance as the space between the wales amidships, which is usually the same as the breadth of the wales; it would be possible to give a greater hanging to this lower wale by increasing the space between the wales amidships and reducing it at the stem and in the way of the fashion piece so that the space separating the wales would then be 3 1/2 inches greater amidships than at the bow and the stern. With the hanging of these wales drawn in on the sheer draught, the upper face of the lower cheek of the head should extend from the lower wale, the breadth of which defines the space separating the two cheeks of the head or the lacings, with the breadth of the lower cheek of the head below the lower face of the lower wale, and the upper cheek of the head extending from the lower face of the upper wale, the breadth of the cheek being below, so that as said before the breadth of the lower wale serves to mark the space separating the two cheeks of the head; the lower cheek to finish in a scroll in the way of the upper sills of the upper deck ports, the scroll being above.

This text, which demands careful reading if it is to be fully understood, is completed by a list of scantlings for all the timbers; however, I have preferred not to transcribe these here, since the information will be given in the later chapters on 8-pdr and 12-pdr frigates.

*The heels of the stern-timbers are either morticed into the top of the wing transom, or else dovetailed into its after face. The text at this point suggests a joint whereby the stern-timber is fastened by means of a double angled cut embracing the wing transom.

Chapter III
EIGHT-POUNDER FRIGATES

8-PDR FRIGATES

In the memorandum transcribed above on pages 52 and 53, Blaise Ollivier introduced a new type of frigate armed with twenty-six 8-pdrs on the upper deck. This was no unconsidered proposal, since it was founded on his experience building the *Médée*. A second document by Ollivier (Cat. N° B.251, *Musée de la Marine*, Paris), provides the following information: "*I gave 117 feet 6 inches of length to the 26-gun frigate* Médée *which I built at Brest in 1740. This frigate has but a single deck. The 13 gunports on either side for 8-pdr guns are 2 feet wide and are cut 5 feet 10 inches apart one from the other. The foremost port is 15 feet 6 inches from the perpendicular of the stem, and the aftermost port is 6 feet from the perpendicular of the post. If I had to build another frigate of the same strength, I would make it 120 feet from stem to post, without increasing either the breadth or the depth in hold*[1]*, and I would then increase the distance between the stem and the foremost port by 18 inches, and that between the aftermost port and the post by 12 inches.*"

It is possible that the design of the *Médée* was influenced by that of the *Astrée*, a frigate built jointly by Blaise Ollivier and his father Joseph, at Brest in 1727. The *Astrée* was a light frigate measuring 109 feet in length and armed with twenty-two 8-pdrs on the upper deck, this armament being supplemented by six 4-pdrs on the quarterdeck. Strictly speaking, Blaise Ollivier did not *invent* a new type of vessel, but merely took up and developed the light frigate design proposed in the Regulations of 1670. However, this "promotion" of the light frigate into what was henceforth to be simply called the frigate sounded the death-knell of the two-decked pseudo-frigate, generally regarded as mediocre vessels.

The *Médée* can thus be considered as the first "modern" frigate[2], of the types which we will go on to examine in the following chapters.

Following on from his memorandum of 1743, Blaise Ollivier received orders the following year to design four 26-gun 8-pdr[3] frigates, of which two were to be built at Brest, each by an Assistant[4] working directly under Ollivier, who was the Master Shipwright of the Royal Dockyard. One of these frigates, the *Renommée*, is covered in much greater detail in the next chapter, and is also the subject of a separate monograph with plans.

For a while, there was some "hesitation" about the designs of these early frigates, some being armed with twenty-six 8-pdrs, others only 24[5]. However, from 1754 onwards all the 8-pdr frigates built were pierced for thirteen[6] gunports. The twenty-six 8-pdrs were supplemented by four 4-pdrs on the forecastle and quarterdeck, which explains why they are also known as 30-gun frigates, from their total armament[7].

The standardisation of the upper deck armament led to the adoption of dimensions which varied little from vessel to vessel[8], the length dictating the breadth and the breadth the depth in hold, which in turn dictated the average draught and thus the height of gundeck sill. This statement may seem surprising at first sight, and is worth exploring in greater depth.

The fundamental dimension is the length, which in frigates and ships is determined by the number of gunports and the calibre of the guns on the upper deck[9]. Long experience had fixed the width of the ports and the distance separating them as a function of the calibre. Thus, as we have seen, the 1671 text imposed a distance between ports of about 7 feet; this was reduced to 6½ feet by the 1673 Regulations, irrespective of calibre. It is however important to increase the dimensions of the ports and the distance between them as the calibre increases. Both manuscript and printed sources show that gunports varied in width from about 18 inches for a 4-pdr to 3 feet for a 36-pdr. By the same token, the distance between ports varied from 6 feet for the smallest calibre to 8 feet for the largest.

Surviving manuscripts indicate that there were only very small differences in the widths of gunports between vessels armed with the same calibre, although there were wider variations in the distances between ports. As already explained, there must be a minimum distance between the stem and the foremost port of 2¼ times the distance between the ports, while at the stern, the distance between the aftermost port and the sternpost should be at least 1 and at most 1½ times this same dimension.

Since the number of gunports is imposed by the type of vessel, the addition of the widths of all the ports, the distances separating them, and the distances at bow and stern, gives the total length of the vessel from stem to post. It is possible however at this early period to discover significant differences in the lengths of different vessels of the same strength, resulting from the desires of individual shipwrights to "personalise" their designs, and from the absence of recognised principles concerning the ideal length to breadth ratio.

In time, progress in the art of naval architecture reached the point where it became possible, with the Regulations of 1762[10], to lay down fixed dimensions for the widths of gunports and the distances separating them, but the distances separating the foremost gunport from the stem and the aftermost gunport from the stern continued to be left to the free choice of the designer, with no minimum being laid down. In fact, the text of 1762 did little more than regularise the widths of ports in current practice[11], and to set what was in effect an average value for the distance between ports.

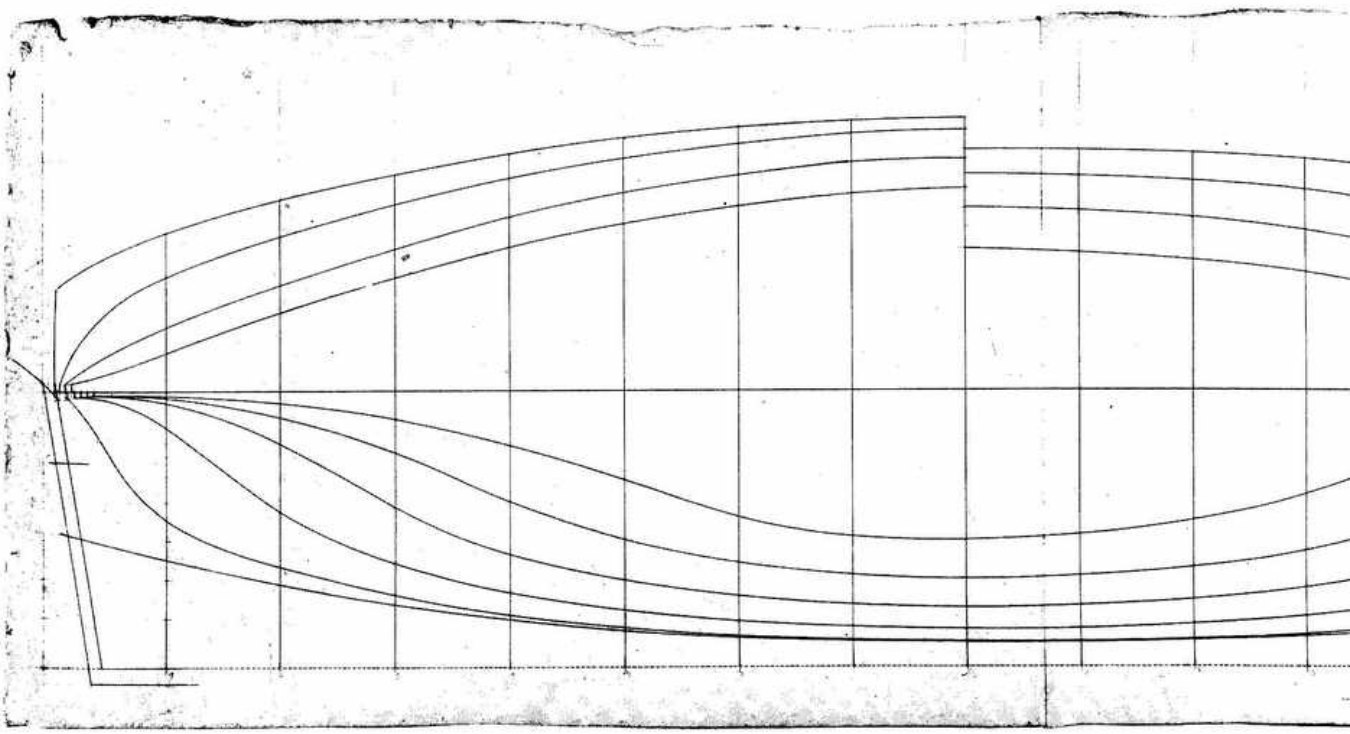
An examination of the draughts of *La Renommée* reveals that the width of the gunports was 2 feet, with 6 feet between each pair of ports, dimensions which were by then more or less standard for 8-pdr guns but which were only made official eighteen years later. By comparison, the *Alcmène*, the last of the 8-pdr class and built thirty years later, followed the same distance between ports of 6 feet, but showed an increase in the width of ports by 2 inches 5 lines. If we compare the distances at bow and stern, we find dimensions of 18½ feet and 7 feet for the *Renommée*, but 19¼ feet and 6½ feet for the *Alcmène*. This comparison is interesting, since it is between the first and the last 8-pdr frigates built for the French Navy, but we could take another example at random, that of the *Mignonne* of 1767: there, the cumulative distance of the width of port and separation amounted to eight feet[12], with the distances at bow and stern being 17 feet and 7 feet respectively. The lengths overall were thus 122'2" for the *Mignonne*, 123'6" for the *Renommée*, and 126'2" for the *Alcmène*. These three examples illustrate the margin of variance possible in the length of frigates of the same type. Taking, in the same order, their breadths, we find 32 feet, 33 feet and 33¼ feet, which give length to breadth ratios of 3.81, 3.74 and 3.79 respectively. Finally, the depths in hold were 15'9", 15'9", and 17'2"[13].

All these dimensions can be considered as reliable, since they have been taken off the draughts, and they reveal the similarity of the principal dimensions and the lack of change over a period of about thirty years. Frigate design evolved through the adoption of new types, notably with larger calibres of guns and thus an increase in tonnage, as we shall see in the following chapters.

As late as 1772, nothing suggested anything other than a bright future for the 8-pdr frigate, and M. de Boynes, who had been appointed Minister for the Navy in April 1771, accordingly asked

Antoine Groignard to draw up the standard class design which was henceforth to be followed for all 8-pdr frigates with twenty-six guns on the upper deck. Two frigates were built at Toulon in 1774 to this new design, but paradoxically they were to be the last of the class: thereafter, the 8-pdr calibre was left to the sloops. The career of the 8-pdr frigate was thus relatively short, and over the thirty or so years which it lasted only 43 vessels were built, the last of which disappeared from the lists of the French Navy in 1798[14].

1. Breadth 31'8" – depth in hold 15'8".
2. As Robert Gardiner has recently pointed out, the Swedish *Vita Ørn* of 1711 was probably the first frigate to be built with all its guns on a single deck and a lower deck at the waterline acting as a berth deck; however, this appears not to have had any influence on design elsewhere. The adoption of the "modern" frigate design by all the navies of Europe in the 1740s and 1750s was due to the influence exerted by Ollivier's *Médée* and her sister ships.
3. The four frigates were to be armed in addition with four 4-pdrs on the quarterdeck, whereas Ollivier's original proposal was for no secondary armament at all.
4. Jacques-Luc Coulomb, 1713-1791 – Clairin-Deslauriers, 1723-1781.
5. Blaise Ollivier had only recommended 6-pdrs for arming the 24-gun vessels; however, the 6-pdr became the domain of the sloop.
6. In addition to these thirteen gunports on either side, a fourteenth, the so-called bowchase port, might be added at the bow, to be armed when required with the neighbouring gun.
7. The number of guns might indeed increase to 32 if the secondary armament were increased to six guns (always 4-pdrs). It is worth noting that this secondary armament was always somewhat variable: surviving manuscripts confirm for example that the same vessel might be armed with either four or six guns on the quarterdeck and forecastle, or indeed none at all, for different commissions.
8. Vial du Clairbois, in his *Traité Élémentaire de la Construction des Vaisseaux* published in 1787, gives the following characteristics for 8-pdr frigates: length 127 to 128 feet – breadth 32 to 32½ feet – depth in hold 15½ to 16½ feet – average draught 13 to 14 feet – displacement 950 tons. These dimensions are in practice somewhat notional, since the 8-pdr frigate had already been abandoned as a class (Bombelle proposed an 8-pdr frigate armed with 26 guns on the upper deck in 1782, which was turned down), but for all that they attest to a gradual lengthening of such frigates. In this context, it is worth noting the extreme case of the *Oiseau*, which measured 139 feet in length, and 31 feet in breadth to inside of plank, giving a ratio of 4.48. This extreme length ought to have made the vessel very fast, but it was not enough to prevent her capture in 1779.
9. Lower deck in the case of ships of the line.
10. Regulations of August 4th 1762.
11. In the seventeenth century gunports tended to be somewhat narrower than in the following century, but there is nothing absolute about this, since Blaise Ollivier gave narrower ports than was the practice in the seventeenth century to the vessels designed by him in the 1730s and 1740s.
12. The width of the gunport is 2 feet 2 inches.
13. The Shipwright Antoine Groignard favoured a depth in hold which was proportionally greater, partly because his underwater lines were sharper, but mainly because he was able to achieve a height of gundeck sill of 6 feet, compared to 5 feet for the *Mignonne* and 4'9" for the *Renommée*, with an increase in the average draught of only 3 inches.
It should be noted also that the distance between the aftermost gunport and the sternpost was significantly less than the equivalent of 1½ times the distance between ports (9 feet), being only 6½ feet in the case of one of the vessels, and 7 feet for the others. This requires some explanation: in ships of the line, the provision of cabins in the gunroom makes it impossible to open a port for the last six feet (the space occupied by the bunk), plus half the normal distance between ports, giving a total of about 10 feet. In frigates however, the gunroom is set up on the lower deck, while it is the captain's cabin which is on the upper deck, and here there is no problem about opening up a port relatively close to the sternpost. On the other hand, note that the distance between the stem and the foremost (armed) gunport is significantly greater than twice the distance between ports, reaching three times that distance. This allows space for a fourteenth port to be opened as a chase-port between the stem and the first permanently armed gunport.
14. The last 8-pdr frigate to serve in the French Navy was the *Mignonne* of 1765.



LA MÉDÉE

The only plans of the *Médée* which have survived are in the Danish National Archives. This draught shows the volume of the hull, both above and below the waterline. The body plan gives the sections corresponding to the station frames, and also shows the ribbands and the various waterlines; the load waterline makes it possible to calculate the draughts.

The sheer is limited to the outlines of the stem and sternpost, over which are laid the waterlines and height of breadth of the half-breadth plan. The upper half-breadth shows the lines of the ribbands, clearly illustrating the discontinuity of the ribbands of the fore and after bodies.

While all the main elements of the *Médée* are shown in these draughts, it is nevertheless a pity that they omit many of the details which one usually finds on builders' draughts.

The relatively modest length to breadth ratio of 3.71 can be clearly appreciated, and the rake of the stem at 12½ feet and of the post at 3 feet are considerable for a shipwright like Blaise Ollivier, who later adopted much smaller rakes in his ships (rake of the stem 6 feet and rake of the post nil in the three 74-gun ships designed by him in 1744). The draught forward is 12 feet 9 inches and the draught aft 14 feet 2 inches. The block coefficient at the load waterline is 0.52, assuming a displacement of about 900 tons and a height of gundeck sill of 5 feet 2 inches (the height to lower sill on the upper deck, including 2 inches thickness of plank of the deck is 2 feet).

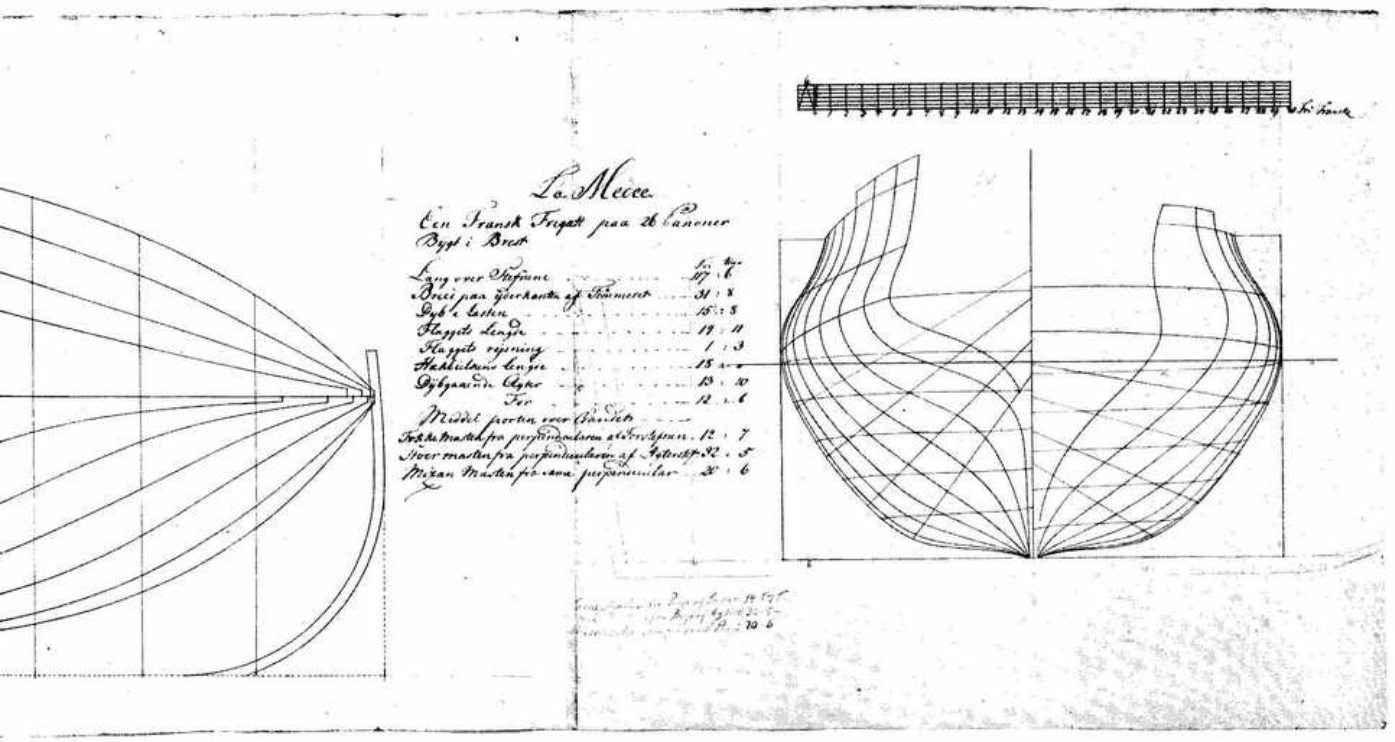
Such a coefficient is characteristic of this type of vessel, the principal design criterion being speed of sailing. Lightly built, with a shifting lower deck, the *Médée* was armed with only the twenty-six 8-pdrs on the upper deck.

The upper works are as flush as possible, and the length of the forecastle is restricted so that it ends at the bitts, the quarterdeck likewise, since it ends at the after ladderway. The height of the bulwarks in the waist is 3 feet 8 inches, and thus there are clearly no gangboards.

Blaise Ollivier was a brilliant shipwright, perhaps the most brilliant of the whole Ancien Régime. A contemporary of his wrote of him: "*The late Mr Ollivier, Surveyor of the Navy, whose skill was well recognised during his lifetime, and whose design principles are still followed today, for he sought at all times to unite in shipbuilding an order and elegance of graphical expression with the superior qualities of his ships, made it a maxim to favour especially their length, so that they were all superior in matters of speed of sailing, and if a few among the many ships which he built were found to be a little tender under sail, it is no doubt because they lacked a little fullness in their lines or that they had been somewhat over-masted.*"

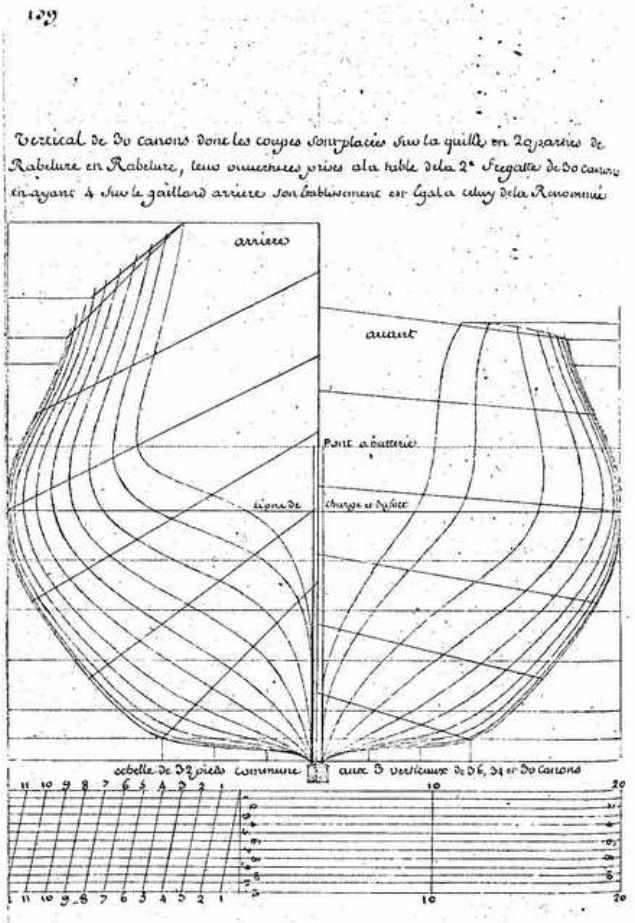
In fact, the number of ships built by Ollivier was not all that great: seven ships of the line of 64 or 74 guns, the *Royal-Louis* of 116 guns (destroyed on the stocks by fire in 1742), to which may be added a number of frigates, storeships and bombs. More important than the number however is the originality of his designs, and it is on this that his reputation is founded, and which earned for him, in 1737, the appointment as Director General of the Royal Dockyard at Brest, an exceptional position.

It may also be worth explaining that when two vessels have the same breadth, it is the one with the greatest length and the least depth in hold, all other things being equal, which will prove to be the faster. This is because of the smaller column of water to be displaced when sailing before the wind, and the greater lateral support when sailing close-hauled. It has been suggested that this axiom was the "key" to Ollivier's success as a shipwright, and indeed the core of Bouguer's theories. All in all, Blaise Ollivier is a subject worthy of greater development, but this is not the



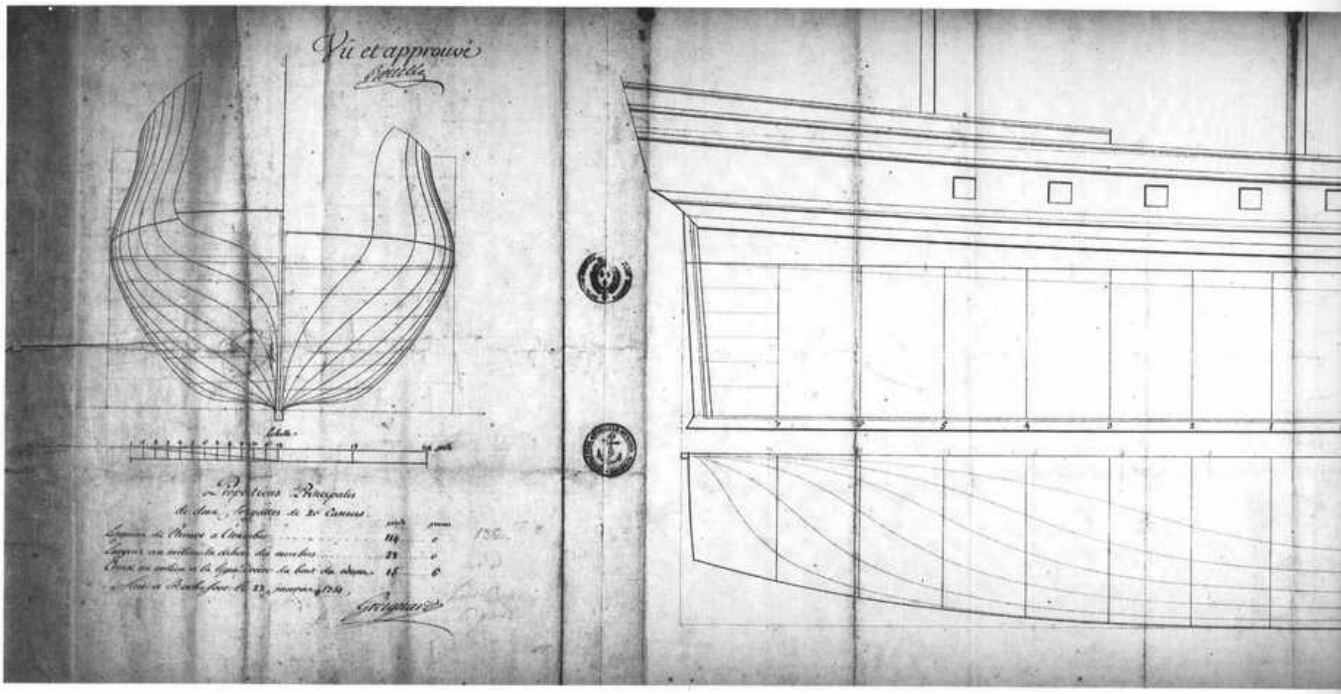
Courtesy Danish National Archives

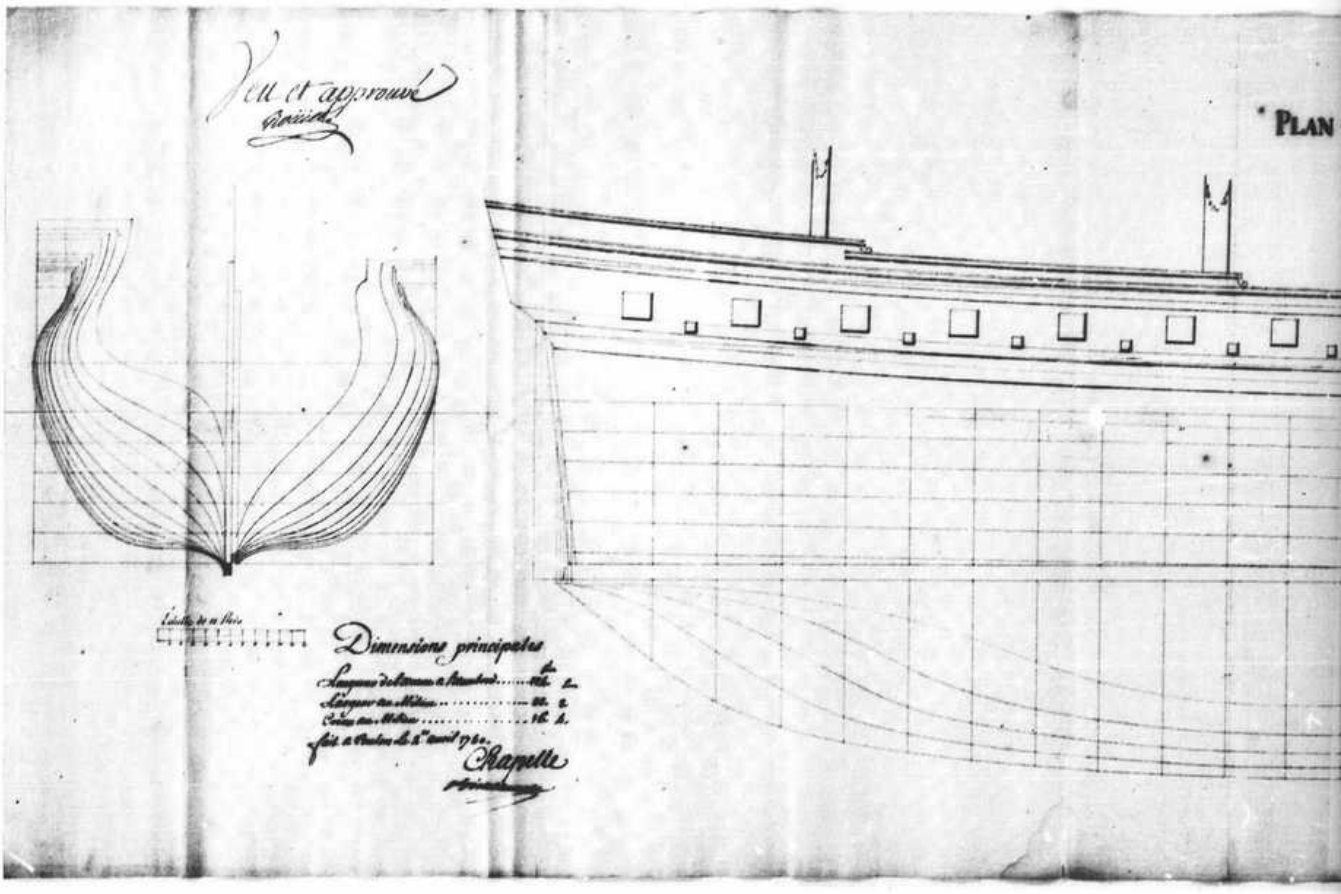
place, especially as his career is covered in considerable detail in the recently published book covering his remarkable journey to England and Holland in 1737 (*18th Century Shipbuilding*, ed. David H. Roberts, Jean Boudriot Publications, 1992).

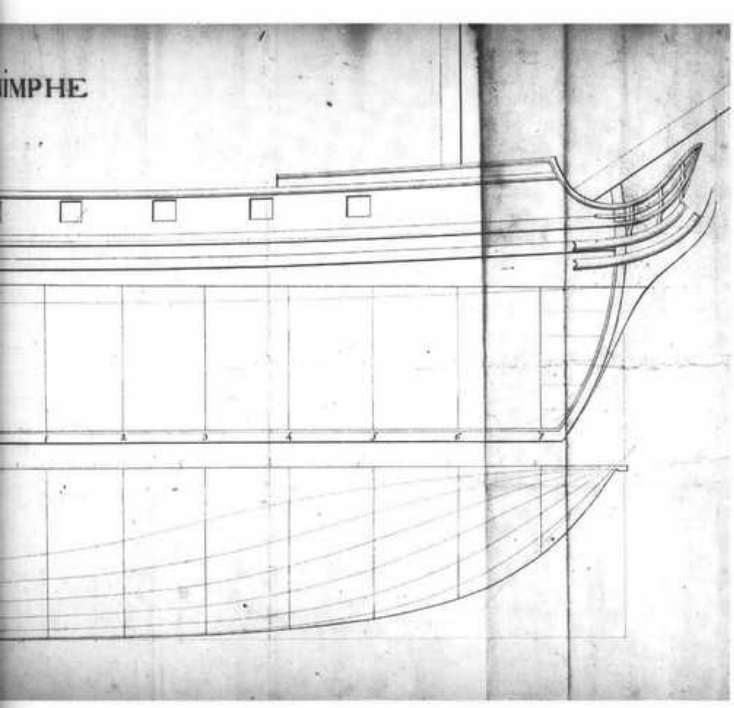


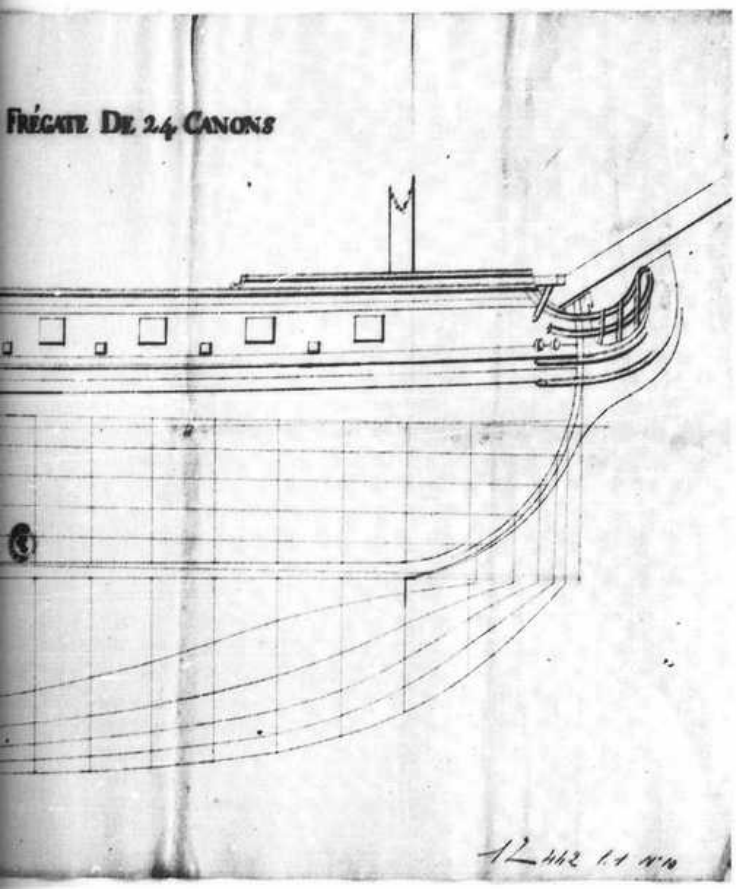
This body plan is taken from the manuscript Treatise by Pierre Morineau. The caption informs us that the lines are those of the *Renommée*, but the breadth is shown as 32 feet, rather than 33 feet as evidenced by the draughts taken off in England after her capture.

The sections are established by dividing the length of the keel into twenty equal parts. The section of the beakhead frame is placed 5½ lines for every foot of the length overall abaft the perpendicular of the stem, and the fashion piece forms an angle of 21 degrees with the keel. The rake of the stem is equal to 1/4 of the length, the arc of a circle which describes the underwater part of the stem has a radius equal to 1/6th part of the length. The rake of the sternpost is equal to 1/5th of the rake of the stem.


Vu et approuvé
Échelle
Dimensions Principales


Vu et approuvé
PLAN
Échelle de 12 Pieds
Dimensions principales
Rapelle





Various examples of 8-pdr frigates

These three draughts show the various alternatives possible for vessels of this class, where the upper deck may be pierced for ten, twelve or thirteen gunports, the latter being the solution which eventually came to dominate.

20-gun frigate. An insignificant case, since there was only ever one built, the *Nymphe*, launched at Rochefort in 1752 to the draughts of Antoine Groignard. However, although this variant was abandoned for frigates, it was taken up again as the basis for the designs of sloops of war in the last quarter of the eighteenth century.

The principal dimensions are: length 114 feet – breadth 28 feet – depth in hold 15½ feet. Note that the modest rake of the stem as advocated by Ollivier continues to be followed; it may not be very pleasing æsthetically, but it should be pointed out that this only applies to the draught, since once launched, the profile of the stem cannot be seen. In his Treatise, Pierre Morineau describes this type of frigate with his usual attention to detail: he proposes a rake of the stem equal to 1/4th of the length overall, and a rake of the sternpost equivalent to 1/6th of the rake of the stem. The displacement is set at 482 tons (the 8-pdr guns weigh 38 tons, 6-pdrs 29 tons). But the frigate proposed by Morineau is relatively short, measuring only 96 feet in length and 26 feet in breadth, giving a ratio of 3.69, compared to the ratio for the *Nymphe* of 4.07.

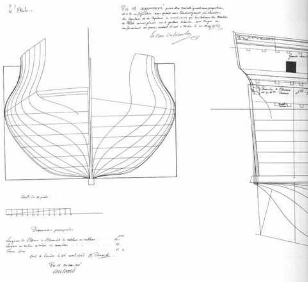
Morineau also indicates a partial lower deck, running from the stem to the breadroom bulkhead. The quarterdeck extends as far as 6 feet abaft the mainmast, the forecastle measuring 19 feet from the stem. The frigate is steered with a hand tiller on the quarterdeck. Note the position of the galley fires amidships, abaft the foremast, but not touching each other, the aftermost of the two fires being forward of the riding bitts, which are on the upper deck. The headroom on the lower deck is 3½ feet. The manuscript gives considerable detail concerning the scantlings, the arrangement of the gunports, the hanging of the wales, and so on, so that there is more than enough information to draw up accurate draughts, as is the case with all the types of frigate proposed by Morineau.

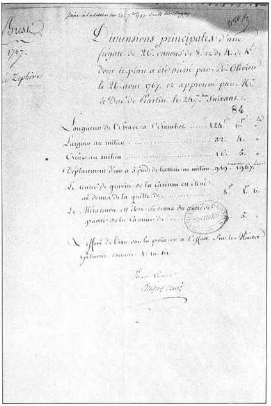
24-gun frigate. Between 1744 and 1752, a total of eight frigates of this strength were built. The example shown is the *Rose*, and her draughts, which are dated 1750, are by the Toulon shipwright François Chapelle. The vessel in question was never built.

Note the presence of oar-ports on the upper deck, more common in the Mediterranean than in the Atlantic. The principal dimensions are as follows: length 114 feet – breadth 32′8″ – depth in hold 16′4″. According to Morineau, a frigate of this strength has a displacement of 770 tons (the guns weigh 45¾ tons), with dimensions of 115′0″, 30′4″ and 15′10″. Apart from the length, the other dimensions differ very little from those of the *Friponne*, built by Morineau at Rochefort in 1747 (see List). As with the 20-gun frigate, Morineau's manuscript provides detailed information. The lower deck is unbroken, the quarterdeck finishes forward of the main jeer bitts, the pumps abaft the mainmast are clear of the quarterdeck breastwork, and the forecastle measures 26 feet from the stem. If there is a steering wheel, the tiller runs underneath the beams of the upper deck, while if there is a hand tiller, the head of the sternpost runs up to the quarterdeck transom, to which it is fastened, with the mainpiece of the rudder extending above the planking of the quarterdeck so as to allow free play for the tiller. It should be pointed out that even a significantly larger frigate than this, the *Embuscade*, with a total length of 128½ feet, was still able to be steered by hand, as can be seen from her draughts which are preserved at the N.M.M., Greenwich.

26-gun frigate. Frequently the upper deck armament is supplemented by four smaller guns on the quarterdeck, but the example shown conforms to the original proposals put forward by Blaise Ollivier, and is armed only on the upper deck. The vessel shown is the *Étoile*, the principal dimensions of which are: length from rabbet to rabbet, 120 feet – breadth, 32 feet – depth in hold, 15′9″. The draughts date from 1766 and were drawn up by the shipwright Noël Pomet (1704-1784). The 26-gun frigate is the true form of the 8-pdr class, and it is described in greater detail in the next chapter, with the *Renommée*. I will accordingly limit myself here to indicating: a continuous lower deck, with headroom under the beam of 4 feet – the quarterdeck ends abaft the main jeer bitts – the forecastle is about 28 feet long. According to Morineau, the displacement is of the order of 942 tons.

*These three draughts give a clear visual comparison of the three types of 8-pdr frigate, but it should be noted that by far the most common type is that pierced for thirteen gunports on the upper deck.





Brest 1767. Le Zephire

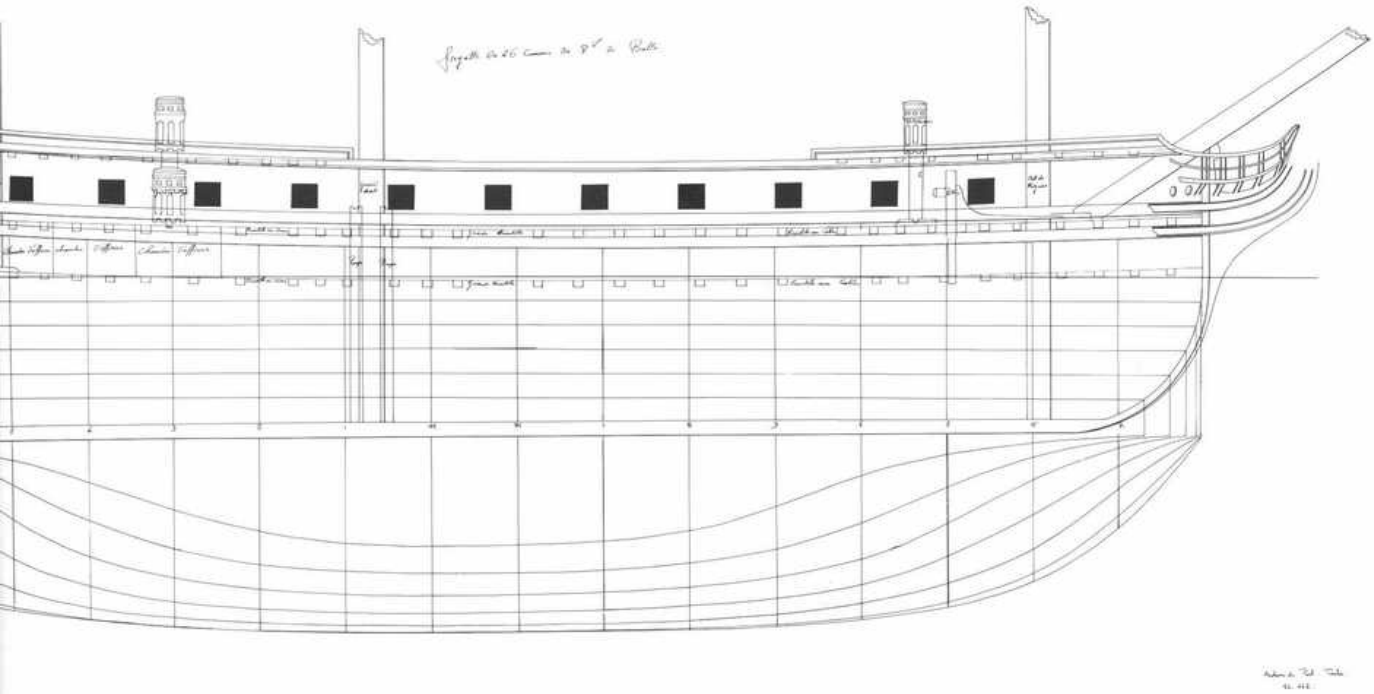
Dimensions principales d'une frégate de 26 canons de 8 et de 4 de 4 dont le plan a été donné par M. Olivier le 26 aout 1767 et approuvé par M. le Duc de Praslin le 24 7bre suivant.

84

Longueur de l'étrave à l'étambot	124	6	–
Largeur au milieu	32	4	–
Creux au milieu	16	5	–
Déplacement d'eau à 5 pieds de batterie au milieu	949	1967	
Le centre de gravité de la carenne est élevé au dessus de la quille de	8	1	6
Le Métacentre est élevé au dessus du centre de gravité de la carenne de		5	–

L'effort de l'eau sur la proue est à l'effort sur le maître gabarit comme 1 : 10.61.

The reproduction of this manuscript sheet gives ample evidence of the progress made by shipwrights in mastering their art, for which they were accorded the title of "engineer" (*ingénieur*) in an edict dated March 25th 1765. This document defines very clearly the 8-pdr frigate, and the most important items are the results of the calculation of the displacement at 5 feet of height of gundeck sill, the centre of gravity of the underwater hull, the metacentre, the ratio of the resistance of water on the bow to the resistance at the midship bend.
The author is *Joseph Ollivier* (1730-1777), the son of Blaise Ollivier, who ended his career as Master Shipwright at Brest.

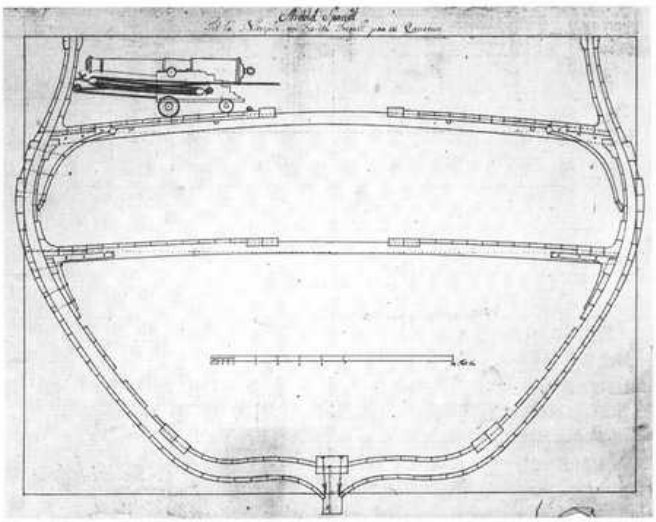


Cross-section at the midship bend of the small frigate *La Nymphe*, built in 1752 to the draughts of A. Groignard. Close examination of the draught reveals just how interesting it is.

There is no rising wood or false keel. A bolt runs through the floor timber and the keel and is clenched on the outside, the rove being underneath the keel (it would be more usual to have used blind bolts, which are easier to work). The keelson is of heavy scantling and is scored down over the floors, being fastened to each with two ragged bolts driven blind into the depth of the timber.

There are two strakes of thickstuff in the hold, and, unusually at this period on the Atlantic seaboard, they are scored heavily down over the frames. Note the air-strakes to ventilate the spaces between the frames, which were still something of an innovation at this time. The lower deck is lightly constructed, with no ledges or carlings, and the beams are fastened to the shelf and the ship's side by means of simple wrought-iron knees, with three bolts driven through the hanging part and all the way through the side, three more securing the lodging part and passing right through the beams; the bolts are forelocked over roves on the inside. Similar bolts pass through the ship's side, the inner waterway and the two outer waterways, being forelocked on the inner face of the innermost strake – not an easy operation to perform in view of the scantlings involved.

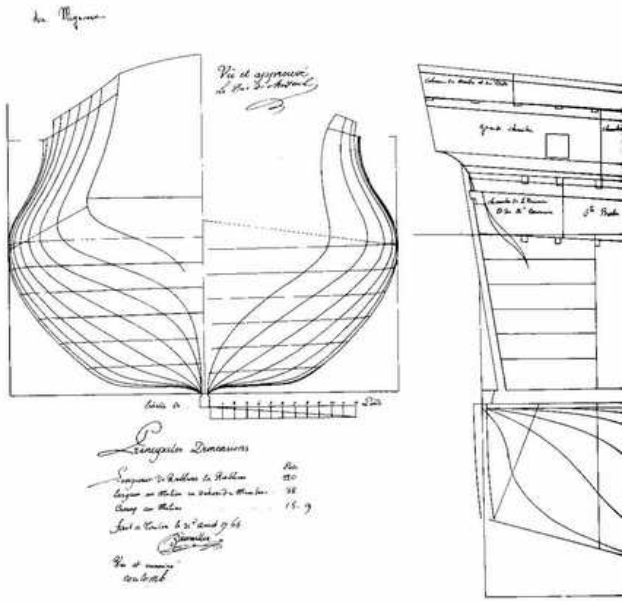
The upper deck is conventionally constructed, the ledges being interrupted by the run of the binding strakes; they rest over the top of the carlings and are let into the edge of the waterways and the binding strakes*. Note the extra thickness of the binding strake bordering the main hatch on either side. The deck shelf is of heavy scantling, while the four strakes of planking below are relatively light. Timber knees fasten the ends of the beams to the ship's sides, by means of forelocked bolts, three each for the hanging part and the lodging part. They run through the two strakes of the wale and the black strake, which is thinner. The method of bolting the waterways and the chine is the same as for the lower deck. The depiction of the guns clearly shows the problems created by an excessive tumblehome, taking into account the recoil, which must not be obstructed by the spare spars or the boats, and the fact that a space of 2 feet is needed between the muzzle and the side when loading.



*In the 17th century the ledges ran right across, being thicker at their ends where they were fastened to the shelf, and the binding strakes and waterways were scored down over the ledges.

Frigate with no quarterdeck armament. As we have seen, this was the original formula, and throughout the period of the Seven Years' War it was still normal to rely solely on the upper deck armament. This had the advantage of reducing tophamper, thereby improving speed of sailing, and it was argued that small calibre guns were largely ineffectual, with the added problem that the gunners were exposed to enemy fire. However, it emerges from the decommissioning reports in the archives that the same frigate might be armed on the quarterdeck or not, for different commissions.

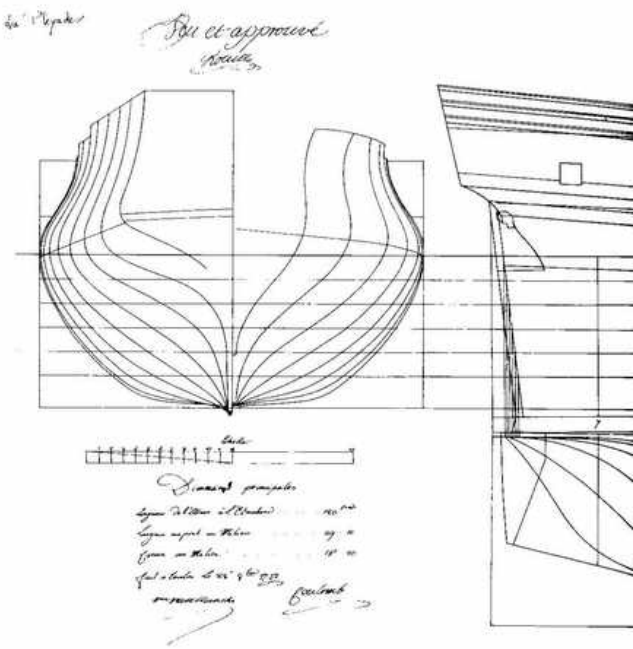
*These are the original draughts of the *Mignonne*; later on, she was armed on the forecastle and quarterdeck (see the following pages).

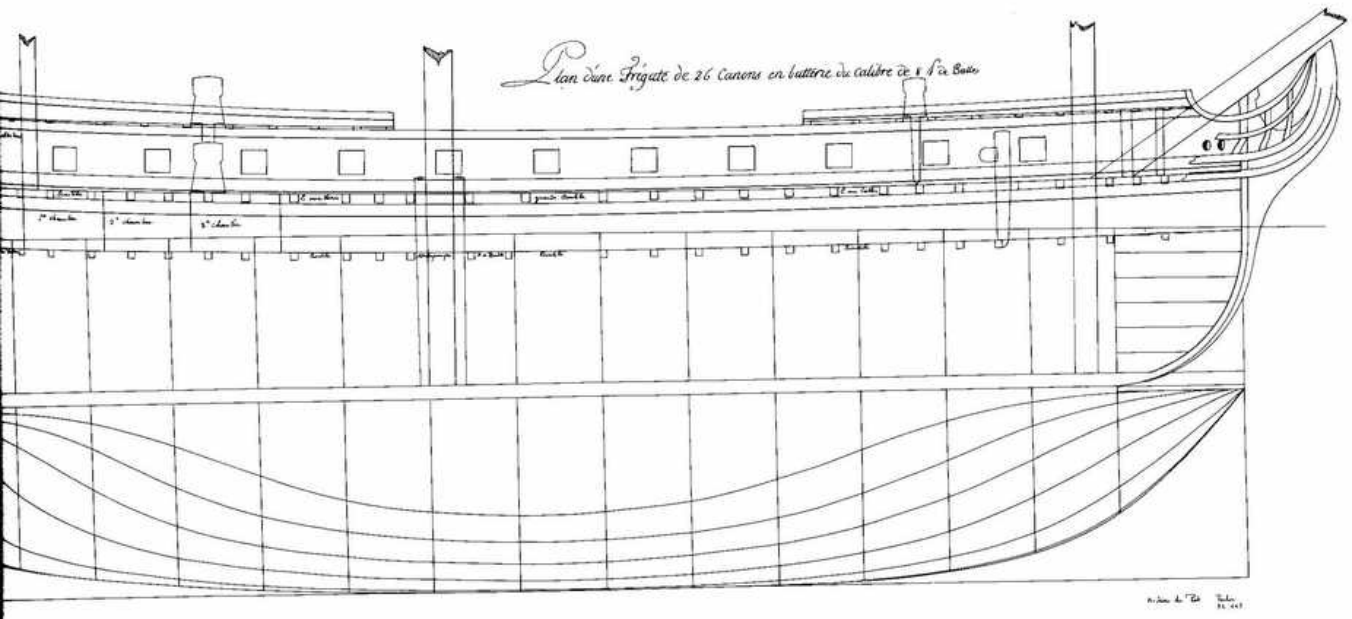


Frigate armed on the quarterdeck. In the majority of cases, the twenty-six 8-pdrs on the upper deck were supplemented by four 4-pdrs. This secondary armament was mostly to be found on the quarterdeck, although sometimes there were two further guns of the same calibre on the forecastle (as was the case with the *Mignonne*, for example). Such vessels could thus be called 32-gun frigates, which sometimes gives rise to confusion with the 12-pdr class, also known as 32-gun frigates. It is worth mentioning also the cases of the *Malicieuse – Licorne – Folle – Danäé*, which were temporarily armed with 6-pdrs on their quarterdeck and forecastle. The 24-gun frigates built by Geffroy Junior were in the event armed with six 4-pdrs, although they had not been designed with that in mind.

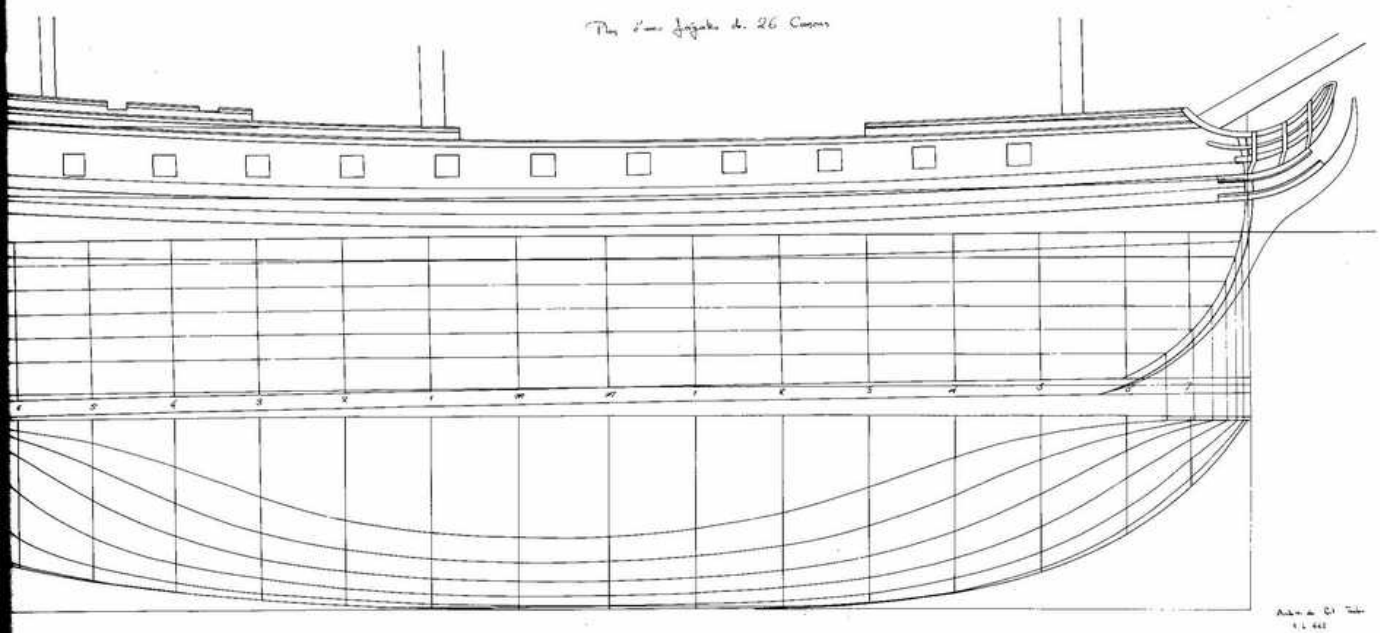
To summarise, the secondary armament of the quarterdeck and forecastle was something of a "movable feast", fluctuating according to whim, some people decrying it, others regarding it as essential.

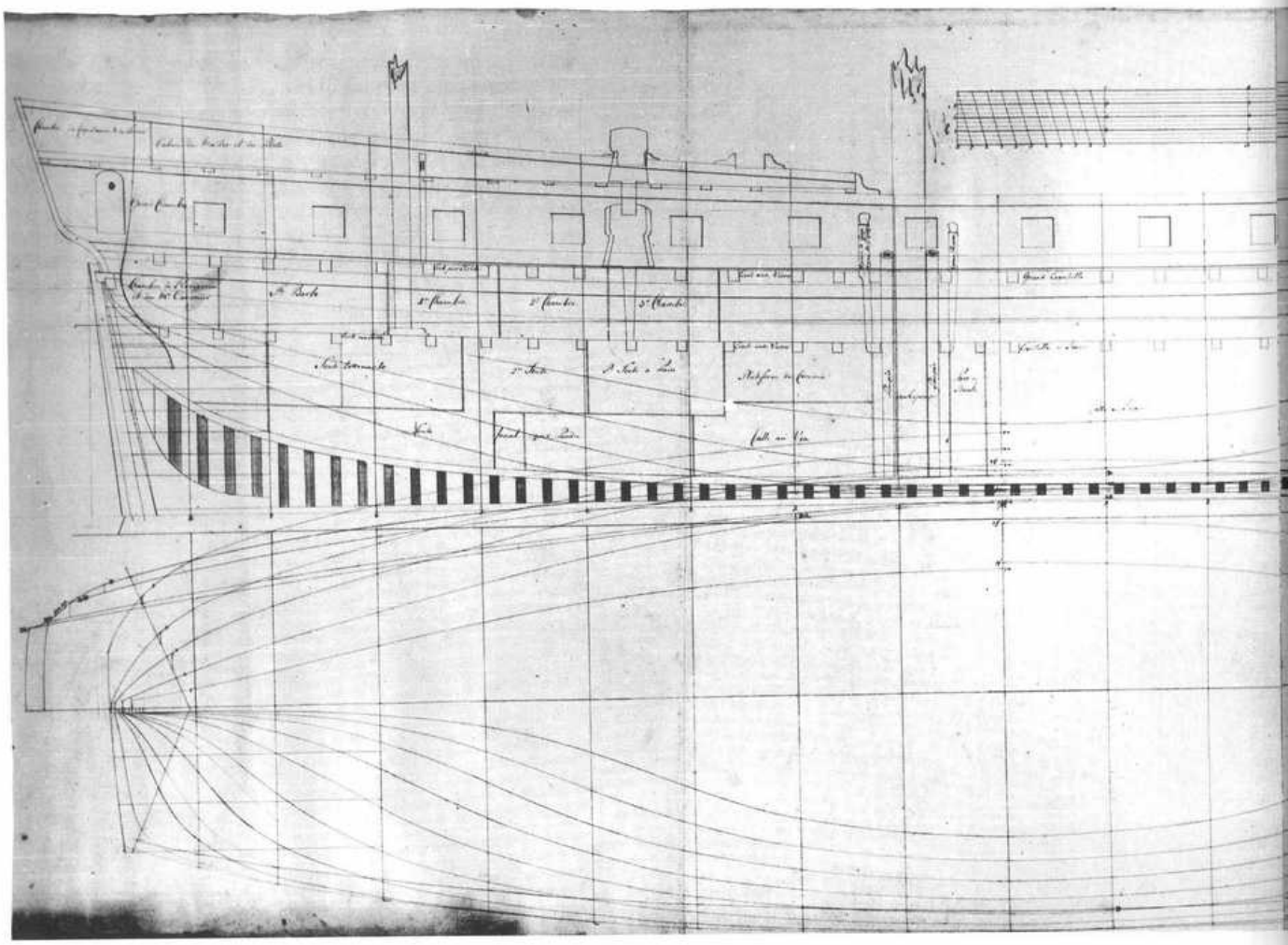
*Both these draughts, like that of the *Étoile* on the previous page, are reproduced at a scale of 1:180.




Plan d'une Frégate de 26 Canons en batterie du calibre de 8 l.e de Bale

Scale 1:180


Plan d'une frégate de 26 Canons



DRAUGHTS OF THE *MIGNONNE*

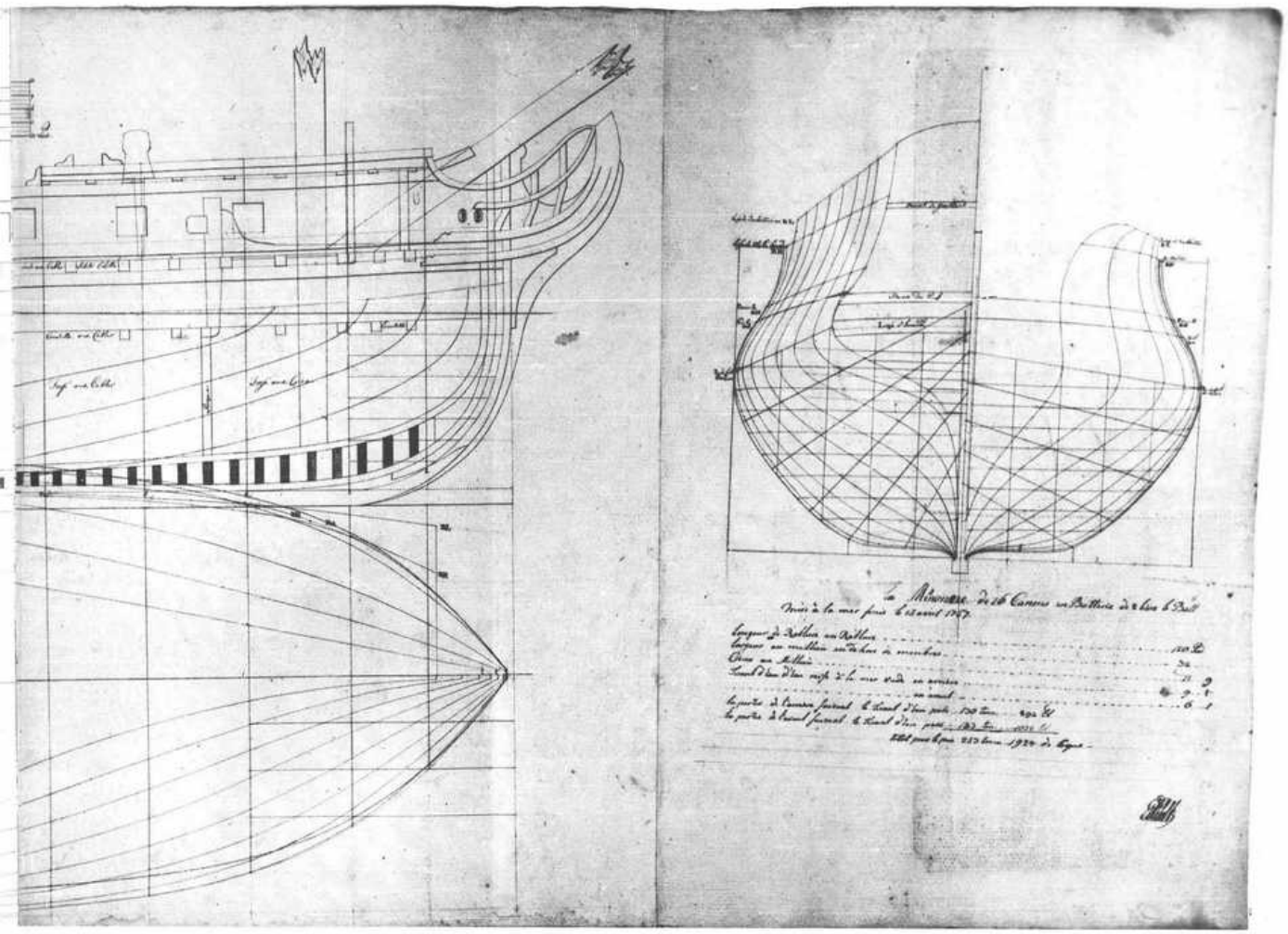
This most interesting draught is preserved in the Danish National Archives. Since it contains a great deal of information concerning the 8-pdr frigate, it is worth examining in detail. Firstly, the "station" frames, spaced seven feet apart; the timber and room is 14 inches and 7 inches. The arrangements in the hold present nothing out of the ordinary, with the Bo'sun's stores forward, followed by the cable tier. Next comes the main hold (for water), which ends at the shot locker and the well, where there are four pumps made entirely of timber flanking the mast. The after hold (for wine) is beneath the Purser's storerooms or issuing room. Abaft the after hold is the magazine, which runs back as far as the lady's hole, where the Gunner's spares are stowed. Overhead are the storerooms for dried vegetables and the bread rooms, which are on either side of the ship and separated by a passageway which provides access not only to these storerooms, but also to the magazine and the light-room. The so-called "winding" bread room at the stern runs the full width of the vessel at this point.

The free height on the lower deck beneath the upper deck beams is four feet, and the positioning of the beams is dictated by the positions of the masts and the various hatchways. Starting from the bow, these are as follows: the scuttle for the Bo'sun, leading to his storeroom in the forepeak[1]; the cable-hatch; the main-hatch; the after hatch; the powder hatch; the scuttle for the Gunner leading to the lady's hole or after-peak.

Not shown on these draughts are the storerooms set up on the lower deck[2]. A short distance abaft the mainmast is the cockpit, with three cabins or bunks giving off it on either side for the officers. Next comes the gunroom, with two cabins at the stern, the starboard one for the Gunner, and the one on the port side for the ship's writer.

Moving up to the upper deck, we find the main-hatch and the after hatch, vertically overhead the corresponding hatchways in the lower deck. The cable-hatch is shorter, and is combined with the crew's ladderway leading up from the lower deck (where the men are berthed) to the upper deck. Forward of the mizen-mast, which is stepped in a block bolted to the lower deck beams, is the after ladderway leading up from the cockpit.

On the upper deck can be seen the riding bitts, preceded by the pins of the fore topsail-sheet bitts and the step of the bowsprit, the heel of which rests on the planking[3] between the bitt-standards; the hawseholes are pierced 2 feet above the planking of the upper deck. The fore jeer capstan is stepped on the upper deck, and the galley fires, which have not been shown, ought to be placed between the spindle of the fore jeer capstan and the forecastle breastwork. The main topsail-sheet bitts are on the upper deck, and the pumps discharge at the same level. Abaft the mainmast is the knight of the main jeer bitts (there are no longer



any fore jeer bitts). The main capstan has two barrels, and the spindle of the lower barrel is stepped on the lower deck, so that it passes down into the gunroom. Afore the mizen-mast is another pair of bitts, the pins of which run down into the between decks. This item of gear is unusual for the mizen-mast. The after part of the upper deck is taken up by the great cabin, with the two doorways leading to the quarter-galleries, and with one gunport on either side.

On the forecastle are the catheads, the fore topsail-sheet bitts, the fore jeer capstan, and the embrasures for a pair of 4-pdr guns.

On the quarterdeck, clear of the jeer bitts, are embrasures for two further pairs of guns, the upper barrel of the main capstan, and the mizen-bitts; against the taffarel are two cabins, the starboard one for the Captain and the port one for his second-in-command, while two small deck-cabins are placed forward of them for the Master and the Bo'sun, pressed up against the bulwarks.

As already indicated, the draughts of the *Mignonne* need to be considered in conjunction with the information provided in the next chapter, where we examine in greater detail the internal arrangements of frigates.

In addition to the sheer draught, there is also a body plan, showing the vertical sections, the ribbands, the waterlines, etc. Note the indication of the draughts of water following launching[4], 6 feet 1 inch at the bow, 9 feet 1 inch at the stern, giving a displacement of 253 tons 1,924 pounds[5], roughly 60% of the final weight of the hull fully fitted-out and equipped (with all internal arrangements completed, galley fires, ovens, etc). The final weight as given by A. Thévenard was 430 tons at 5′9″ height of gundeck sill, or 966 tons overall weight fully stored for six months at sea.

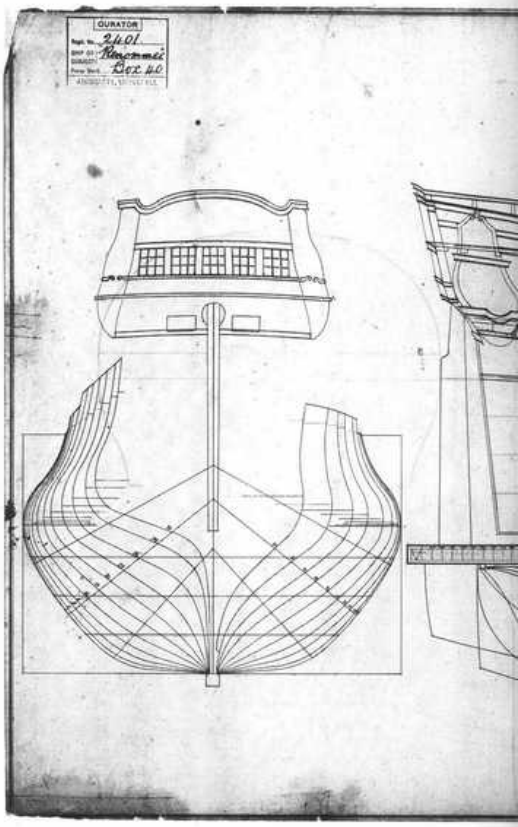
*Note what appears to be an anomaly: the rudderhead in the way of one of the upper deck beams.

1. The Bo'sun's storeroom may on occasions be on the lower deck.
2. A better idea of these can be gained from a number of draughts which are reproduced in Chapter V on the 12-pdr frigate, but they are also shown in the plans of the *Renommée* in the next chapter.
3. With a bolster inserted in between.
4. *La Mignonne* was launched on April 25th 1767.
5. The French ton is equal to 2,000 French pounds of 489 grammes, or 978 kgs.

LA RENOMMÉE

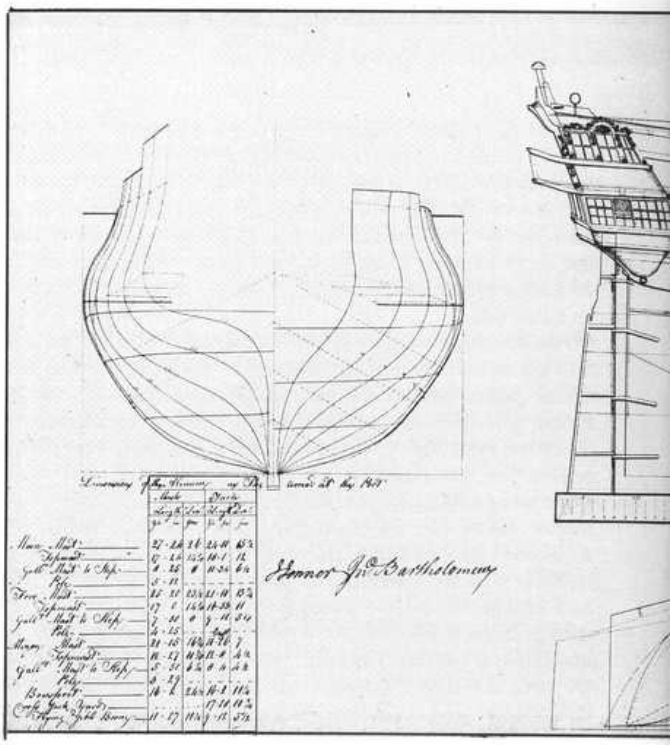
These draughts, preserved at the National Maritime Museum at Greenwich, complement perfectly the pages in the Morineau manuscript describing the vessel.
The *Renommée* was designed by Morineau's nephew, *Clairin-Deslauriers*, who was employed as an Assistant* at Brest Dockyard, working under Blaise Ollivier. It is immediately apparent that the frigate is considerably longer than the *Médée*, at 123′6″ compared with 117′6″. This additional length makes it possible to increase the distance between gunports to 6 feet, and to place the foremost and aftermost ports farther from the stem and post as already explained. Blaise Ollivier had already suggested that such frigates should be built longer, although not to quite the same extent. In short, the *Renommée* is a development of the design of the *Médée*, with the characteristics which were to become standard for all 30-gun frigates. There is a clear "family resemblance" between the lines of the *Médée* and those of the *Renommée*, the latter having a length to breadth ratio of 3.74, the former 3.79. Captured in 1747, thus three years after her launch, the *Renommée* was to influence English design for this class of frigate, as we shall see in the next chapter, based partly on the excellent articles by Robert Gardiner (*French Frigates and the Royal Navy*).

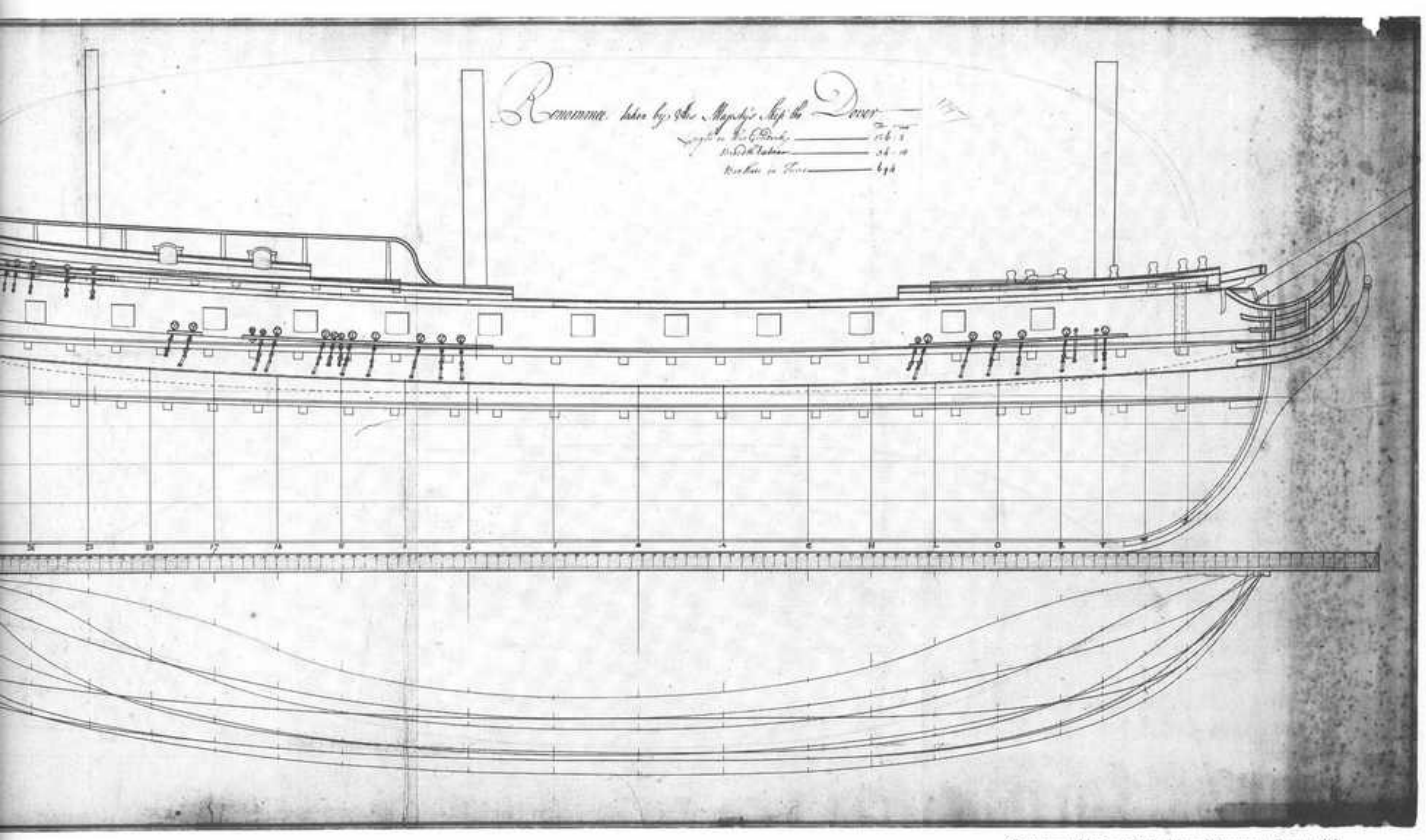
*Clairin-Deslauriers was promoted Shipwright in 1746. He was employed at Brest from 1742 to 1748, when he was transferred to Rochefort where he worked until his death in 1781.



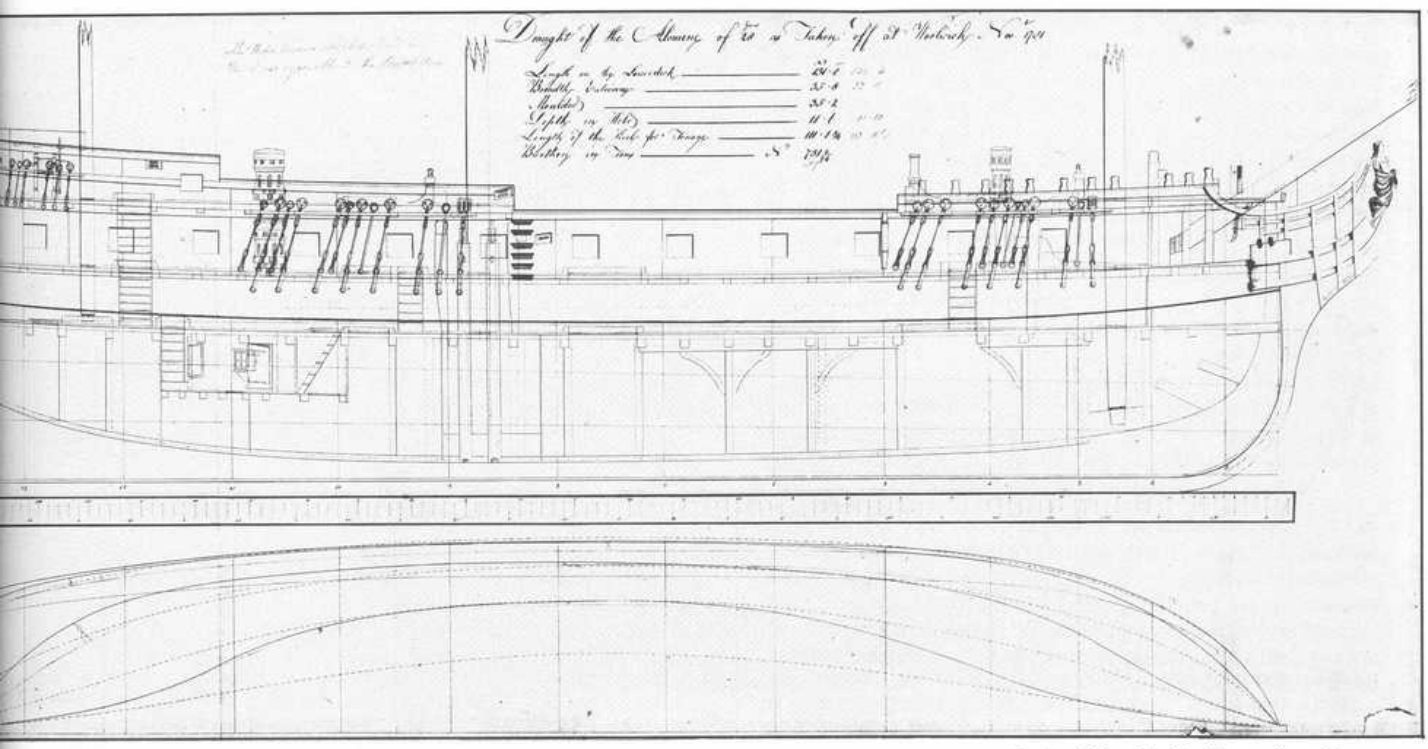
L'ALCMÈNE

The *Alcmène* and the *Aimable* were the last frigates of the 8-pdr class; they were built at Toulon to the draughts of *A. Groignard*, draughts which were intended to be the class design for all frigates of this type in the future; the intention came to nothing, however, since no more 8-pdr frigates were in fact built.
I thought that it would be interesting to juxtapose, on the same page, these two examples which represent the first and the last frigates of the class, the one built in 1744, the other in 1774. Thirty years is perhaps too short a period for it to be possible to talk about the evolution of a design. While it is true that Groignard's designs are two feet 8 inches longer, the length to breadth ratio reaching 3.79 compared with 3.74 and the displacement 966 tons as against 952, the differences in arithmetical terms are in fact negligible.
The underwater lines of the hull , however, are markedly different, with much sharper floors, less rake to the stem and none at all to the post. On the other hand, the elegance of the upper works is compromised by their excessive height at the stern, where there is a large poop complete with a gallery, a rarity in frigates.
These draughts are more detailed than those of the *Renommée*, and contain a considerable amount of information missing from the draughts of the *Mignonne*, on which we spent some time on the preceding page. Two points in particular are worth noting: the presence of small rollers at the bottom of the drums of the main capstan, these being an anti-surge device, and a timberhead fitted with a sheave, typical of Toulon Dockyard practice, which is used in conjunction with the catheads.
The *Alcmène* was captured, in 1779, as was her sister-ship the *Aimable*, in 1782, and the draughts of both vessels are preserved at the National Maritime Museum in Greenwich; in this we are especially fortunate, since they are the only documents which have survived concerning Groignard's class draught, of which there is no trace of the original in the French archives.





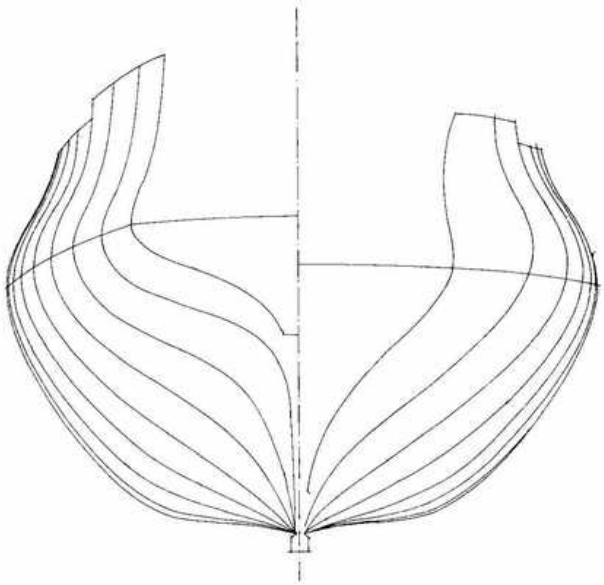
Courtesy: National Maritime Museum, Greenwich



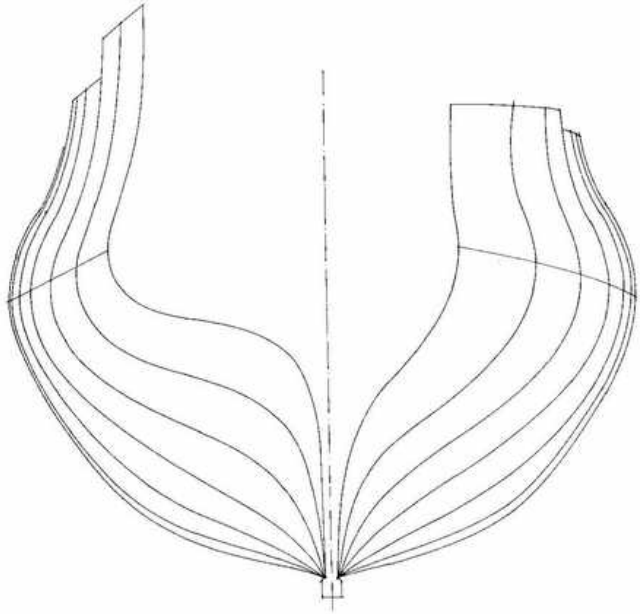
Courtesy: National Maritime Museum, Greenwich

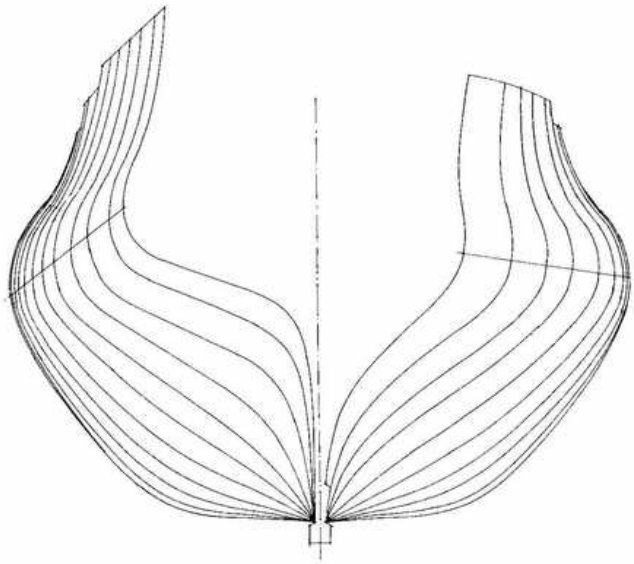
VARIOUS BODY PLANS OF 8-PDR FRIGATES (scale 1:120)

La Médée 1740. By *Blaise Ollivier*. The first "modern" frigate. Length 117′6″ – breadth 31′8″ – depth in hold 15′8″. The *Médée* has extremely sleek upper works and a pronounced tumblehome (3 feet on either side). This and the absence of any secondary armament on either quarterdeck or forecastle ensure a good measure of stability.

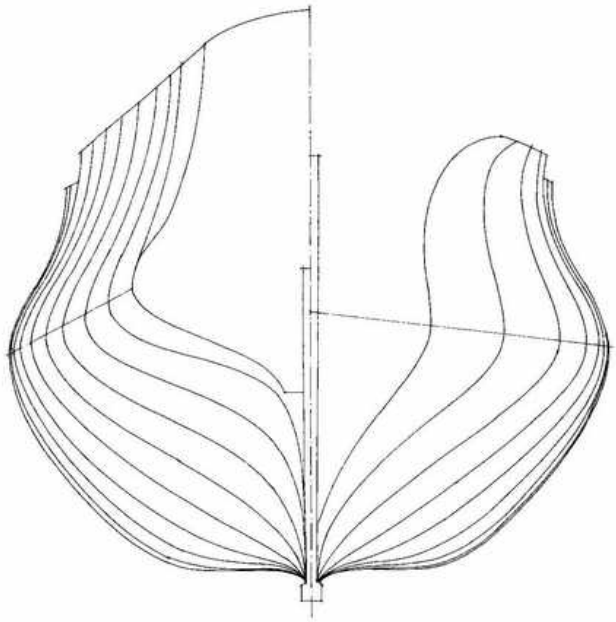


L'Alcmène 1774. By *Antoine Groignard*. Also built to the same draughts (which were intended to be the class draughts for all 8-pdr frigates) was the *Aimable*. By comparison with the *Médée*, the dimensions are larger: 126′2″ – 33′3″ – 17′2″. The underwater lines are significantly different, the upper works higher, the tumblehome less exaggerated.

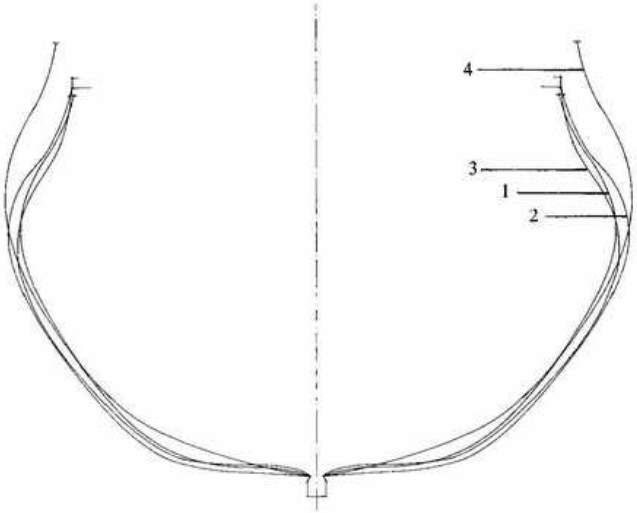




La Renommée 1744. By *François Clairin-Deslauriers*. This frigate, very similar in design to the *Médée*, is somewhat larger: 124′6″ – 33′0″ – 15′10″. The tumblehome is no less extreme, the upper works heavier, and the forecastle and quarterdeck are armed.



La Mignonne 1765. By *Claude Saussillon*. The design of this frigate is very little different from that of the *Renommée*, although slightly smaller: 122′2″ – 32′0″ – 15′9″. When she was struck from the lists in 1797, she was the last surviving example of the 8-pdr class of frigate.



This sketch shows the midship bends of the four examples quoted on the previous pages. It can be seen that the lines of the *Médée* (1), *Renommée* (2) and the *Mignonne* (3) are very similar, with little difference in the amount of deadrise; the reverse sweep where the hull joins the keel is more exaggerated in the *Mignonne* than in the *Médée*, and is absent in the *Renommée*. The tumblehome of all three frigates is similar.
On the other hand, the midship bend of the *Alcmène* (4) is very different. The deadrise (rise of floor) is much more marked, and there is thus no reverse sweep where the hull meets the rabbet of the keel. The reduction in hull volumes in the central part of the vessel is compensated for however by greater volumes at bow and stern. The tumblehome is much less extreme than in the three other vessels.

*The dimensions are taken in the usual manner (length from outside of stem to outside of post).

The sailing qualities of ships

The behaviour of ships at sea can be estimated from the Sailing Quality Reports or what in France were known as "decommissioning reports" (*devis de retour de campagne* – see Vol. IV, *The Seventy-Four Gun Ship*). In the case of the ship-frigates, however, very few such reports have survived[1], and and even where they have, the forms have often not been filled in completely, so that it is impossible to draw any serious conclusions. For this class of vessel therefore, we must make do with the judgements of Blaise Ollivier, which, as we have seen, are not very flattering. The same applies to the light frigates, even though it is reasonable to suppose that some of them performed well, which can hardly have ben the case for the ship-frigates. To cut a long story short, we must wait for the 8-pdr class before we find any real information, although even here it remains limited. For the 12-pdr and 18-pdr classes, the reports are far more numerous, so that they give a very real view of the performance of the French frigate at sea.
The reports list a number of criteria on which comments were required, as follows: responsiveness to the helm – ability to carry sail – pitching motions – rolling motions – sailing close-hauled – sailing large – sailing wind astern – performance on the various points of sailing – tendency to gripe – tendency to carry a slack helm – performance in stays and veering.
No vessel can expect to answer well to all these criteria, but if there is one factor which ought to characterise frigates it is the speed of sailing close-hauled, and this was to prove the main "stumbling block" for designers.
We will develop these questions in the succeeding chapters in rather greater depth than is possible here, because of the paucity of reports on 8-pdr frigates.

Performance at sea of 8-pdr frigates

Fewer than a dozen Sailing Reports have survived, some of which are incomplete or filled out carelessly, so that it is impossible to have a clear idea of the performance of this class of frigate, whether good or ill. There is no report for the *Médée*, but we can at least refer to the English archives for information on the *Renommée*, which was captured in 1747. She had been built to the draughts of Clairin Deslauriers, but in all probability under the close supervision of Blaise Ollivier. Here are the views of her captain when she was taken into the Royal Navy: "*She steers as well as any ship in the world and will wear and stay when few ships will*"; he went on to say that she forereached and weathered "*surprisingly*"; under double topsails she was capable of 11 knots close-hauled, 13 knots reaching; with a good wind two points abaft the beam and a full sail, he was sure she would do 15 knots. On the other hand, the *Renommée* rolled savagely with the wind astern or whenever the sea got up, straining her masts and rigging, and she was very wet in a stiff wind or a rough sea because of the low upper works[2].
The speeds of sailing indicated are surprisingly good, and the 15 knots with the wind on the quarter are astonishing.
By comparison, Guignace's *Médée* (12-pdr, of 1777 – see Chapter V) was capable of 10½ knots close-hauled and 13 knots running free.
To summarise, her performance was remarkable, and it can be assumed that Ollivier's *Médée* was equally exceptional.

The Report of the *Friponne* by *Pierre Morineau* notes that she answered the helm well, and carried her sail in like manner. She would scend when sailing close-hauled. Apart from these comments, nothing else at all except to indicate that her best trim was with 12 to 14 inches more draught astern and 6 feet of height of gundeck sill. *Ginoux' Malicieuse* was very easy under sail, and handled equally well in heavy weather. Her great length made her slow in stays, but for all that she answered the helm well. Carrying her sail well, she was at her best with the wind on the quarter, but sailed badly with the wind astern (it would appear that her performance close-hauled was adequate).

Geffroy's *Thétis* was not good close-hauled and made much leeway. Her best points of sailing were large and with the wind astern. His *Licorne* performed excellently, answered the helm well, and was never better than when trying. She was not however particularly fast. She behaved best in a slight sea. Her entry lacked a degree of support at the waterline, so that she tended to pitch in a head sea to the detriment of her speed, and she was likewise prone to missing stays. Reached well in a chase, but close-hauled was not her forte. Tried well, was stiff in foul weather.

Lamothe's *Folle* was judged to be excellent, carrying her sail well, and being a fast sailer both large and close-hauled! The same was not however true with the wind astern, and she was leewardly and lap-sided on the port side. The Report on *Blaise Geslain*'s *Fidèle* is entirely bereft of information, but from that for *J.-L. Ollivier*'s *Comète* we learn that, when trimmed by the stern and drawing 13 feet 2 to 4 inches aft she answered the hem well and was extremely weatherly. Her performance with the wind astern was good, but less good close-hauled or scant, making a lot of leeway. Her best point of sailing was large or eight or nine points free.

The Report on the *Mignonne* of 1765, by *C. Saussillon*, indicates that she sailed well on all points, being however "*much hogged*", being thirteen years old at the time of the commission in question. For all that, she was not in fact struck from the lists until 1797, the last surviving 8-pdr frigate, having undergone a number of great and small repairs.

Finally, the Report on *Antoine Groignard*'s *Flore* informs us that she answered the helm moderately well if not trimmed too much by the stern, carried her sail well, and had gentle pitching and rolling motions. Her only satisfactory point of sailing was close-hauled, and sailing large she needed a stiff breeze; she sailed poorly with the wind stern. She griped in a wind, but was slack in a light breeze, tacking much easier than she veered.

Other Reports are less than flattering for the *Flore*, for *J.-L. Ollivier's Zéphir*, and also for *J.-L. Coulomb's Oiseau*, all three being considered mediocre, the last less so than the other two.

These judgements appear to be corroborated by the decision taken by the Minister, du Boynes, in 1772, to charge Antoine Groignard with drawing up a standard draught for all 8-pdr frigates to be built in the future; as he explained: "*There is reason to hope that this vessel will combine all the essential qualities, without having the faults for which nearly all the frigates of this class which are in our ports today are justifiably criticised.*" It would appear that the Minister was unaware of the reproaches levelled at Groignard's own *Flore*, but it has to be said that he was generally regarded as being an excellent shipwright.

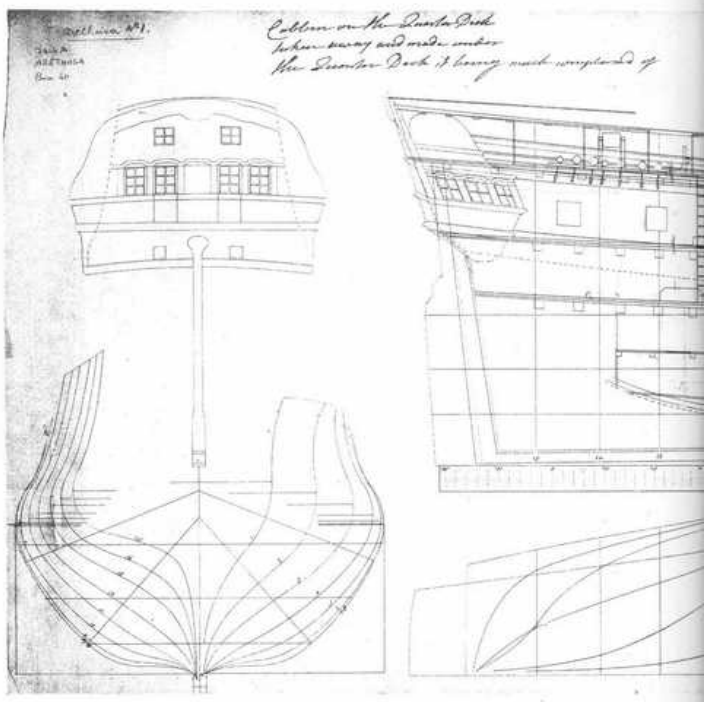
It is impossible to say whether the two frigates built to Groignard's class draught, the *Aimable* and the *Alcmène*, conformed to the Minister's expectations, since not a single Sailing Report survives for either vessel; and if they were good vessels, it did not save them from being captured during the War of American Independence.

The remaining Reports provide us with no additional information, and the general paucity of the archival record in this respect makes it difficult to reach any overall assessment of the 8-pdr class of frigates. It would appear that the earlier vessels performed well, but that this was less true of the ones which came later. It is possible that this contributed to the decision to abandon the class, but the principal cause for this was undoubtedly the weakness of their armament.

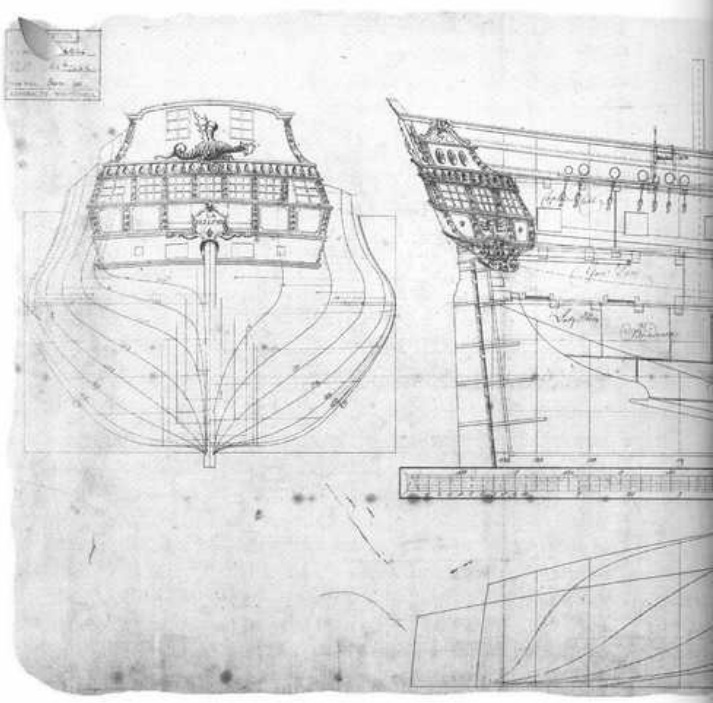
1. At most we can quote the Report on the *Pomone* which indicates that she steered and carried her sail well, with easy motions, her best points of sailing being large and with the wind astern. Another Report, that of the *Diane*, states that she did not carry her sail very well, pitched and rolled badly but without straining her masts, sailed badly close-hauled, but rather better reaching and with the wind astern. Tried well, and was quick in stays.
2. These comments are taken from the excellent series of articles on the English frigate by Robert Gardiner which appeared in *Le Petit Perroquet*, and (in abridged form) in *Warship*.

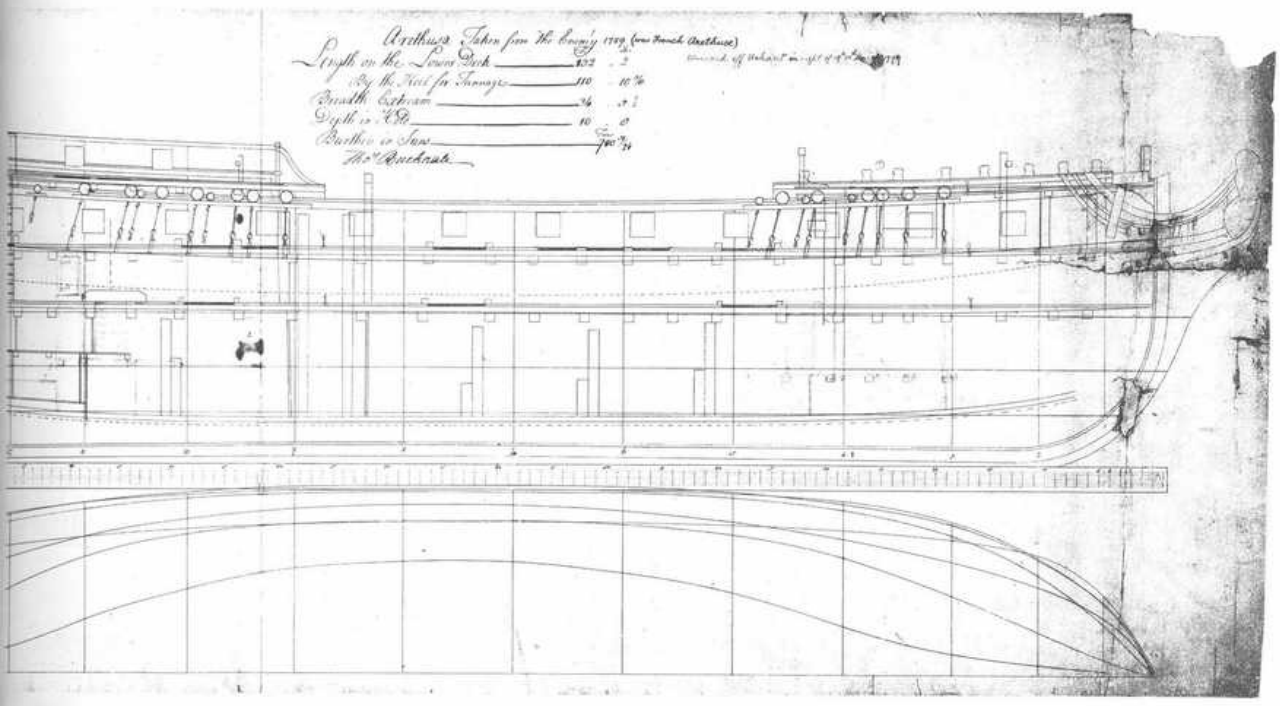
L'ARÉTHUSE. Built at Le Havre in 1758 to the draughts of *J.-J. Ginoux*, this frigate was captured in 1759. She has a more "modern" appearance that either the *Brune* or the *Bellone*. The profile of the head is typical of this period. The upper deck has fourteen ports on either side, and in theory all of them were armed, but the Navy Lists indicate that it was with twenty-four 8-pdrs and four 6-pdrs. It is unclear whether this mixture of calibres was forced by a shortage of 8-pdr guns. The Lists also indicate twelve 4-pdrs on the forecastle and quarterdeck, but the draughts only show positions for eight.

It is apparent that the positioning of the after ladderway varied from vessel to vessel: here, it is placed abaft the mainmast, but in other examples it is abaft the cable-hatch. There is a great similarity in the underwater lines of all three frigates built by J.-J. Ginoux between 1754 and 1758.



LA BELLONE. Built at Rochefort in 1756, she closely resembles the *Brune*, suggesting that Ginoux' draughts were also used at Rochefort. The *Bellone* was captured in 1759. The details of the carved-work are interesting. Note the presence of a single "Royal" (i.e. bronze-barrelled) pump, the other being entirely of wood. There are no fore topsail-sheet bitts*, and the positions of the capstans are indicated simply by lines indicating their axes.

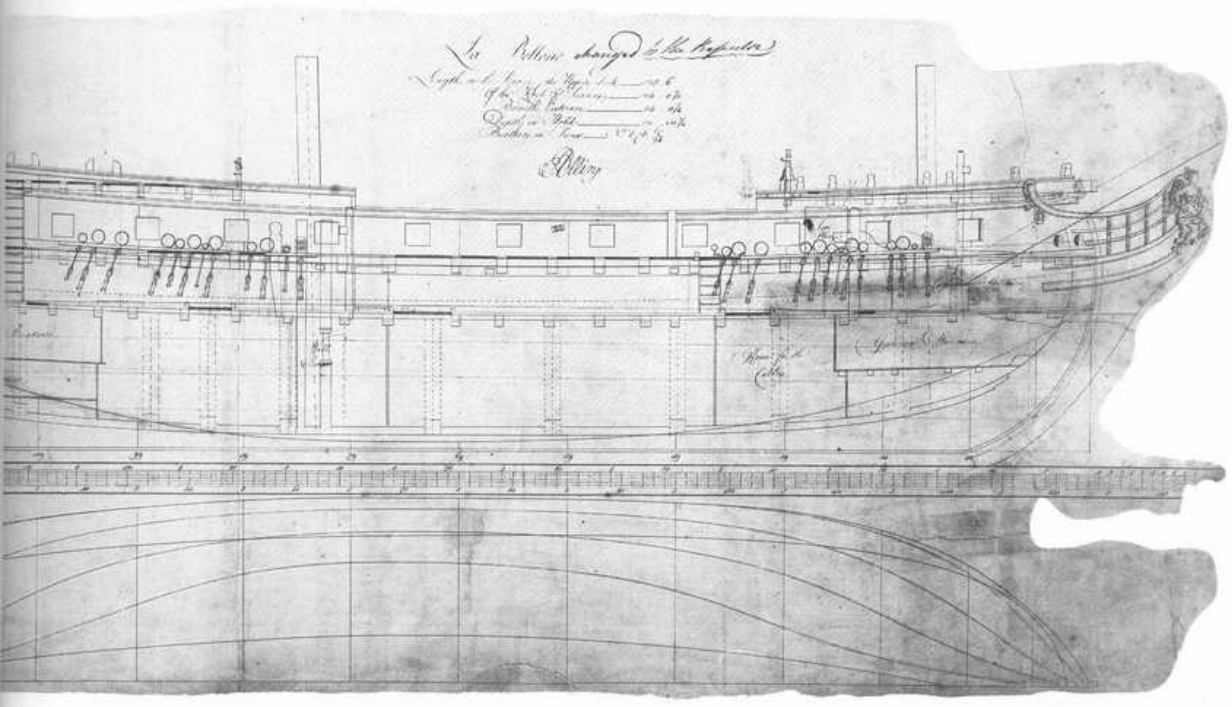




Scale 1:190

Note the tiller, and the existence of a short poop as evidenced by the small lights opened in the upper part of the stern. The upper deck has ports for thirteen guns on either side, plus a fourteenth unarmed bowchase port.

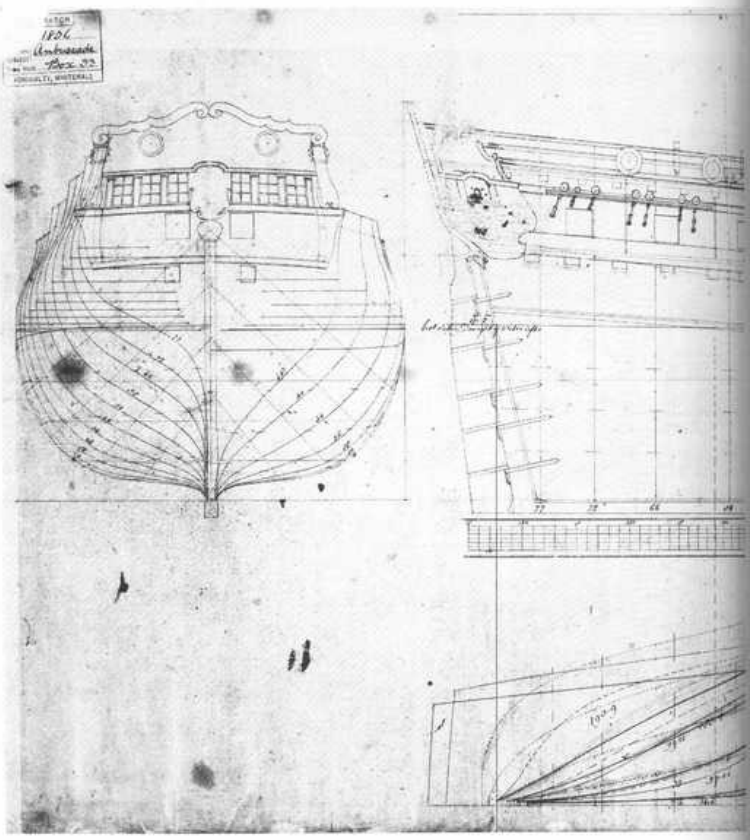
*The same is apparent in all the other 8-pdr frigate draughts. Those of the *Brune* show conventional bitts in the place of knights for the jeers.



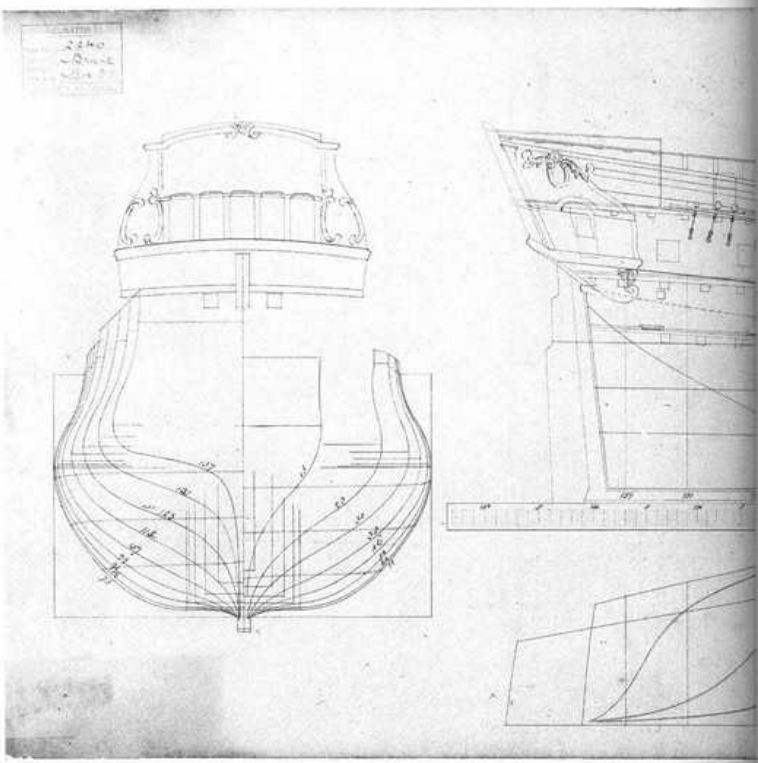
L'EMBUSCADE. This frigate was built at Le Havre in 1745 to the draughts of *Chaillé*; her service career in the French Navy was brief, for she was captured in April 1746. It would appear however that she excited a certain interest among English shipwrights, if we are to judge from the annotations and calculations which appear on the draughts.

I will not attempt to comment on all the details which appear on these draughts, but will simply pick up a few salient points on each.

The rake of the stem is very much reduced, and the gripe is unusually broad, no doubt with a view to reducing her leeway when sailing close-hauled. On the other hand, the rake of the sternpost is considerable. The galley fires are situated on either side of the vessel against the sides between the bowchase port and the first armed port on the upper deck. The circular shape of the quarterdeck gunports, common the 17th century, is unusual for this period. The skids and the entering ladder appear to finish well above the load waterline, and the height of gundeck sill is 5½ feet, which is excellent considering the date.

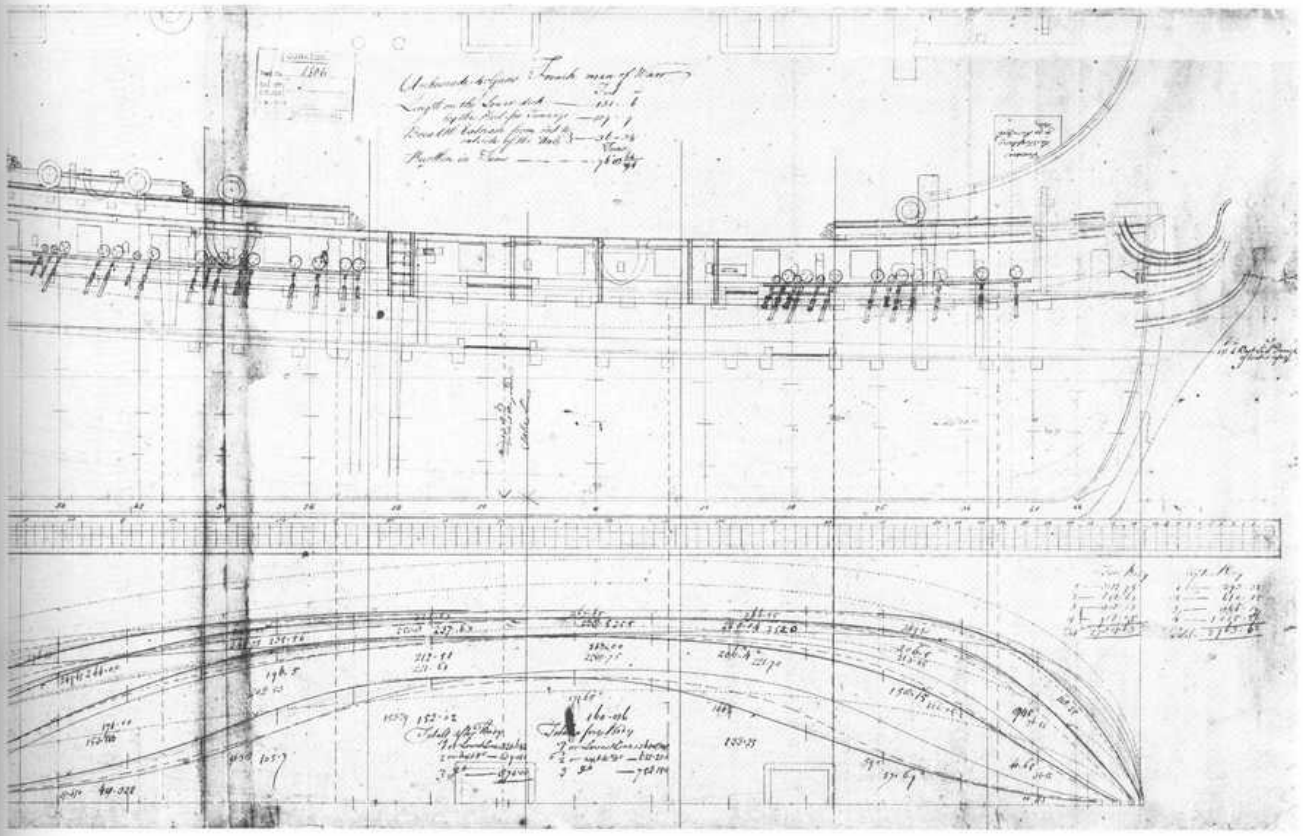


Courtesy: National Maritime Museum, Greenwich



LA BRUNE. Also built at Le Havre in 1755 to the draughts of *J.-J. Ginoux*, the *Brune* was captured in January 1761; according to the annotations on the Greenwich draughts, these were taken off in March of that year.

Note the somewhat old-fashioned curve of the head, and the fact that the load waterline coincides with the line of the LOWER DECK; there are oar-ports, and a height of gundeck sill of 6 feet; the four riders do not extend beyond the LOWER DECK; the half-poop is fifteen feet in length, and there are two gunports on either side in the great cabin. The hatches and gratings are marked in grey on the sheer draught.



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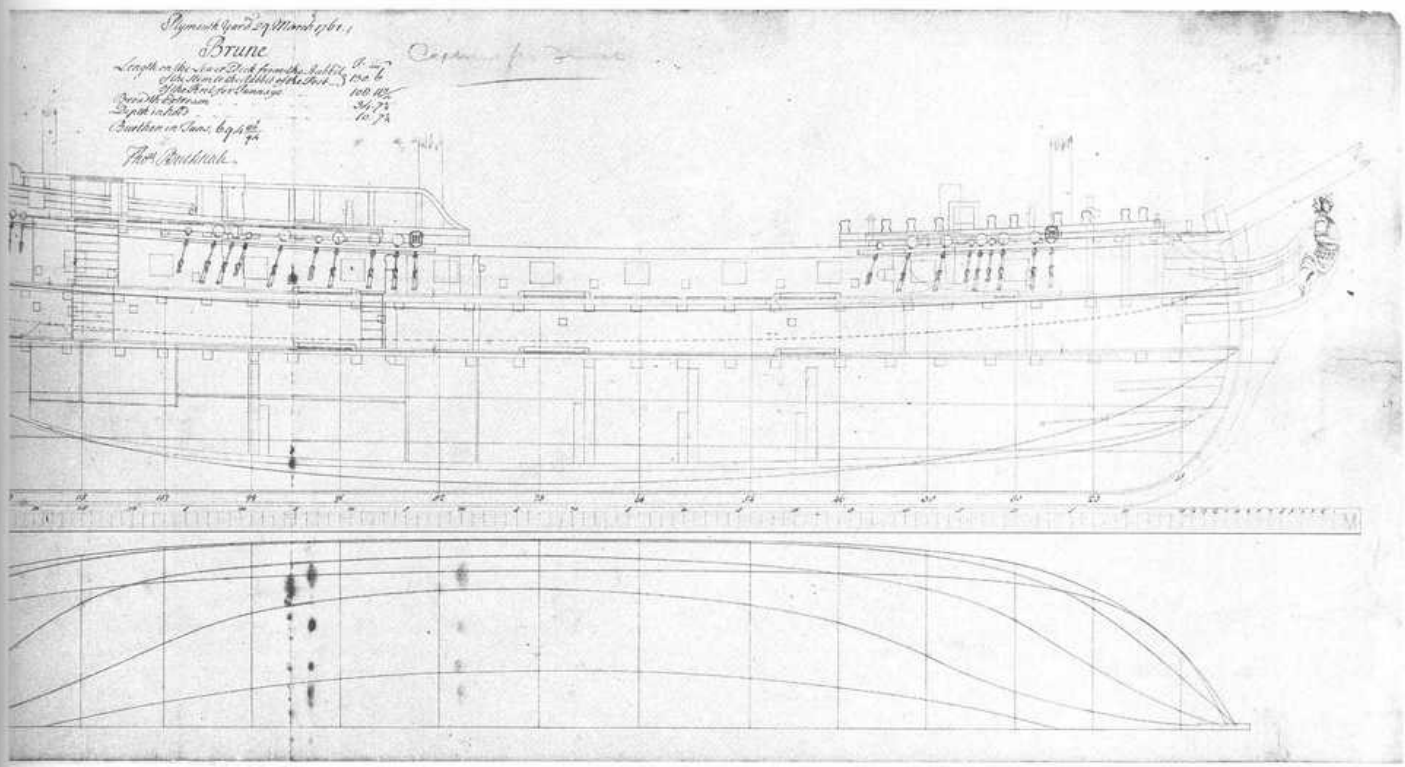


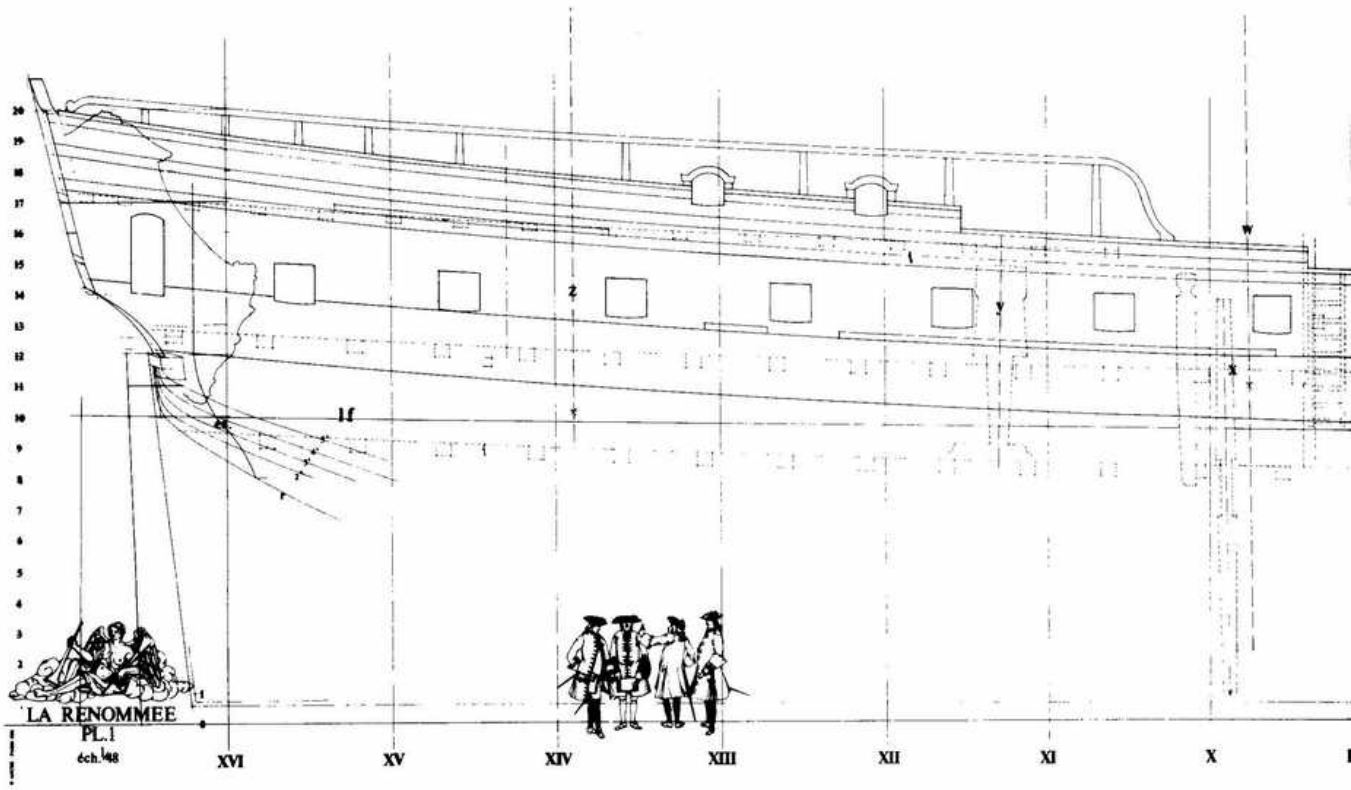
Courtesy: National Maritime Museum, Greenwich

8-pdr Frigates

Laid down	Name when launched	Builder	Place of building	Length	Breadth	Depth in hold	Gundeck	Fo'csle/ Q'deck	Total	Struck from lists	Notes
1740	*la Médée*	B. Ollivier	Brest	117'6"	31'8"	15'8"	26x 8		26	1744	Dr. DNA
1744	*l'Émeraude*	Chaillé	Le Havre	118'0"	30'0"	16'0"	24x 8	4x 4	28	1757	
1744	*la Fine*	Chaillé	Le Havre							1746	
1744	*la Sirène*	J.-L. Coulomb	Brest	116'0"	30'10"	16'ê0"	26x 8	4x 4	30	1760	Chapman, *ANM*.
1744	*la Renommée*	F. C.-Deslauriers	Brest	124'6"	33'0"	15'10"	26x 8	4x 4	30	1747	Dr. NMM; PM m/s.
1744	*le Castor*	R.N. Levasseur	Quebec	118'6"	30'5"	13'2"	26x 8	4x 4	30	1747	
1744	*la Mégère*	Tenard	Bayonne	116'0"	30'10"	13'6"	26x 8	4x 4	30	1749	
1745	*l'Embuscade*	Chaillé	Le Havre	128'6"	33'9"	17'6"	26x 8	12x 4	38	1746	Dr. NMM.
1747	*la Friponne*	P. Morineau	Rochefort	115'0"	31'6"	16'10"	24x 8		24	1761	Report, RDA.
1747	*la Favorite*	J.-L. Ollivier	Brest	127'0"	33'0"	14'0"	26x 8	4x 4	30	1770	
1748	*la Fidèle*	B. Geslain	Rochefort	119'0"	31'0"	17'7"	24x 8		24	1758	Report, RDA.
1750	*la Topaze*	J.-J. Ginoux	Brest	115'0"	30'0"	15'0"	24x 8		24	177β	
1751	*la Thétis*	J. Geffroy jnr	Brest	114'0"	30'0"	15'0"	24x 8		24	1773	
1752	*la Comète*	J.-L. Ollivier	Brest	118'0"	31'8"	16'0"	26x 8	4x 4	30	1761	Dr. DNA; Report, RDA.
1752	*l'Héroïne*	J. Geffroy jnr	Brest	114'0"	30'10"	15'6"	24x 8		24	1766	
1752	*la Nymphe*	A. Groignard	Rochefort	114'0"	28'0"	15'6"	20x 8		20	1757	Report, RDA; Dr. DNA & SHM.
1752	*la Rose*	F. Chapelle	Toulon	114'0"	32'8"	16'4"	24x 8		24	–	Never built; Dr.TDA.
1753	*la Valeur*	F. C.-Deslauriers	Rochefort				20x 8		20	1760	
1753	*la Fleur de Lys*	J.-L. Ollivier	Brest	120'0"	31'8"	16'0"	26x 8	4x 4	30	1760	
1753	*l'Améthyste*	J. Geffroy jnr	Brest	120'0"	32'0"	16'3"	26x 8	4x 4	30	1771	
1754	*la Pleyade*	J.M.B. Coulomb	Toulon	120'0"	29'10"	15'10"	26x 8	6x 4	32	1784	Dr. TDA.
1754	*la Minerve*	J.-L. Coulomb	Toulon	120'0"	31'8"	15'10"	26x 8	4x 4	30	1762	
1754	*l'Oiseau*	J.-L. Coulomb	Toulon	120'0"	31'8"	15'10"	26x 8	4x 4	30	1762	
1755	*la Licorne*	P. Geffroy snr	Brest	120'6"	31'10"	16'6"	26x 8	6x 4	32	1778	Dr. NMM.
1755	*la Brune*	J.-J. Ginoux	Le Havre	124'0"	32'0"	16'4"	26x 8	6x 4	32	1761	Dr. NMM.
1755	*la Blonde*	J.-J. Ginoux	Le Havre	124'0"	32'0"	16'4"	26x 8	6x 4	32	1760	
1755	*la Sauvage*		Brest				26x 8	4x 4	30	1759	
1755	*la Sirène*	J.-L. Coulomb	Lorient	118'0"*	31'8"	16'9"	26x 8	4x 4	30		Acquired from E.I.C.
1756	*l'Aigrette*	J.-J. Ginoux	Le Havre	124'0"	31'8"	16'4"	26x 8	4x 4	30	1788	Report, RDA.
1756	*la Diligente*	J.-L. Coulomb	Lorient	122'0"	32'0"	15'6"	26x 8	4x 4	30		Acquired from E.I.C.
1756	*la Malicieuse*	J.-J. Ginoux	Le Havre	124'0"	31'8"	16'4"	26x 8	6x 4	32	1777	
1756	*l'Hermione*		Bayonne							1761	
1756	*la Bellone*		Rochefort	120'6"	32'3"	15'6"	26x 8	4x 4	30	1759	Dr. NMM.
1756	*la Félicité*	J.-J. Ginoux	Le Havre							1761	
1756	*la Vestale*	J.-J. Ginoux	Le Havre	124'0"	31'8"	16'4"	26x 8	4x 4	30	1761	
1757	*l'Opale*		Bayonne				26x 8	4x 4	30	1762	
1758	*l'Aréthuse*	J.-J. Ginoux	Le Havre	127'3"	31'8"	16'0"	24x 8; 4x 6	8x 4	36	1759	Dr. NMM; Report, RDA.
1760	*la Folle*	P.-A. Lamothe	Nantes	120'0"	31'6"	16'0"	28x 8	6x 4	34	1762	Bought in.
1763	*la Danaé*	A. Groignard	Nantes	124'0"	32'7"	16'0"	26x 8		26	1779	
1765	*la Diligente*	J.-L. Coulomb	Lorient	123'0"	31'0"	16'0"	26x 8	4x 4	30		Acquired from E.I.C.
1765	*la Mignonne*	C. Saussillon	Toulon	122'2"	32'0"	15'9"	26x 8	4x 4	30	1797	Dr. DNA, TDA; Report TDA; ex *Précieuse*.
1766	*l'Étoile*	N. Pomet	Toulon	121'5"	32'0"	16'4"	26x 8		26	–	Dr. TDA; never built.
1768	*le Zéphir*	J.-L. Ollivier	Brest	124'6"	32'4"	16'5"	26x 8	4x 4	30	1779	Report, RDA.
1768	*l'Oiseau*	F. C.-Deslauriers	Rochefort	139'0"	31'0"	15'6"	26x 8		26	1779	Dr. NMM.
1769	*la Flore*	A. Groignard	Brest	128'6"	32'6"	16'4"	26x 8		26	1785	Report, TDA.
1774	*l'Aimable*	A. Groignard	Toulon	126'2"	33'3"	17'2"	26x 8		26	1782	Dr. NMM.
1774	*l'Alcmène*	A. Groignard	Toulon	126'2"	33'3"	17'2"	26x 8		26	1779	Dr. NMM.

*Length at the load waterline.
Abbreviations: *ANM*: *Architectura Navalis Mercatoria*, F.H. af Chapman, 1768; BDA: Brest Dockyard Archives; DNA: Danish National Archives; Dr.: Draughts; EIC: French East India Company; MM: Musée de la Marine, Paris; NMM: National Maritime Museum, Greenwich; P.M.: Pierre Morineau; RDA: Rochefort Dockyard Archives; SHM: Service Historique de la Marine, Vincennes; TDA: Toulon Dockyard Archives.

Chapter IV
THE 8-Pdr FRIGATE *LA RENOMMÉE*



LA RENOMMÉE 1744-1747

The following pages are taken from the most recent monograph for modelmakers, describing the 8-pdr frigate *La Renommée*; of the 33 sheets of plans, only some are reproduced here.

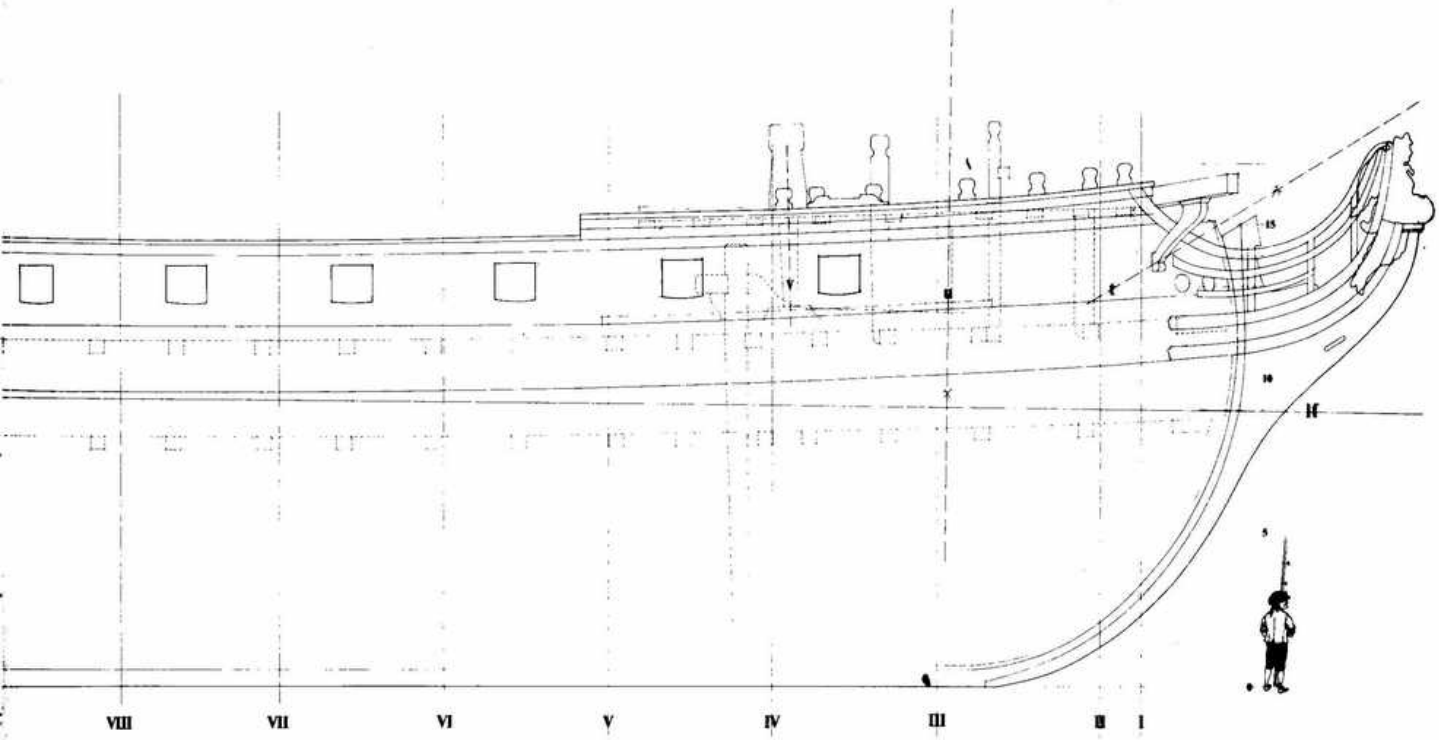
As we have seen, this frigate was one of the very first of her type, designed by Clairin-Deslauriers but built according to the proposals put forward by Blaise Ollivier, under whom Deslauriers studied at Brest. The master's influence is clearly visible. While it would have been preferable to have presented the prototype of the class, the *Médée*, unfortunately insufficient material has survived for such a detailed study as is demanded by a monograph.

The *Renommée* was thus launched at Brest in 1744, but was to have a relatively short career (albeit an honourable one) in the French Navy: after a valiant struggle against an English squadron off Ushant, she was finally captured by the *Dover* (44) on September 25th 1747; badly damaged in her spars, she was towed to Plymouth and repaired. Taken into the Royal Navy and renamed the *Renown*, she was finally broken up at Woolwich in May 1771. Her career in the Royal Navy was thus a long one.

The plans which follow are based on the draughts taken off at Plymouth, and the carved-work has been taken from the original designs by Caffiéri which have fortunately been preserved in the French archives at the *Service Historique de la Marine* at Vincennes. Further details are recorded in Duhamel du Monceau's classic work, *Élémens de l'Architecture Navale*, published in 1752 (with a 2nd edition in 1758).

A word concerning the English draughts is not perhaps out of place: while I have in the main followed them scrupulously, I have nevertheless noted a number of anomalies concerning the arrangement of the beams (see below). There appears also to be evidence of two gun positions on the forecastle, but in this instance I have preferred to stay with the 30 guns which characterise French frigates of this period. The masts would appear to be rather smaller in diameter than was usual, and this is especially true of the bowsprit, whose given (largest) diameter was normally taken as half the given diameters of the mainmast and foremast added together. By the same token, the number of deadeyes is insufficient for rigging a fore-topmast and fore-topgallant. Whether these anomalies are due in any part to the considerable damage in the spars suffered by the *Renommée* when she was captured is a matter for conjecture. However, these minor comments should not be taken as putting into question the overall authenticity of the document, and I have preferred to rely on this as the basis for my research, rather than the later draught preserved at the Science Museum in London, showing the *Renown* as modified for service in the Royal Navy.

I hope that this very detailed treatment of one of the first 8-pdr frigates will help to expand on the previous chapter, and that the drawings will help to explain better what has been said concerning these vessels.



Schematic sheer draught (Plate 1)

This drawing and the two others which follow give the basic dimensional details of the *Renommée*. The lines are shown to inside of plank, in other words with the planking of the hull notionally removed. The profile of the stem is completed by the addition of the head, while at the stern the outline of the quarter-gallery is indicated. The horizontal lines of deck of the gundeck and the upper deck are shown with dotted lines, as are the beams. The gunports are shown: note the way their lower sills are slightly curved. Marked on the frames are the positions of the wales, rails, and channels. Also indicated are the axes of the masts, pumps, and capstans, the latter being shown in outline, as are the riding bitts and topsail-sheet bitts; the catheads and their supporters are shown in full.

The transverse sections or station lines, sixteen in number, are indicated with roman numerals. At either end of the drawing are a series of horizontal sections numbered from zero to twenty, zero corresponding to the lower face of the keel; these sections are spaced 18 [French] inches apart. Additional spacial information is provided at the stern by five vertical lines parallel to the axis of the keel. The axes of the fashion piece and of the wing transom are shown, likewise those of the counter and the stern timbers. Finally, I have shown the load waterline.

I to XVI. Vertical sections spaced 8 [French] feet apart, except for sections **I** and **II** which are only 2 feet apart. This corresponds to a room and space of two timbers 16 inches thick making up each frame, with a space of 8 inches.

1 to 20. Horizontal sections spaced 18 inches apart, starting at the lower face of the keel, all the sections being parallel to the keel rather than the waterline.

1′ to 5′. Vertical sections parallel to the keel.

es. Round aft of the fashion piece.

lf. Load waterline.

t. Axis of the bowsprit.

u. Axis of the foremast.

v. Axis of the fore jeer capstan.

w. Axis of the mainmast.

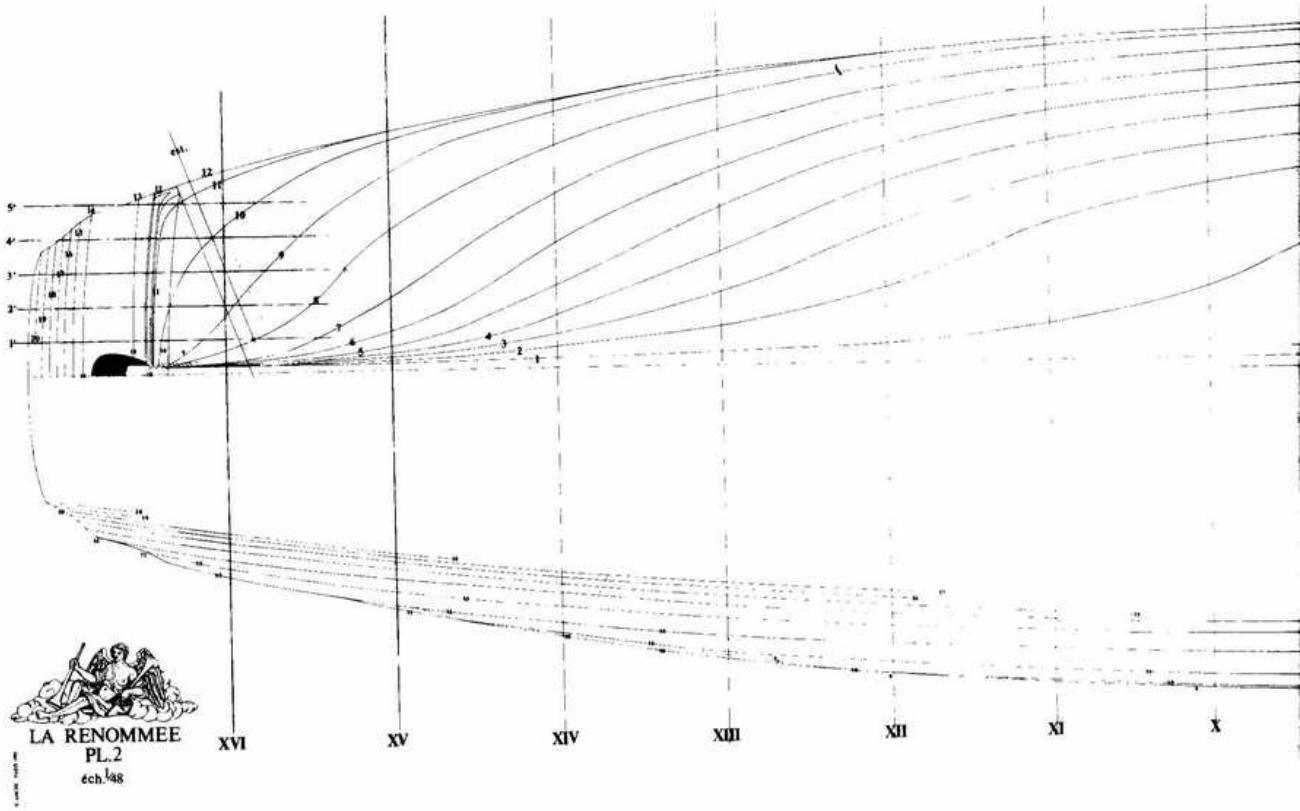
x. Axis of the pumps.

y. Axis of the main capstan.

z. Axis of the mizen-mast (the dotted line abaft the mast is the line of the tiller-ropes running down from the steering wheel).

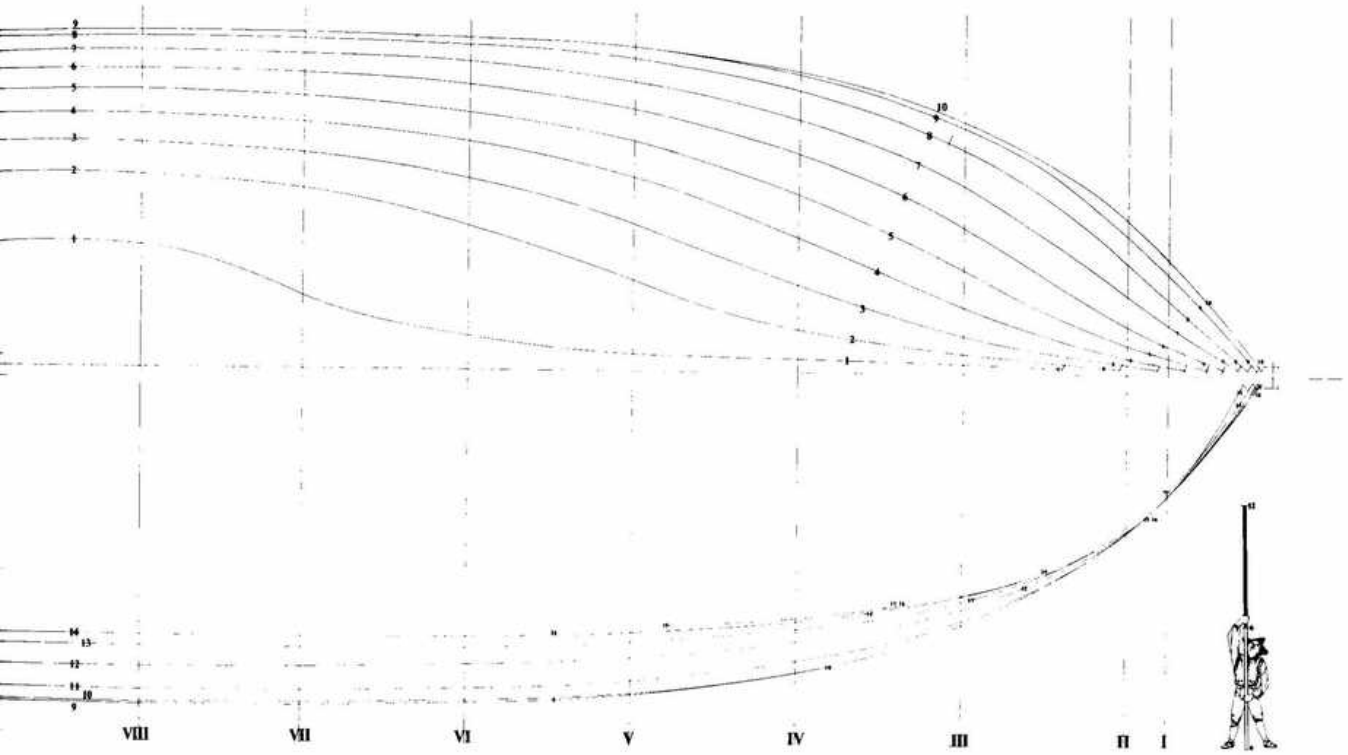
Note the distances between the horizontal lines of deck of the upper deck and the quarterdeck and forecastle, which are 5′6″ forward and 5′9″ aft at the break of the quarterdeck, rising progressively to reach 6′4″ at the stern.

The distribution of the beams at the various levels has been copied strictly from the NMM draught; this dictates the positions of the various hatchways and the deck gear. As far as the latter are concerned, the arrangements differ somewhat from usual practice in the French Navy: the pins of the riding bitts are bolted to the after face of the gundeck and upper deck beams[1], while the opening for the mainmast leaves room for the installation of only two pumps[2].



Finally, the main capstan has only a single barrel, its spindle running down to be stepped on the gundeck; in order for this to be possible, it must clearly not run foul of a beam, with sufficient clearance for the spindle and the barrel to be withdrawn between the beams of the quarterdeck. This results in the capstan being placed too close to the quarterdeck breastwork for a second barrel to be fitted, since the bars would foul the breastwork.

1. As a rule the pins of the bitts are bolted to the after face of the upper deck beam and the forward face of the gundeck beam.
2. A manuscript in the *Bibliothèque Nationale* (Fonds Français, NA 6206, folio 103), entitled "Essay on the Navy, or, a Table of the Expense Necessary for the Building, Fitting out and Storing of Every Sort of Ship", and dating from 1744, lists in the section on Vessels of the Sixth Rate (frigates of 30 to 38 guns) the provision of only two bronze-barrelled pumps, but it should be noted that there were also two other elm-tree pumps.



Horizontal sections (Plate 2)

The upper part of the drawing shows the horizontal sections (*not* waterlines) below the height of breadth, the hull being viewed from below; this allows a view of the wing transom, the counter, the helm-port, and the taffarel.
The lower part of the drawing shows the horizontal sections above the height of breadth, seen from above. Remember that all these lines are taken to inside of plank.
The vertical sections at the stern, parallel to the longitudinal axis of the vessel, are marked with arabic numerals and an additional tick to distinguish them from the lines showing the horizontal sections. The fashion piece has been shown in full, and the sixteen vertical sections at this point are marked with arabic numerals.

Vertical sections (Plate 3)

The upper of the two body plans opposite shows stations I to VIII of the fore body. The hull is shown with the viewer standing at the bow and looking aft towards the stern. Note that the openings for the hawseholes and the bowsprit, the head, the beakhead bulkhead, the cathead and its supporter, are all precisely represented. The left-hand side shows the outlines of the stations (always to inside of plank) with dotted lines marking the horizontal lines of deck of the gundeck, upper deck and forecastle. The solid lines mark the run of the wales, composed of an upper and lower strake with two black strakes between. The waist rail, fore drift rail and the planksheer are all clearly marked, while small ticks mark the positions of the gunports. The right-hand side includes the same elements, but also includes the positions of all the strakes of hull planking. Note in particular strakes n° 13 (numbering from the keel), n° 17, and n° 21, all of which are stealers, starting at stations III, II and I respectively, all the remainder landing in the rabbet of the stem.

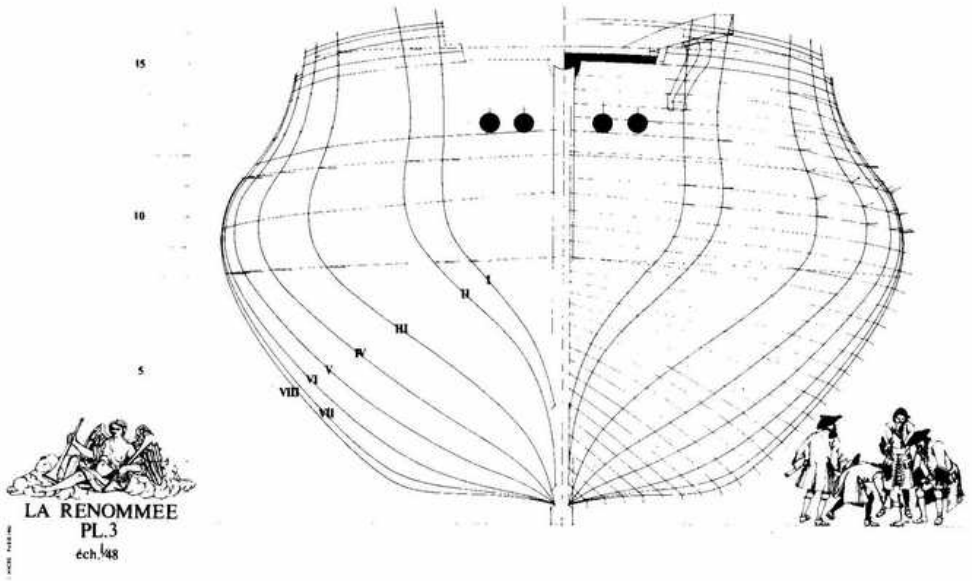
The upper wale has the distinction of having its upper edge horizontal, while all the other strakes have their edge perpendicular to the frame timbers. This is especially pronounced at the height of breadth, because of the marked tumblehome of the hull at this point. The distance separating the upper and lower wales is such that there is room for two black strakes between, although I have not shown them individually here, in order not to overload the drawing.

The lower body plan illustrates stations IX to XVI of the afterbody. The hull is shown as if one were looking from the stern towards the bow. The same lines are indicated as in the upper plan, so that there is no need to repeat my explanations. The rabbet of the wing transom receives the hooding ends of strakes 19 to 24. The 25th strake, which is the first of the diminishing strakes immediately below the lower wale, has its lower edge exactly on the line of the rabbet, so that a small part of the strake remains visible outboard of the wing transom.

I have not shown the fashion piece, but the outline of the side counter timber shows where the planking of the side finishes in the upper works; these strakes must overlap the timber sufficiently to hide the butts of the planking of the counter. The helm-port has been shown, through which can be seen the outline of the upper deck transom. Note the line marking the sharp change of angle where the counter meets the taffarel; dotted lines indicate the beginning of the taffarel fife rail, and (on the left side) the outline of the taffarel where it masks the port gallery.

There are 25 strakes of hull planking below the lower wale, plus an additional drop-strake forming the garboard as far as station XII (this can be seen in Plate 7, where it is also quite apparent why the extra strake must be inserted in order to ensure a harmonious run to the planking of the bottom.

Finally, this Plate shows once again the 20 or so horizontal sections 18 inches apart from the lower face of the keel upwards, and also the five additional sections at the stern.


LA RENOMMEE
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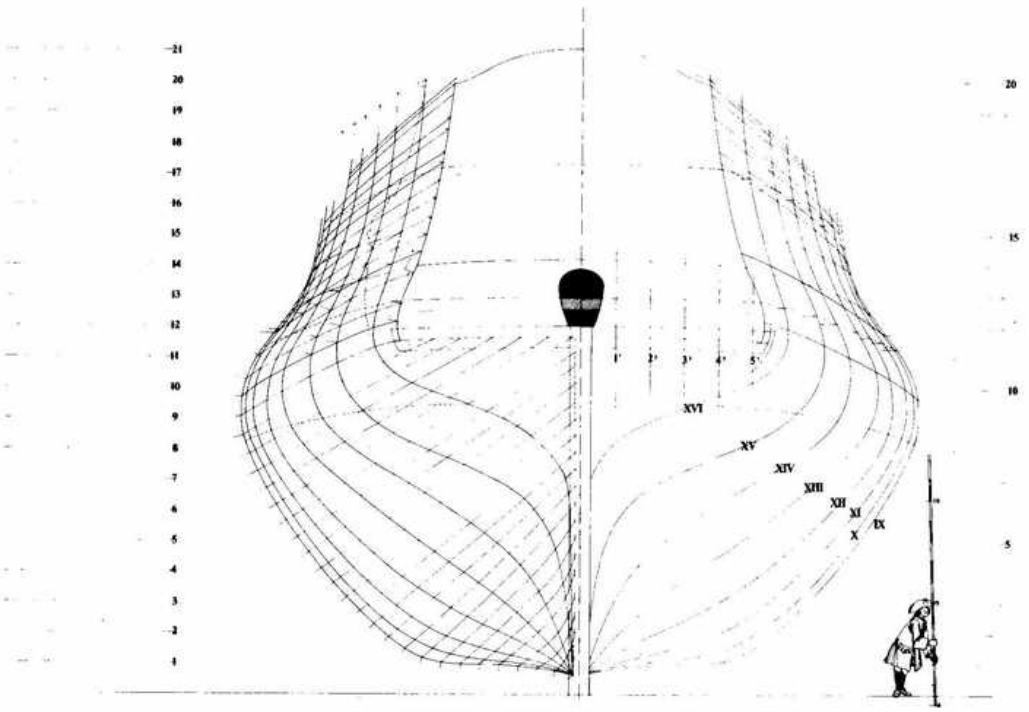
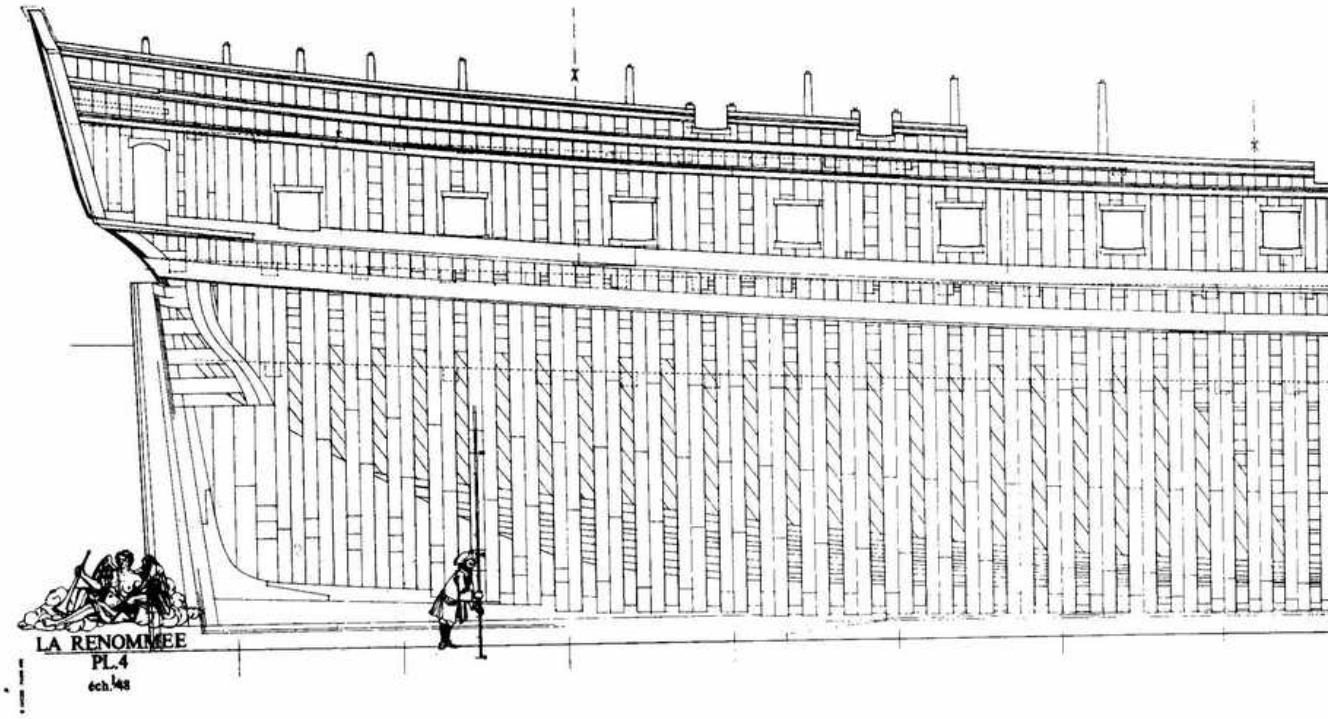




Disposition of frame (Plate 4)

This Plate shows all the timbers of the frigate. The frames are made up of double thicknesses of timbers (16 inches), with a space of 8 inches between; they are arranged in the usual manner, with flat floors, rising floors and crotches. There are 58 frames in all, including the two partial frames at the stern. The arrangement of the gunports respects the disposition of frame as closely as possible, with only a few gunports where the fore edge of the port is formed by a filling-timber inserted in the space between two frames. The hawsepieces are entirely conventional in appearance, but note that the rabbet of the stem is relatively close to its outer face. The very pinched entry explains the height of the crotches and the deadwood of the bow on which the heels of the hawsepieces land.

The face-piece fits into a step in the forefoot, and it extends upwards in a series of ekeings in which the gammoning holes are cut. The upper and lower lacings are filled in between with a frieze made up of short lengths of board which slide into long mortices; together with the uppermost ekeing of the face-piece, these form the seat of the figure. The lacings are tenoned into the outer face of the stem. The knee of the head fits into the curve formed by the stem and the upper lacing, and all these timbers are solidly fastened together with a large number of bolts (see *74-G.S.*, vol. I).

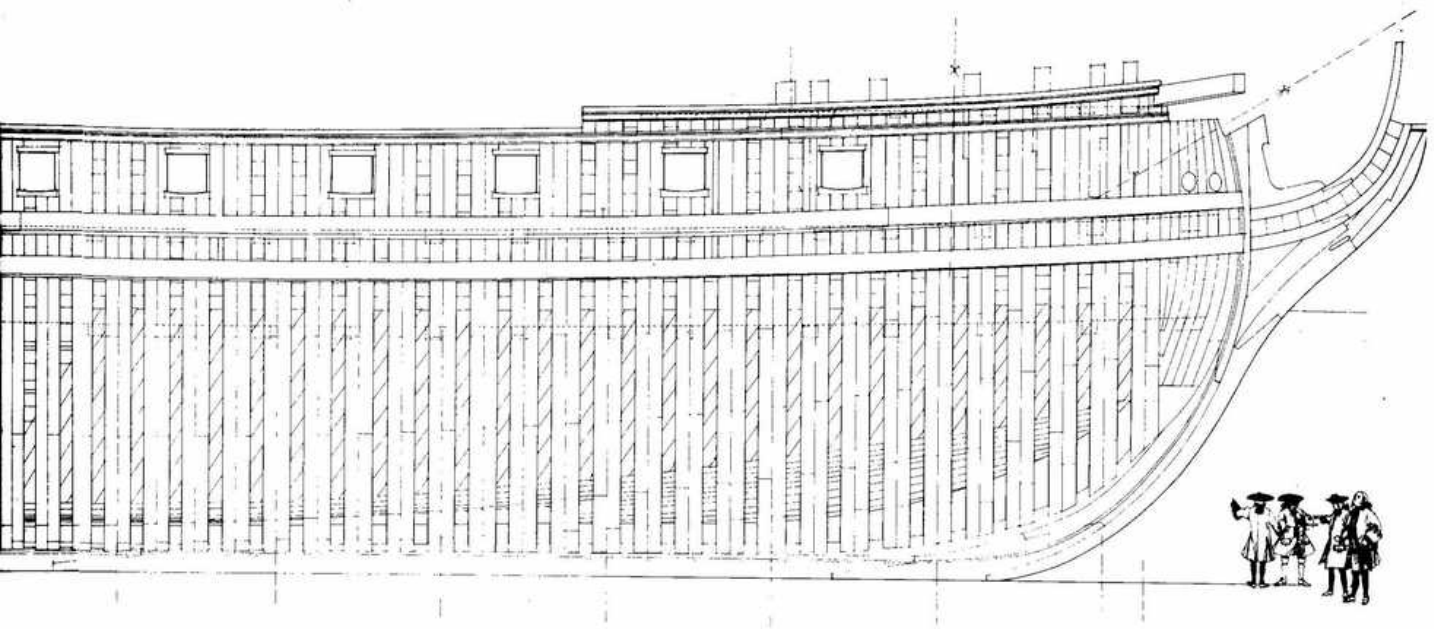
At the stern, the deadwood is built up over the rising wood and serves to raise the heels of the crotches of the afterbody. The sternpost knee and the timbers of the deadwood rise as far as the heel of the fashion piece. There are three intermediate transoms, and the wing transom, into which are scored the timbers of the counter, which in turn are fayed to the timbers of the taffarel, over which curves the arch of the cove. I would draw your attention also to the sternpost, the head of which ends at the lower face of the wing transom, in order to leave room for the free movement of the tiller between it and the upper deck transom.

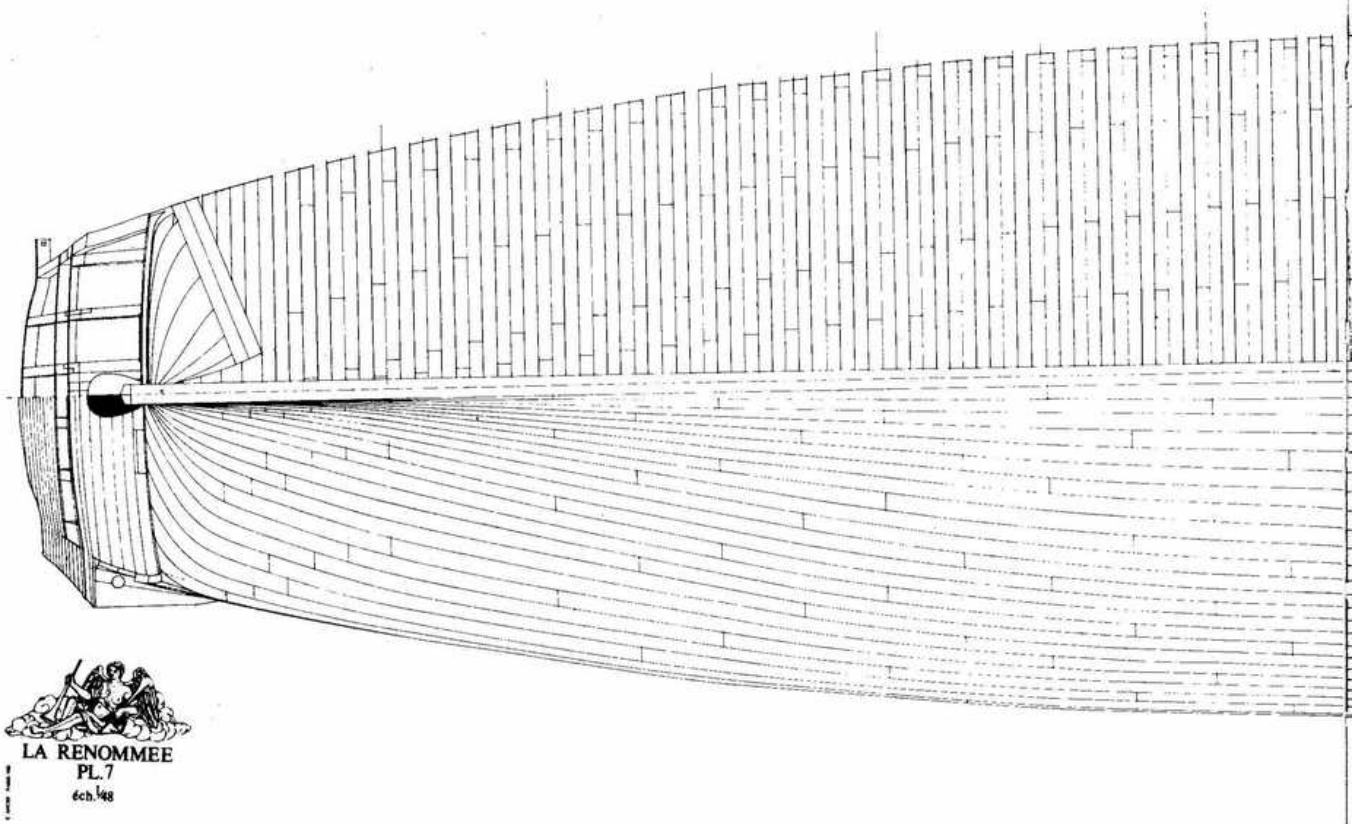
Note that there are no furrings or fillings either between the frames (see *74-G.S.*, vol. I), or between the keelson and the rising wood. The considerable space between the frames and the desire to lighten* the structure as much as possible are the explanation for this anomaly, but it is also true that some shipwrights dispensed with such fillings even in ships of the line. Nevertheless, a number of fillings would have had to be inserted as required to provide a secure anchorage for some of the fastenings and for the chains of the shrouds.

I have shown the two wales in order to emphasise the tumblehome of the frigate, which is evident from the view of the lower face of the wales. Also visible are the various decorative rails and the lower stool of the quarter-gallery.

I will conclude my commentary here, since the other Plates illustrating the structure of the head and the stern will give ample opportunity to come back to the subject.

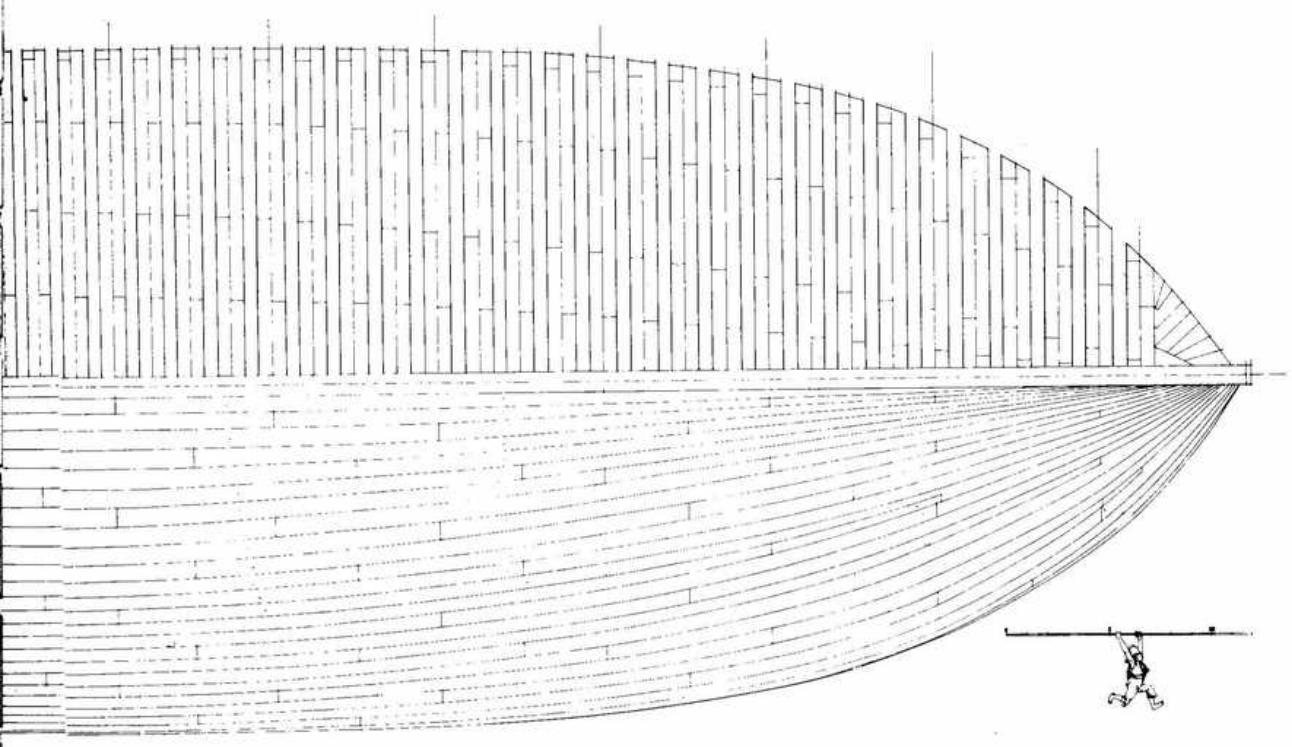
*It has to be recognised that these fillings inserted between the floors form a sort of "natural ballast", allowing the ordinary ballast to be diminished in proportion, so that strictly speaking there is no weight penalty.

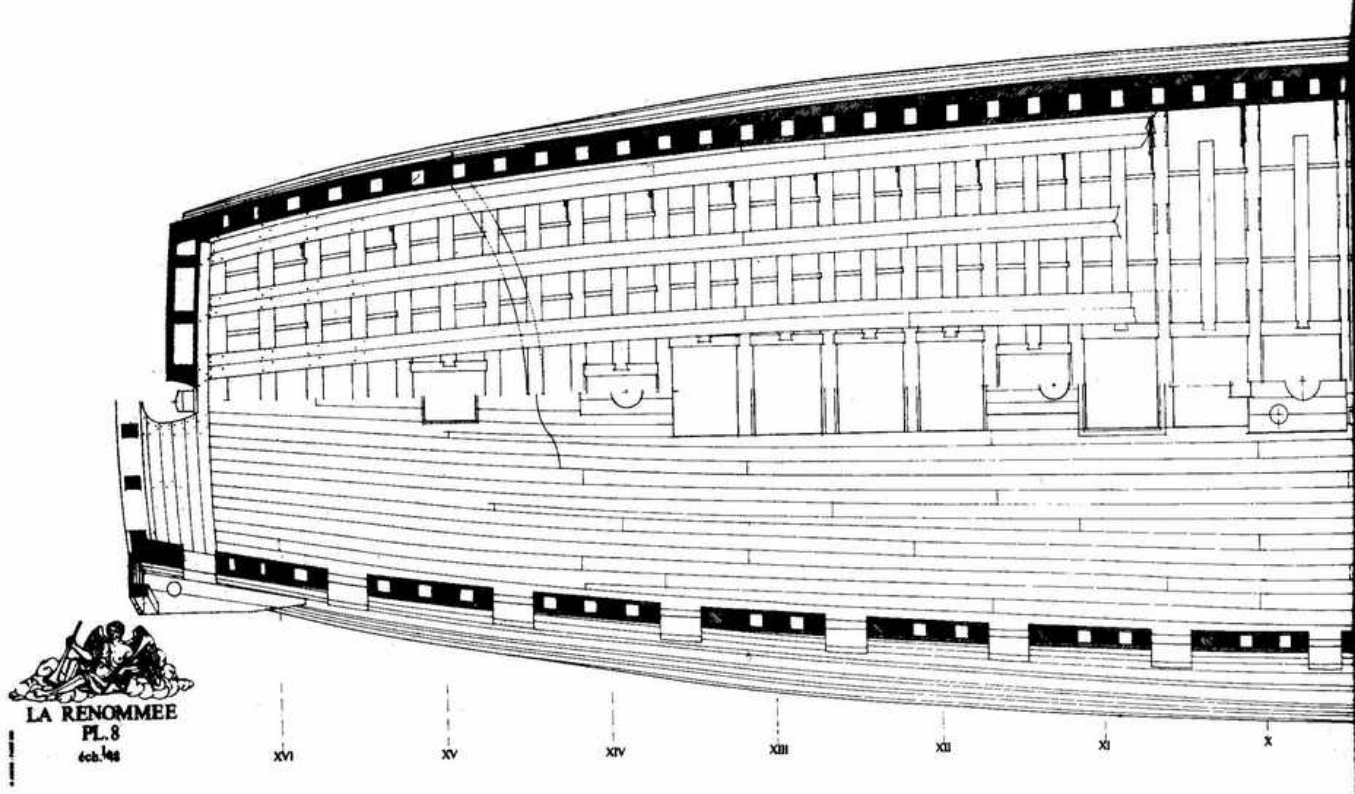




Underwater hull – timbering and planking (Plate 7)

The upper part of the drawing shows the timbering seen from below, including the hawsepieces at the bow and the upper part of the fashion pieces, the transoms, and the stern timbers.
In the lower part of the drawing these timbers are planked up, including the counter, in the middle of which can be seen the helm-port. The stern timbers form the munions of the stern-lights. The lower stool of the quarter-gallery is shown in outline; just below it can be seen the butt of the lower wale and that of the first diminishing strake; the small curved triangle marks the area occupied by the upper face of the second diminishing strake whose hooding end lands in the rabbet of the wing transom.





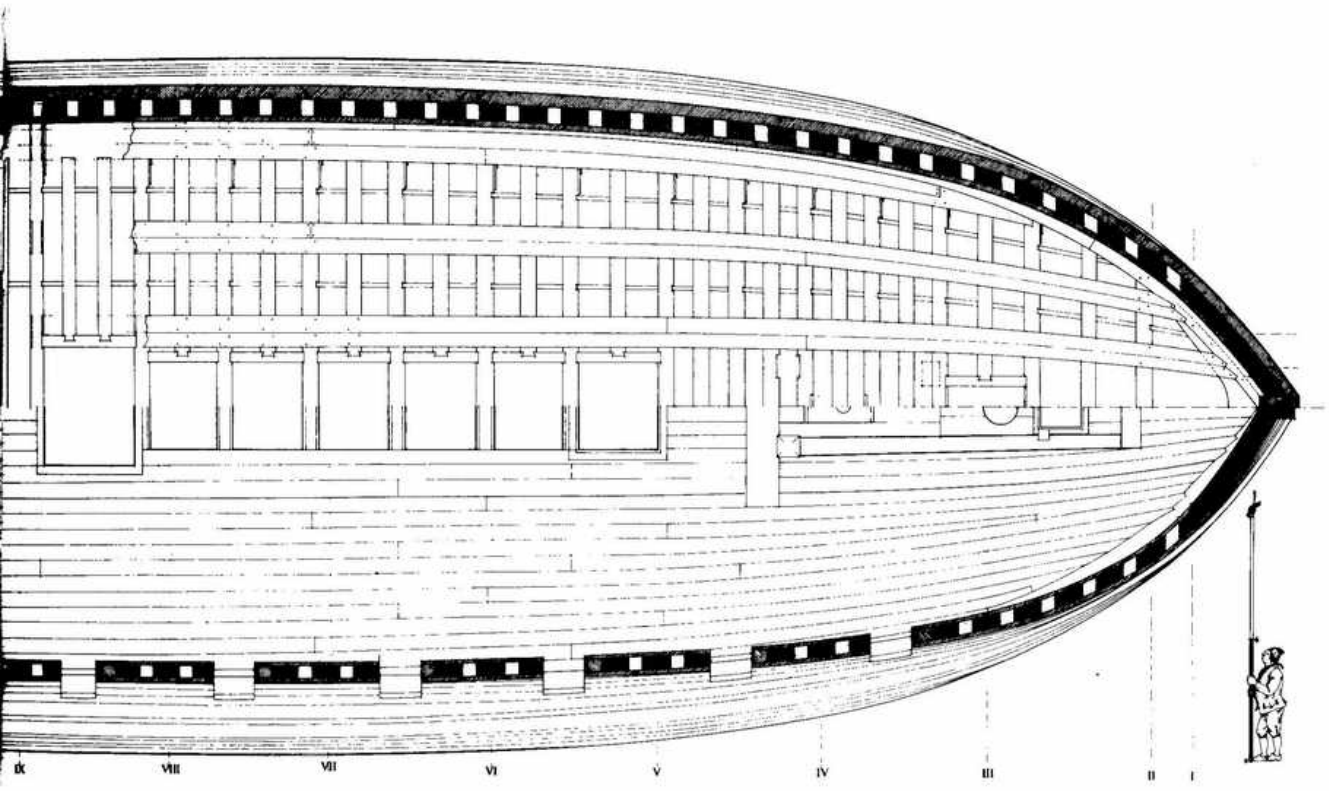
Upper deck plan (Plate 8)

The upper part of the drawing shows the arrangement of the beams and the ledges. The latter are dovetailed at their inboard end into the carlings marking the hatches and other openings, while at their outboard end they are scored down into the inner waterway. Note that the upper face of the beams and the ledges are flush with each other. This arrangement makes it necessary to score down the binding strakes into each ledge. An alternative arrangement, which does not have the disadvantage of weakening the binding strakes, is also possible: the ledges can be made in several parts, each part being scored down into the binding strakes as they are into the inner waterway at the vessel's side. Some of the ledges run clear across the vessel like the beams.

The binding strakes, inner waterways, and the chine of the waterways proper are established according to the usual practice in the French Navy, as are the other timbers of the decks, such as the carlings, hatch-carlings, partners, etc. The sweep of the tiller is bolted beneath the upper deck beams.

The lower part of the drawing shows the planking of the deck, but the section here is not, as in the upper part of the drawing, at the level of the chine of the waterway but rather higher, at the upper sill of the gunports. The planking of the deck amidships, between the two central binding-strakes, is thicker than elsewhere, as can be seen in Plate 10.

The indication of the external planking of the hull illustrates the degree of tumblehome.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VIII
VII
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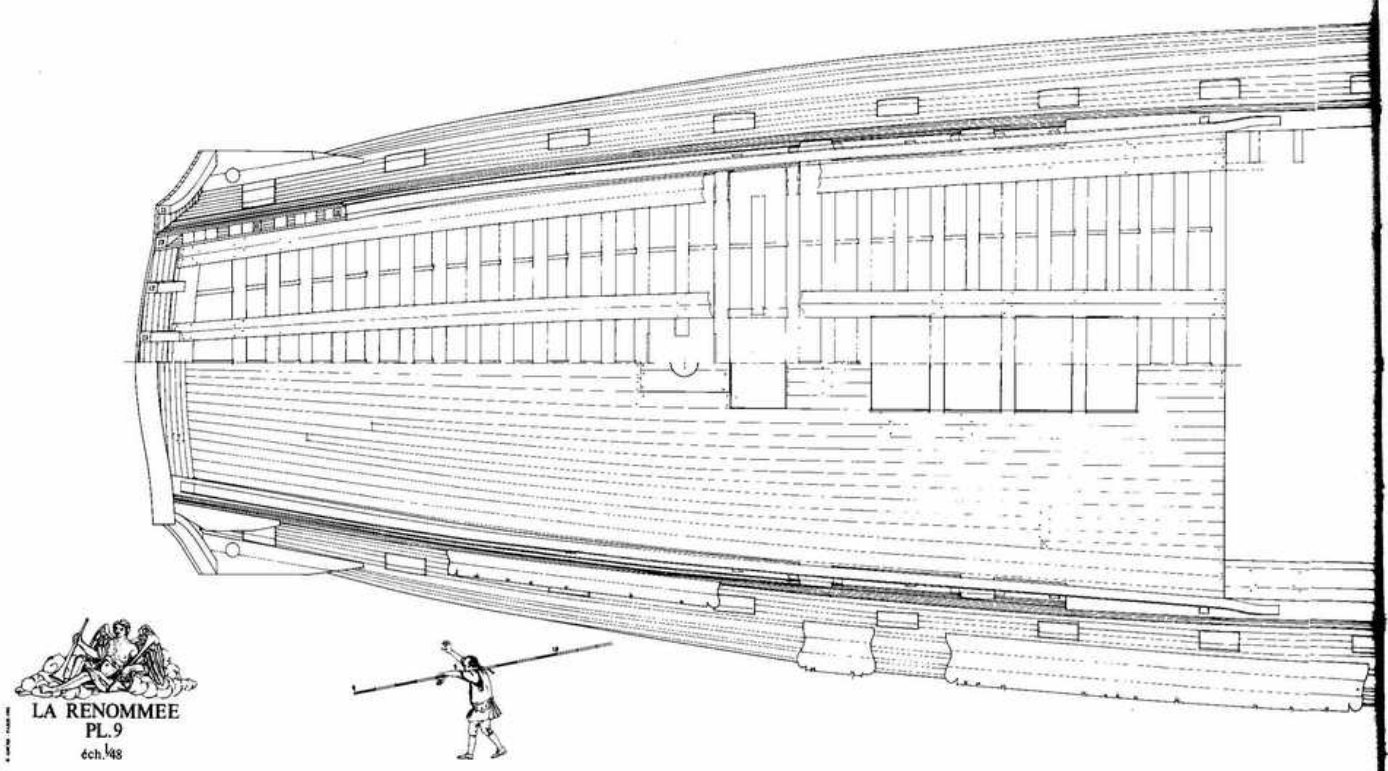


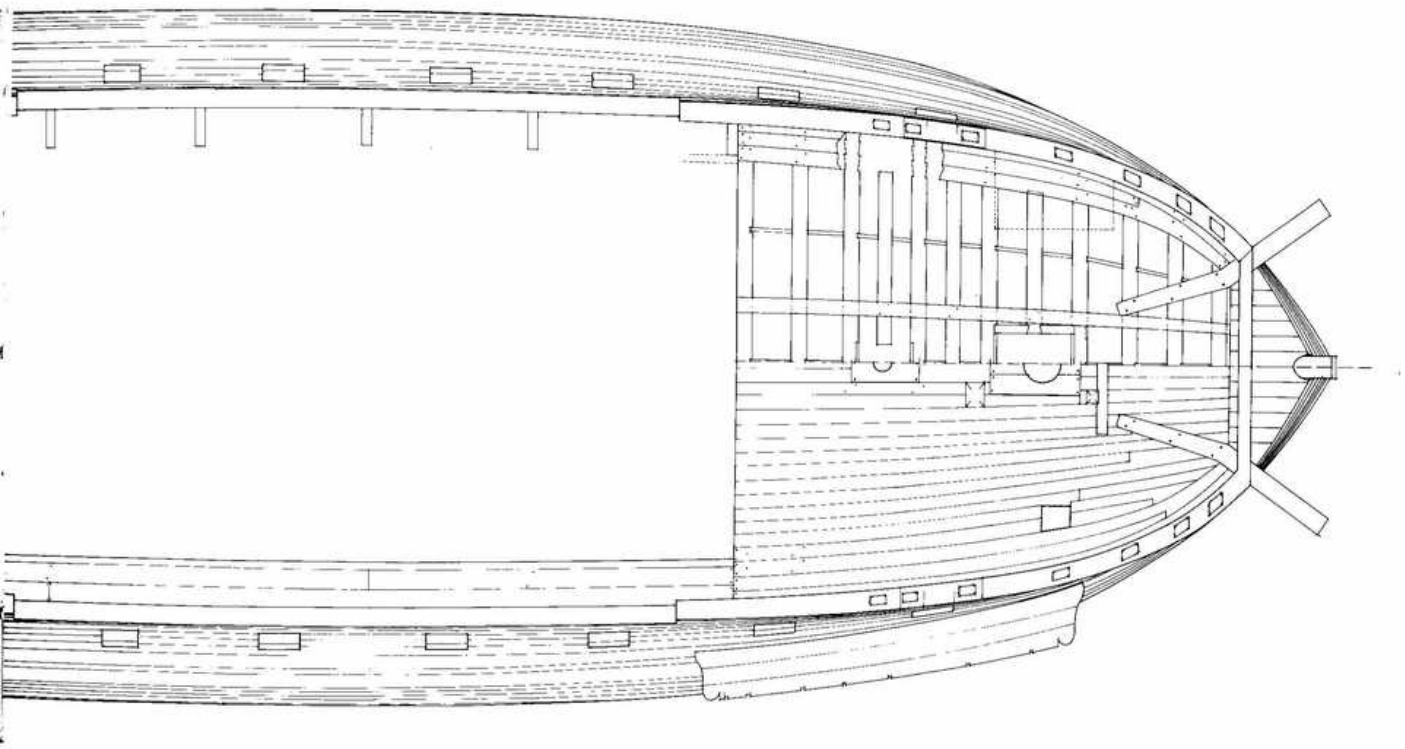
Forecastle and quarterdeck (Plate 9)

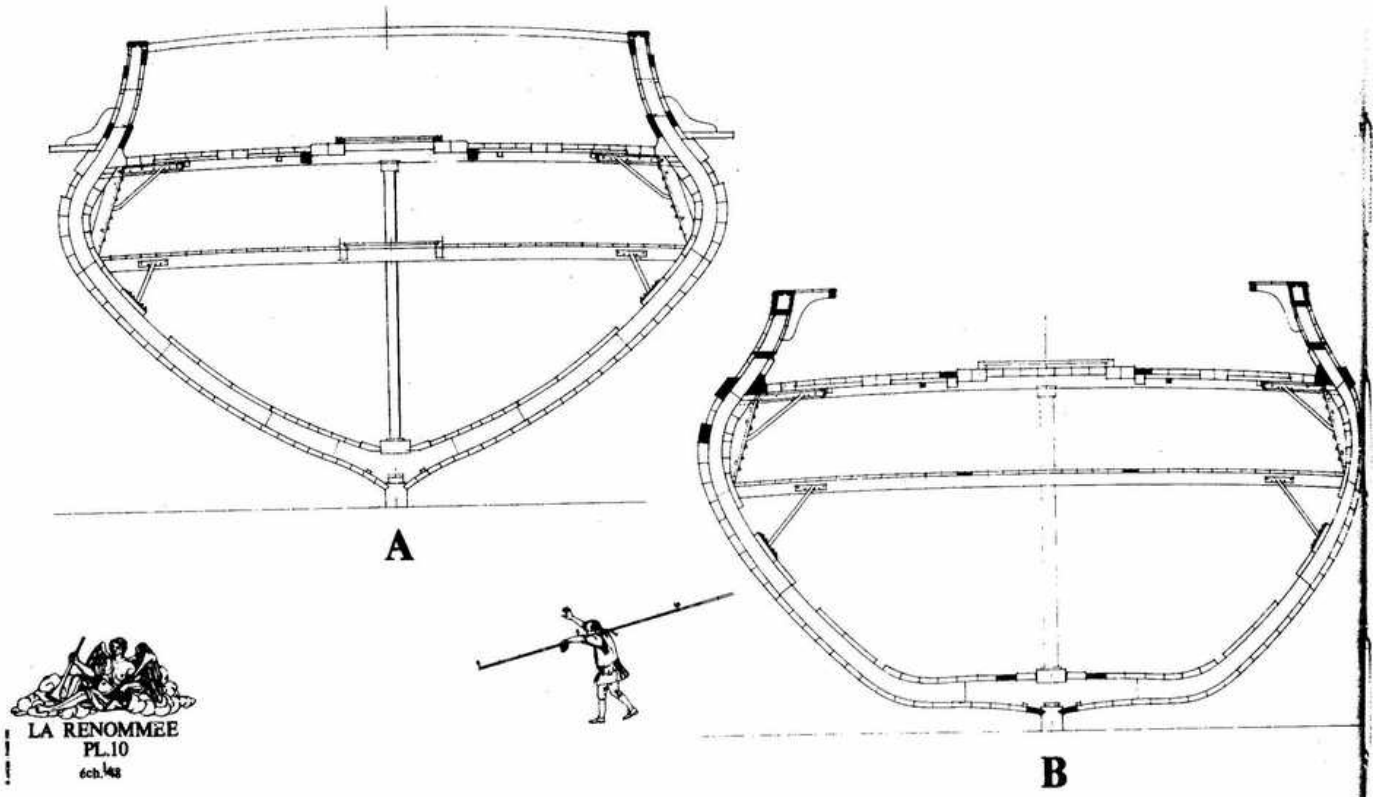
The upper part of the drawing shows the timbering, with parts exposed to illustrate how the ends of the beams are worked culvertail-fashion into the inner waterways. Note that the inner arm of the catheads (the cat-tail) is bolted down into the beams; note also the knees supporting the gangboards, and the way the plankshеer returns inboard above the cleats leading down to the heads.

At the stern, note the stern timbers and their external planking, which runs out over the side counter timbers behind which can be seen the lower stool of the quarter-gallery; also visible is the doorway leading into the gallery, and the frame timbers.

The lower part of the drawing shows the planking of the forecastle and quarterdeck. Situated in their usual places are the fore top-sail-sheet bitts, the foremast partners, the fore jeer-bitts and the step of the fore jeer capstan. The galley fires are placed against the side of the vessel, and the hole for their chimney is visible, the same holes serving for the passage of spar-shores if required when heaving down and careening.

The channels are shown, with the scores to receive the chain-plates for the deadeyes. The gangways are stepped down a level from the forecastle and quarterdeck (see Plate 23), and are composed simply of two strakes of gangboards bordered by carlings. At the stern, the internal planking is shown, as is the tafffarel fife rail, forming a sort of extension of the plankshеer. Also shown is the outline of the upper stool of the quarter-gallery.





Transverse sections (Plate 10)

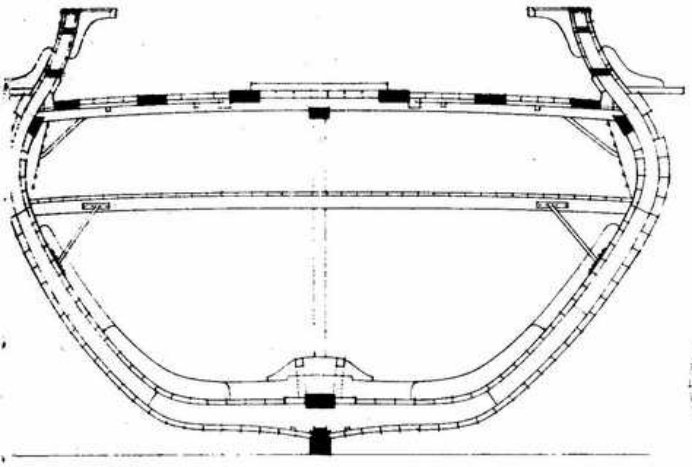
Section **A** is at the hatchway leading down to the cable-tier. Various timbers are visible in section: the hatch-coaming, the chocks or "spacers" into which the ends of the ledges are scored, the upper deck spirketting, the forecastle shelf, the planksheer, drift-rail, and the lower sills of the gunports.

Section **B** is at the main-hatch. The gundeck (lower deck) is very lightly timbered and the beams are fastened to the planking of the ceiling with iron Z-knees; a thin layer of planking is laid directly over the beams. The upper deck is kneed more substantially with triangular iron knees, the vertical arm of which is bolted to a chock inserted between the knee and the timbers of the side.

As in the previous section, the following elements are visible (some hatched-in to mark their cross-section): garboard strakes, limber-strakes next to the limber channels, lower wales, upper wales, waterways, lower and upper gunport sills, gunwale, carlings of the gangboards, and the planking of the decks and the hull.

Section **C** is slightly further aft than the previous one. Note the rider, the futtocks of which end just below the gundeck, and the mainmast step; there is a carling under the beams supporting the upper deck, which is supported in its turn by a row of pillars running down to rest on the keelson. Note also the greater thickness of the central binding-strakes and of the deck planking between them. Marked by cross-hatching are the keel and rising wood, the inner waterways and the upper deck shelf.

The last section **D** is at the after-ladderway (reserved for the officers). The beams of the gundeck, upper deck and quarterdeck are all shown. At this upper level the knees are replaced by a carling under the beams forming a double shelf. Note the black strake between the two wales and of rather lighter scantling. Since the ceiling is planked diagonally, there is no thickstuff in the hold.



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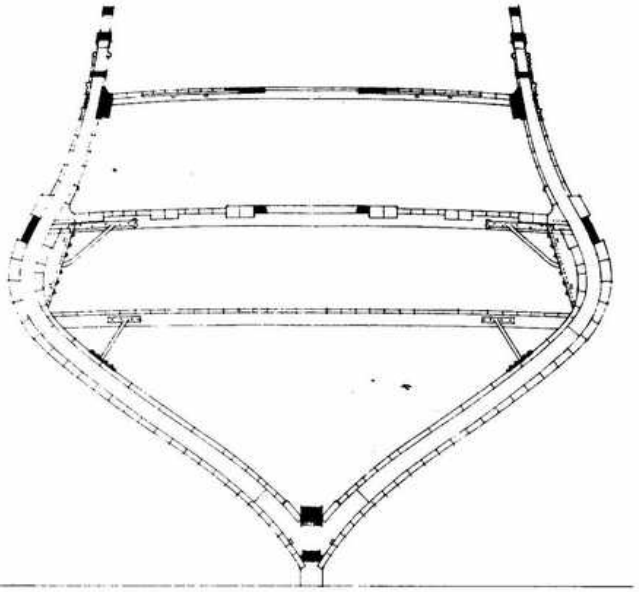

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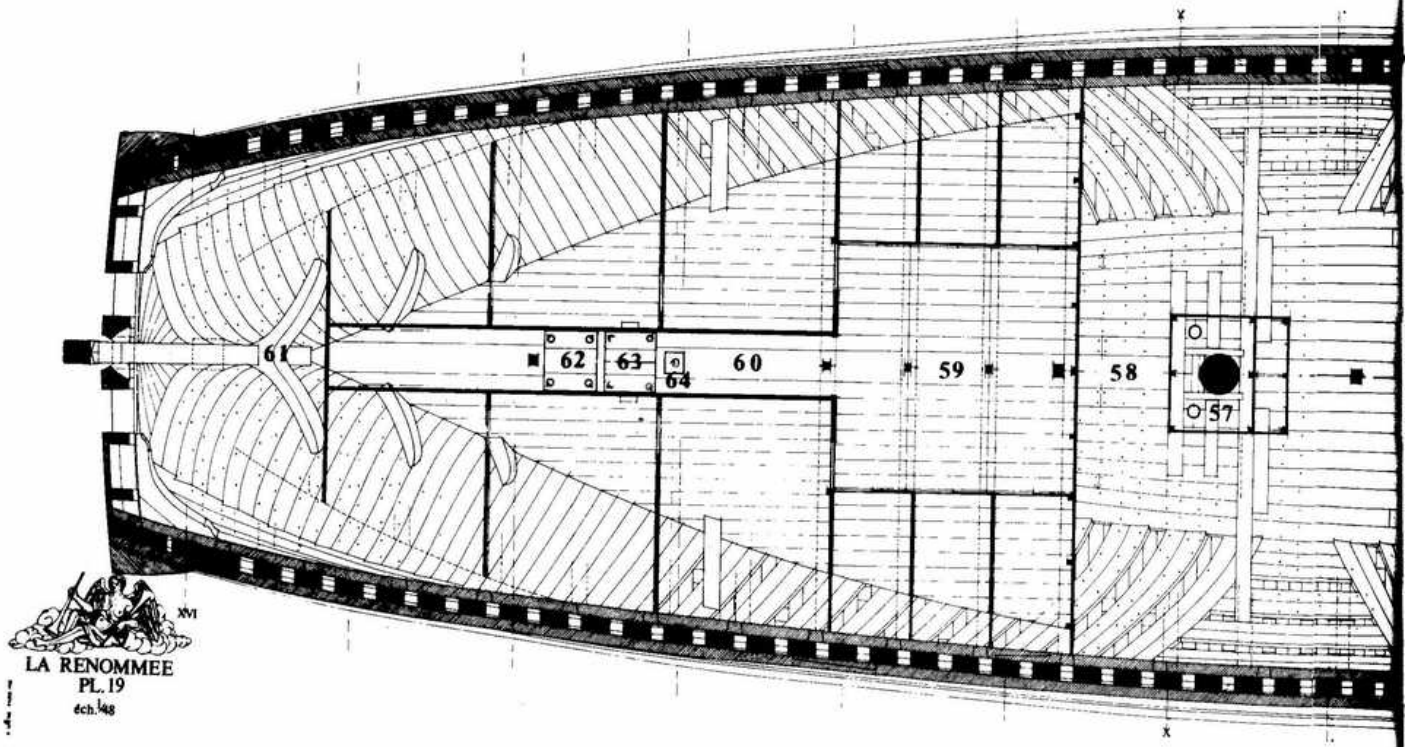


Internal arrangements in the hold (Plate 19b)

The numbers are the same as are to be found on Plate 24 (profile of inboard works), and the same also applies to the next three Plates following this one.

50. Bo'sun's storeroom. Contains all the spares required by the Bo'sun. Access is by way of a scuttle situated forward of the foremast.

51. Forward powder rooms. Contain made-up cartridges for the service of the forward guns.

52. Light room. Takes the form of a small locker, the forward side of which has a glazed window covered by a grille or mesh cut in the forward bulkhead of the cable tier, from which it can be opened. It contains a lantern, which affords illumination to the space between the two powder rooms, and the cartridge cases are passed up through the scuttle of the Bo'sun's storeroom.

17. Pins of the riding bitts. These are stepped on the planking of the ceiling in the hold.

54. Cable tier. The cables are coiled up on either side, the coils being secured by stoppers made fast to ringbolts. There are five cables in all, including a small bower and two hawsers, each 120 (French) fathoms in length; other large ropes such as the buoy-ropes, stoppers and the messenger may be stowed in the Bo'sun's storeroom.

53. Ballast scuttle. Underneath the flat of the cable tier is stowed some of the shifting ballast, made up of scrap iron in the form of reject shot, pieces of guns, etc.

55. Samson's post. Notches cut in the edges of the pillar provide steps, and with the aid of a hand-rope it is possible to clamber down into the cable tier.

56. Main hold. The water is stowed here, and the hold stretches as far aft as the pump well; it is separated from the after hold, where the wine is stowed, by a shifting bulkhead.

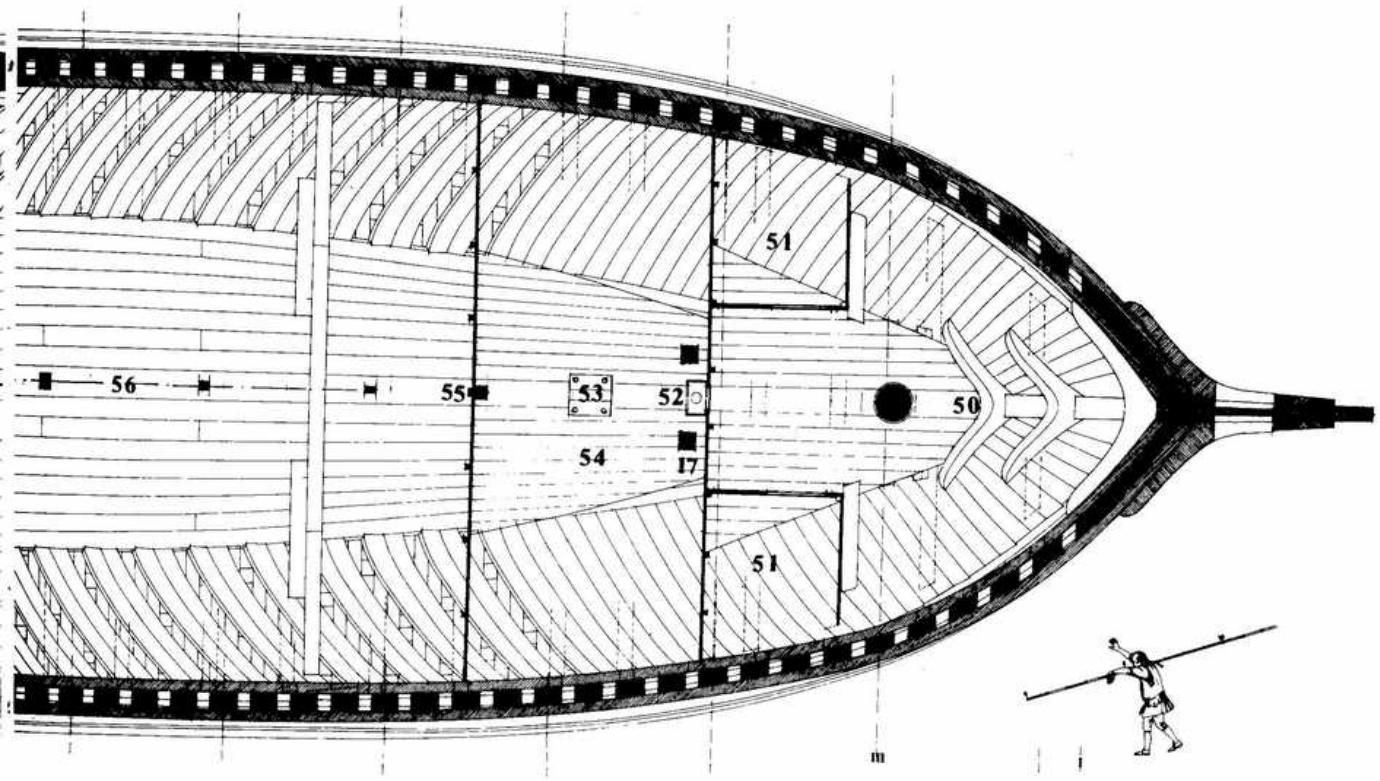
57. Pump well. Encloses the mainmast and the two pumps; the forward part is taken up by the shot locker, where the shot are stowed in two compartments; access is by way of a scuttle in the gundeck.

58. After hold. For the stowage of the crew's wine ration. Extends aft under the issuing room.

59. Issuing room. This can be struck down in order to provide access to the after hold, which also contains the salt provisions and other stores in cask (see *74-G.S.*, vol. II).

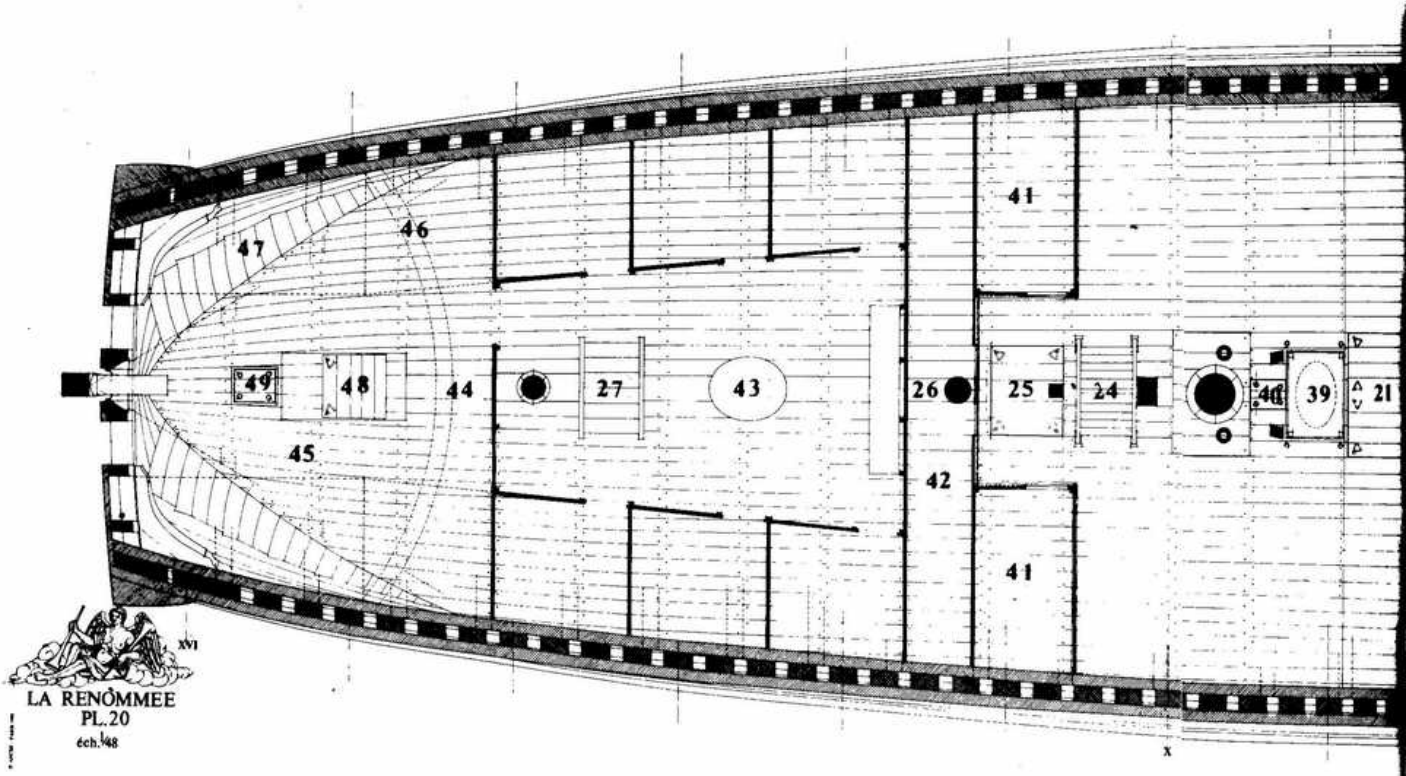
On either side of the issuing room are three lockers; of the six, four are reserved for dried vegetables and rice, the remaining two for the officers' sea stock.

60. Bread room passageway. Off this passageway on either side are three large rooms for the stowage of bread (biscuit). Access is by way of the issuing room, which in turn is reached via the after-hatch. There is another entrance to the passageway from the magazine hatch*.



64. Cartridge scuttle. The cartridges are carried up in their cases through the issuing room, through the after-hatch, and then up the crew's ladderway (**24**).
63. Light room scuttle. Affords access to the light room of the magazine from the bread room passageway.
62. Magazine hatch. Access is by way of a small shifting ladder.
61. Lady's hole. Also known as the afterpeak, this contains the Gunner's spares. Access is by way of the scuttle (**49**) in the gunroom.

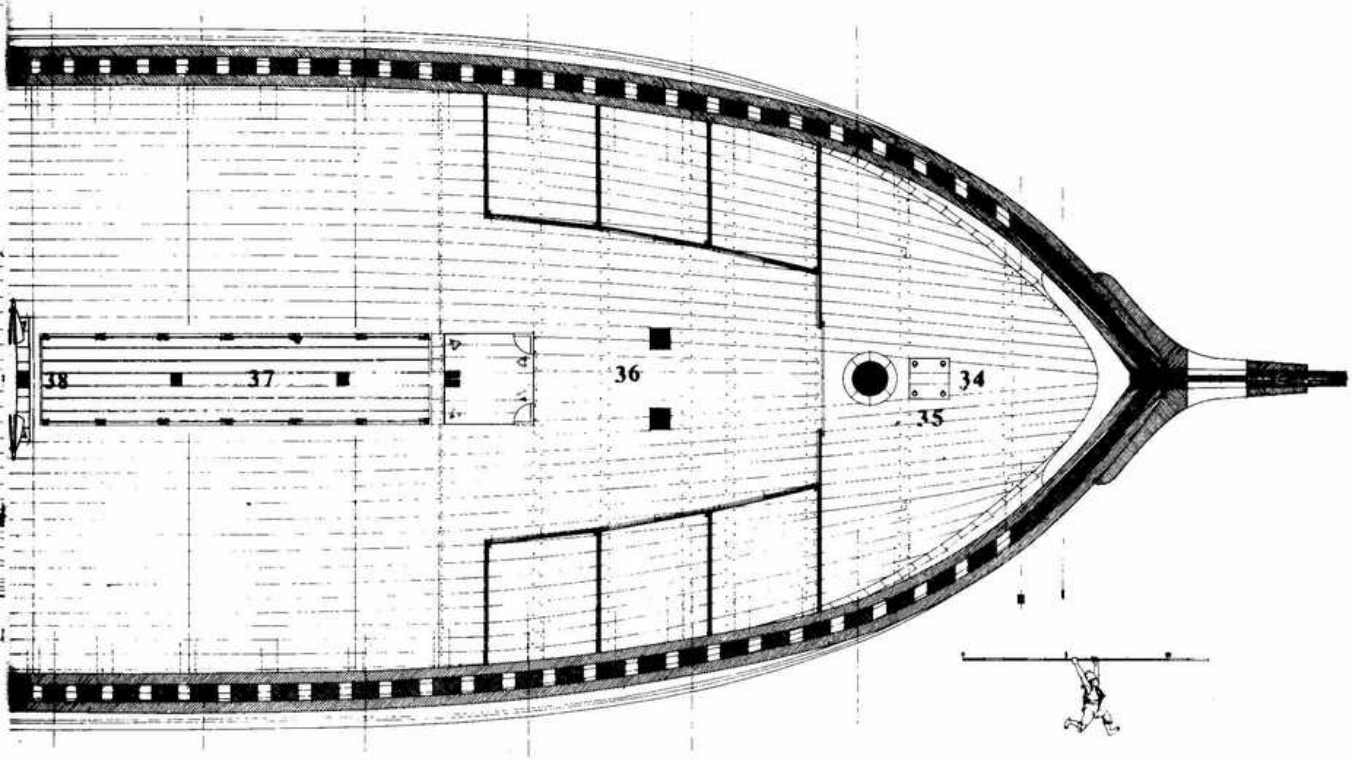
*Alternatively, the light room may be erected in the passageway itself, in which case the after part of the passageway can only be reached via the magazine hatch. Since the bread rooms intercommunicate, there is no problem from that point of view.



Internal arrangements on the lower deck (Plate 20)

34. Bo'sun's storeroom. The Bo'sun also uses this storeroom, in addition to the smaller one in the forepeak below. The area is relatively large, and provides space for the stowage in small lockers of the corn used to feed the ship's poultry.
35. Scuttle. Affords access to the lower storeroom, through which the cartridges are passed up in action.
36. Petty officers' storerooms. On the port side are the storerooms of the Caulker, Carpenter and the Sailmaker. To starboard, those of the Master and the Surgeon.
37. Sheep pen. Forward is the scuttle leading to the cable tier. The pen is large enough for some twenty or so sheep (see *74-G.S.*, vol. IV).
38. Spare anchor. Sometimes called the waist anchor, but generally stowed in the hold.
21. Main-hatch. Formed in two separate parts.
39. Bread oven. Provides fresh bread for the officers and for any sick among the crew.
40. Scuttle. Affords access to the well.
24. Crew's ladderway. A second ladderway is sometimes provided at the forward end of the gundeck.
25. After-hatch. Affords access to the issuing room.
26. Step of the main capstan.
41. Officers' storerooms. For their sea stock.
42. Sail room. Contains a spare suit of sails.
43. Cockpit. Six cabins give onto this small area which serves as a wardroom for the same number of officers.
27. Staircase. Provides access to the upper deck from the cockpit and from the gunroom.
44. Gunroom bulkhead.
45. Gunroom.
48. Magazine hatch.
49. Gunner's scuttle.
46. Chaplain's and Surgeon's berths. The Surgeon's berth is to starboard.
47. Bunks. To starboard is the Gunner's berth, the Purser's to port.

*Every available space on the gundeck is taken up with the crew's hammocks, which are extremely cramped in view of the space taken up by the sheep pen and the sick-bay (see *74-G.S.*, vol. IV).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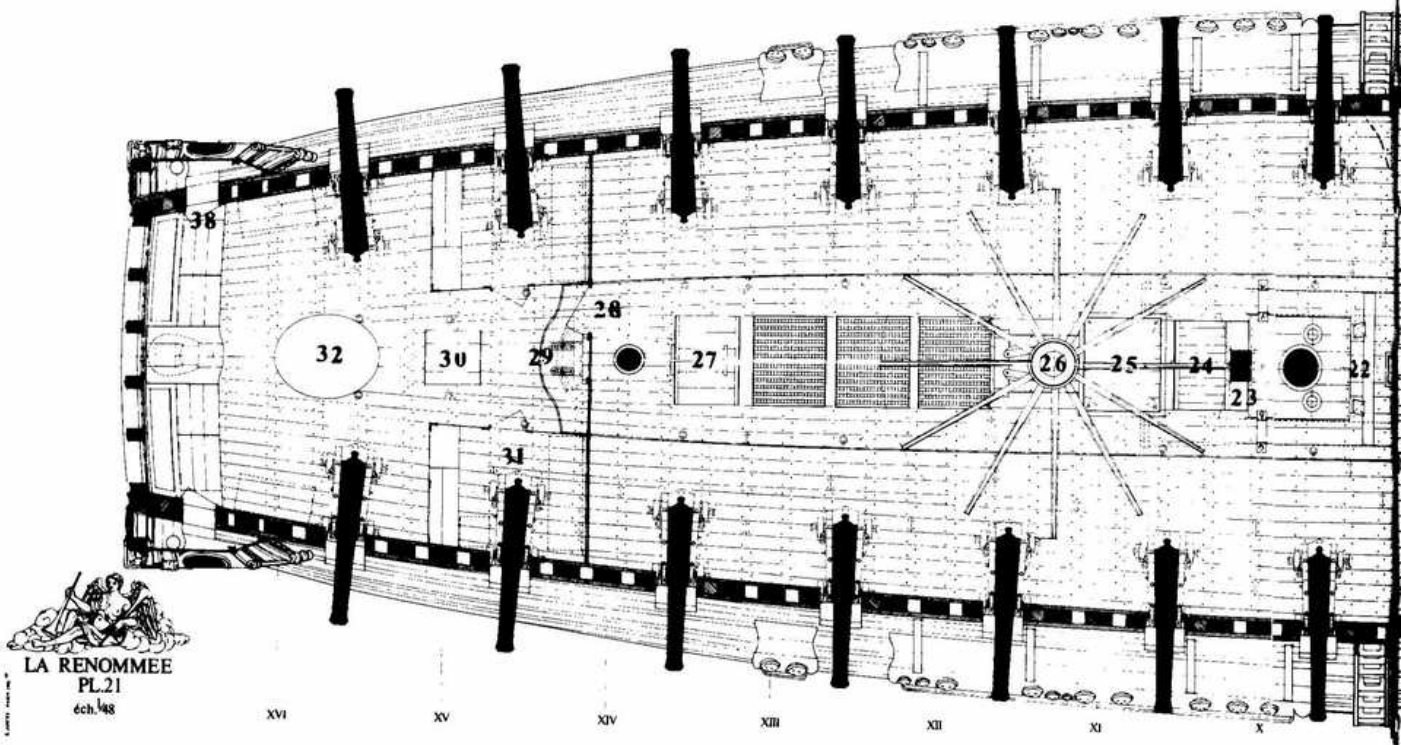


Internal arrangements on the upper deck (Plate 21)

This plan has been drawn as if the hull had been sectioned horizontally just below the upper sills of the gunports. The considerable degree of tumblehome is clearly visible, with evident problems when serving the relatively long-barreled guns of the period. There is only just enough room for the guns to recoil, and they must be placed diagonally to reload them, since the usual requirement for reloading is for two feet of space between the vessel's side and the muzzle of the gun when run in (see *74-G.S.*, vol. IV).

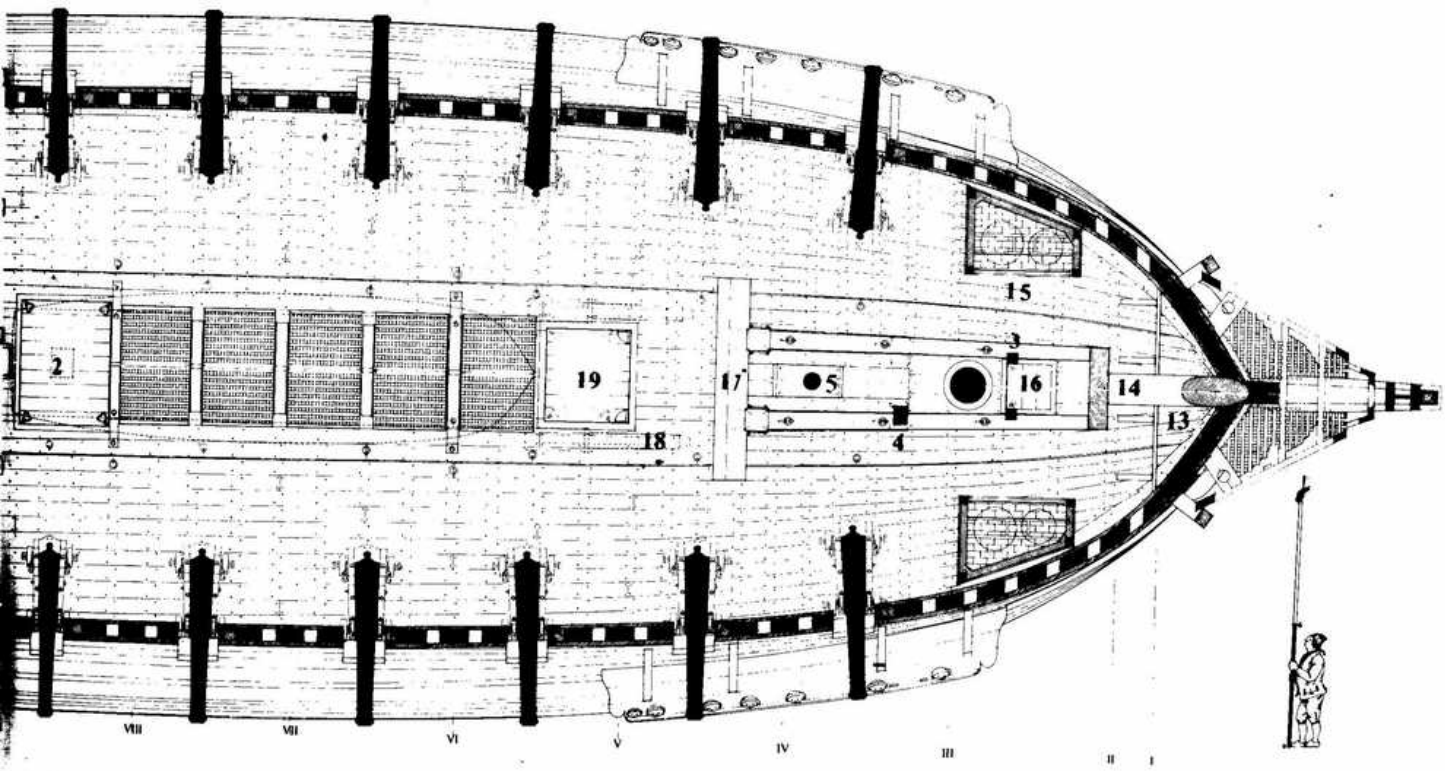
The boats are stowed on chocks on the upper deck, and this is a serious encumbrance. In later years it was decided to imitate English practice and to stow the boats at the level of the quarterdeck and forecastle, either on the spare spars, or else on skid beams linking the carlings of the gangways, which must be supported on pillars; in the latter case, the boats are slightly lower than the level of the quarterdeck and forecastle.

Moreover, the adoption of shorter pattern guns made life easier, but this was not to occur for another twenty years or so.

It is apparent that both the Captain and his Second have a cabin each, which is a peacetime arrangement only, when the armament may be reduced by the removal of one of the guns from a cabin which is already extremely cramped. In wartime, these sleeping-cabins are not fitted. The Captain berths in the great cabin, having merely a hanging cot, while his Second occupies a cabin off the cockpit.

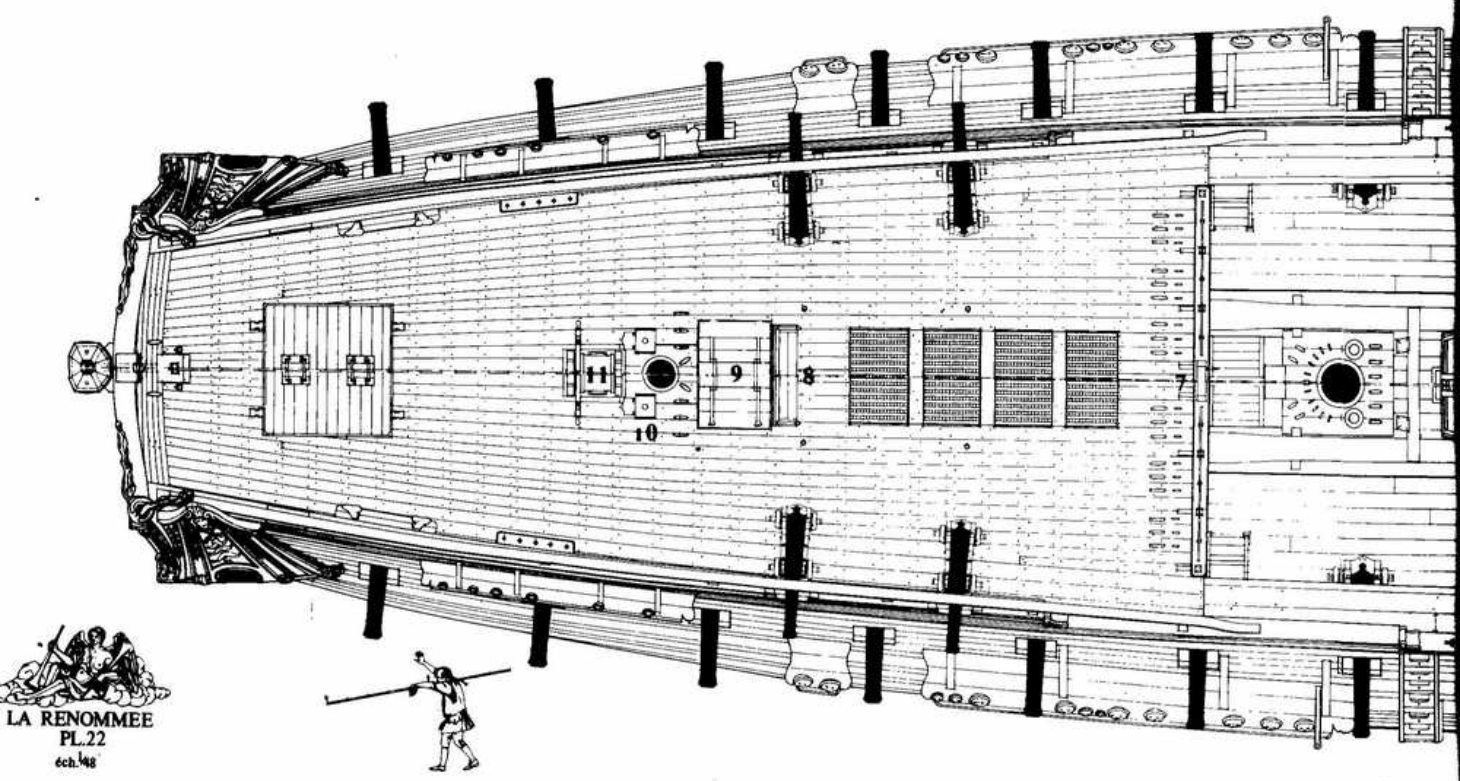
Note that access to the quarter-galleries is only by way of the great cabin. In these small frigates there is no room for the galley fires amidships underneath the forecastle, and they are installed one on either side of the vessel forward of the foremost gunport. After these brief explanations, here is the key to the various items numbered on the plan (I have not shown the skids or fenders, but these are to be found on the plan on the following page).

13. Manger.
14. Step of the bowsprit.
15. Galley fires.
16. Scuttle leading to the Bo'sun's storeroom.
5. Spindle of the fore jeer capstan.
17. Riding bitts.
18. Spare topmasts*.
19. Cable hatch.
3. Pins of the fore topsail-sheet bitts.
4. Pin of the fore jeer bitts.
21. Main-hatch.
22. Main topsail-sheet bitts.
23. Main jeer bitts.
24. Crew's ladderway.
25. After-hatch.
26. Main capstan.
27. After ladderway (for the officers).
28. Forward bulkhead of the cabins.



29. Tiller-ropes.
30. Magazine scuttle.
31. Bunks of the Captain and the Second.
32. Great cabin.
38. Doorways to the quarter-galleries.

*The spare topsail-yards must be stowed in the main- and mizen-channels, where they are supported by iron brackets. However, like the poultry-coops, these tend to spoil the look of a model, and it is common to leave them off, with perhaps the exception of a single coop right aft on the quarterdeck amidships, against the taffarel.



Internal arrangements on the quarterdeck & forecastle (Plate 22)

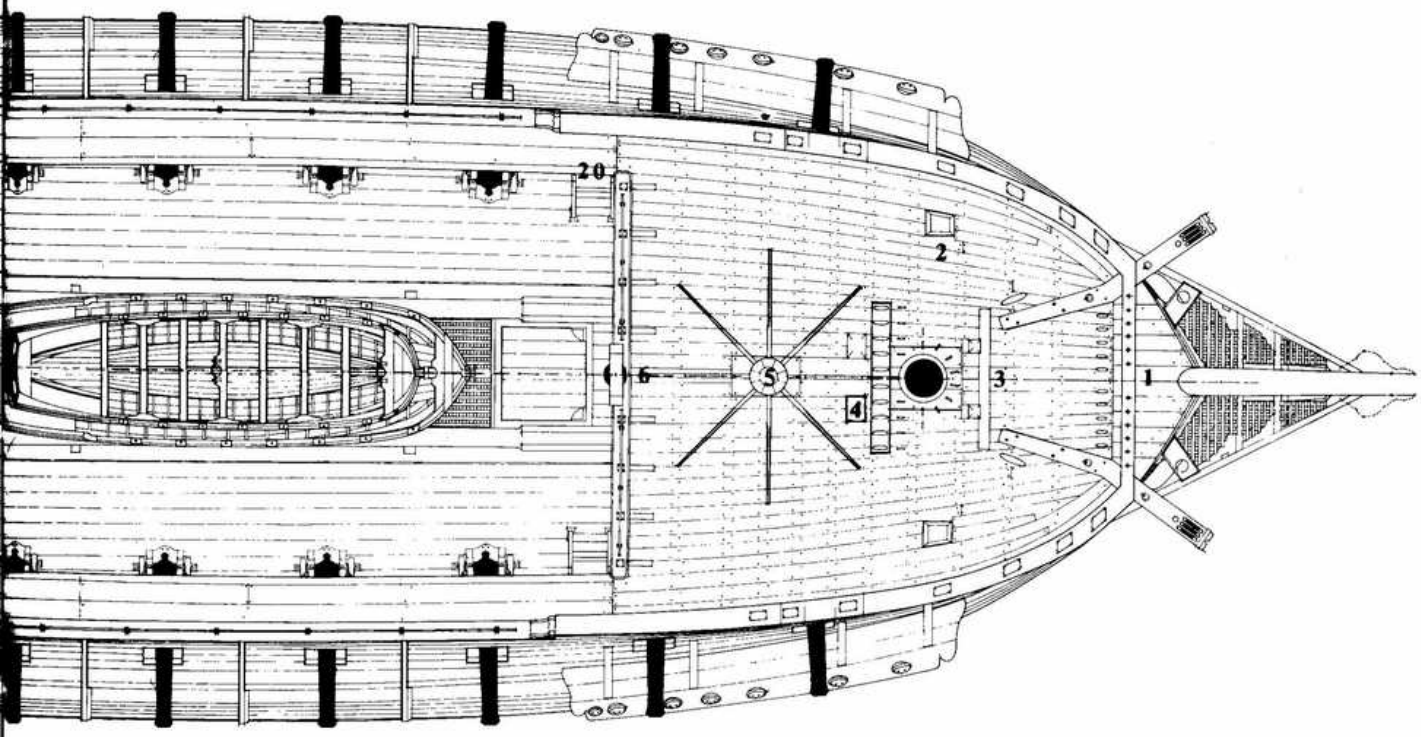
The forecastle and quarterdeck are relatively clear of obstructions: there are no guns on the forecastle, and a single step separates it from the head, which is at two levels, the lower level being formed of a grating above the knee of the head and the lacings. The forecastle is almost completely flush and devoid of bulwarks (see the profile of inboard works overleaf).

The bulwarks of the quarterdeck rise gradually towards the stern, where they are high enough to conceal small deck-cabins for the petty officers; our frigate is not however provided with any of these, but the height is such that the taffarel has room for an impressive amount of carved-work (see Plate 26).

Obviously, the absence of a poop results in a considerable reduction in the height of the upper works, to the benefit of the vessel's aesthetic appearance. There are four 4-pdrs on the quarterdeck*, and their ports have been provided with decorative canopies. The top of the ladderway for the officers is protected by a companion in imitation of English practice, as recommended by Blaise Ollivier**, who preferred this arrangement to the usual French disposition of an iron handrail covered by a tarpaulin. I have only illustrated a single large poultry-coop, but this is really a minimum in view of the number of poultry normally shipped.

1. Planksheer at the bow.
2. Chimneys for the galley fires.
3. Fore topsail-sheet bitts.
4. Fore jeer bitts.
5. Fore jeer capstan.
6. Forecastle breastwork.
22. Ladders to the gangways.
7. Watch bench.
9. Companion over the officers' ladderway.
10. Binnacle.
11. Steering wheel.

*It is possible that there were two further 4-pdrs on the forecastle when the frigate was captured, but this poses real problems for the installation of the guntackles and breechings.
**See *18th Century Shipbuilding: Remarks on the Navies of the English & the Dutch*, Jean Boudriot Publications, 1992.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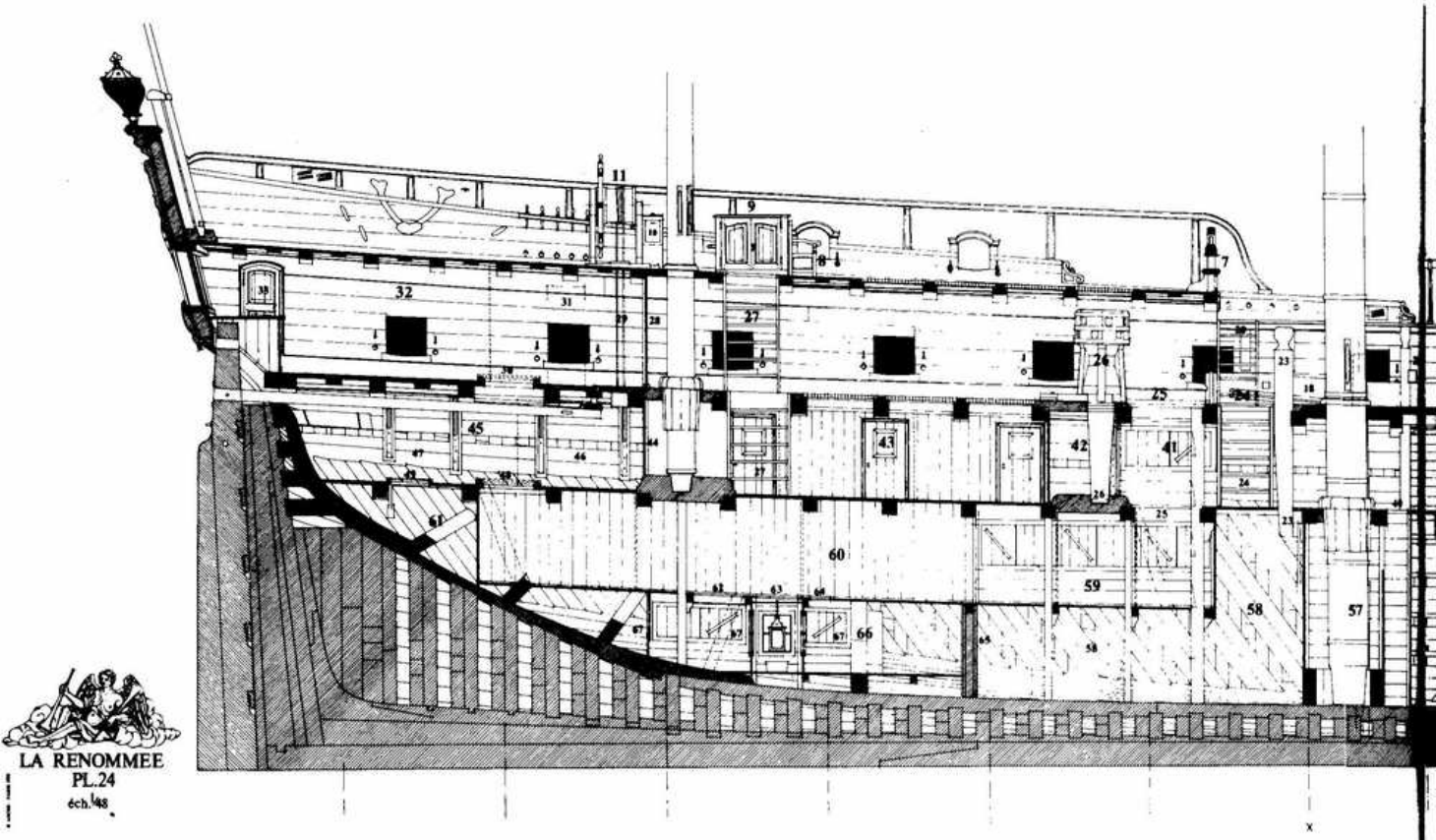
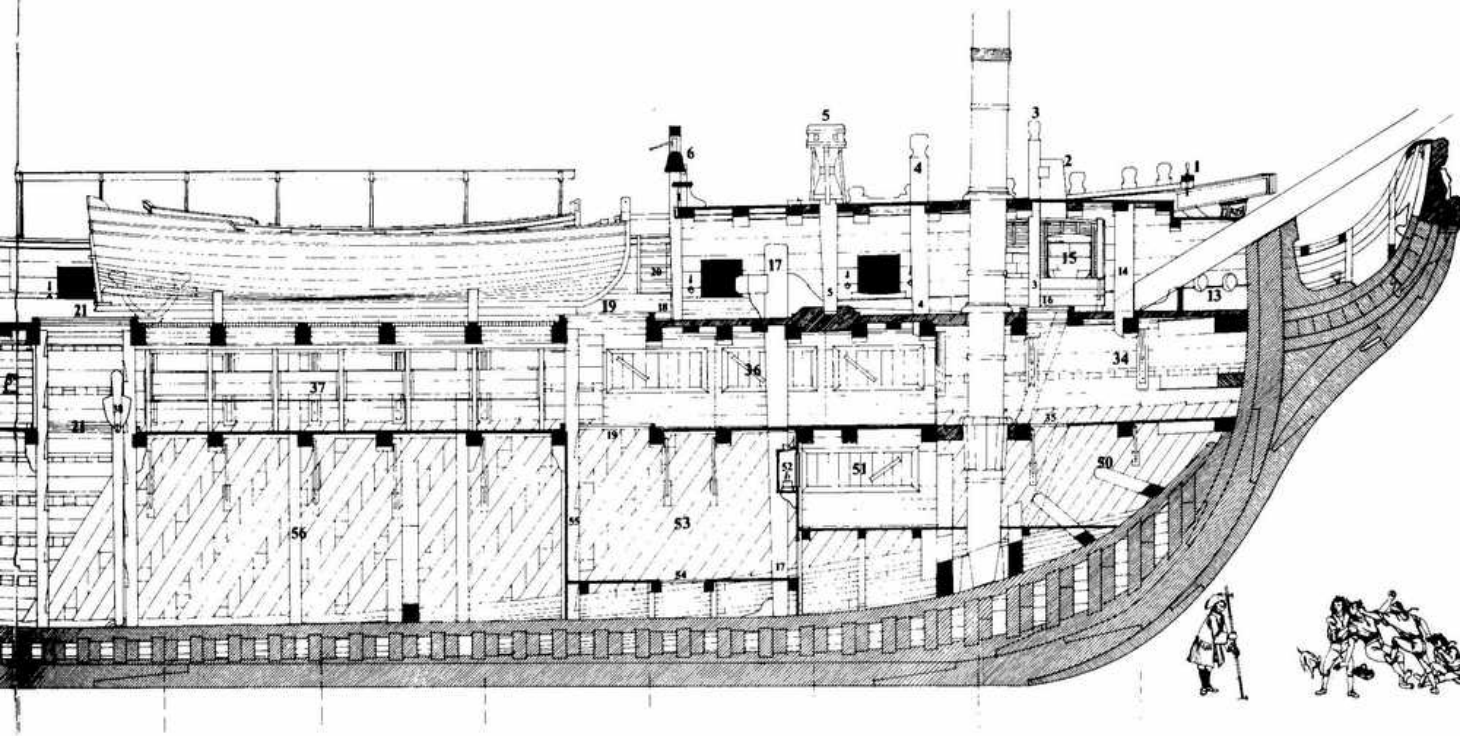


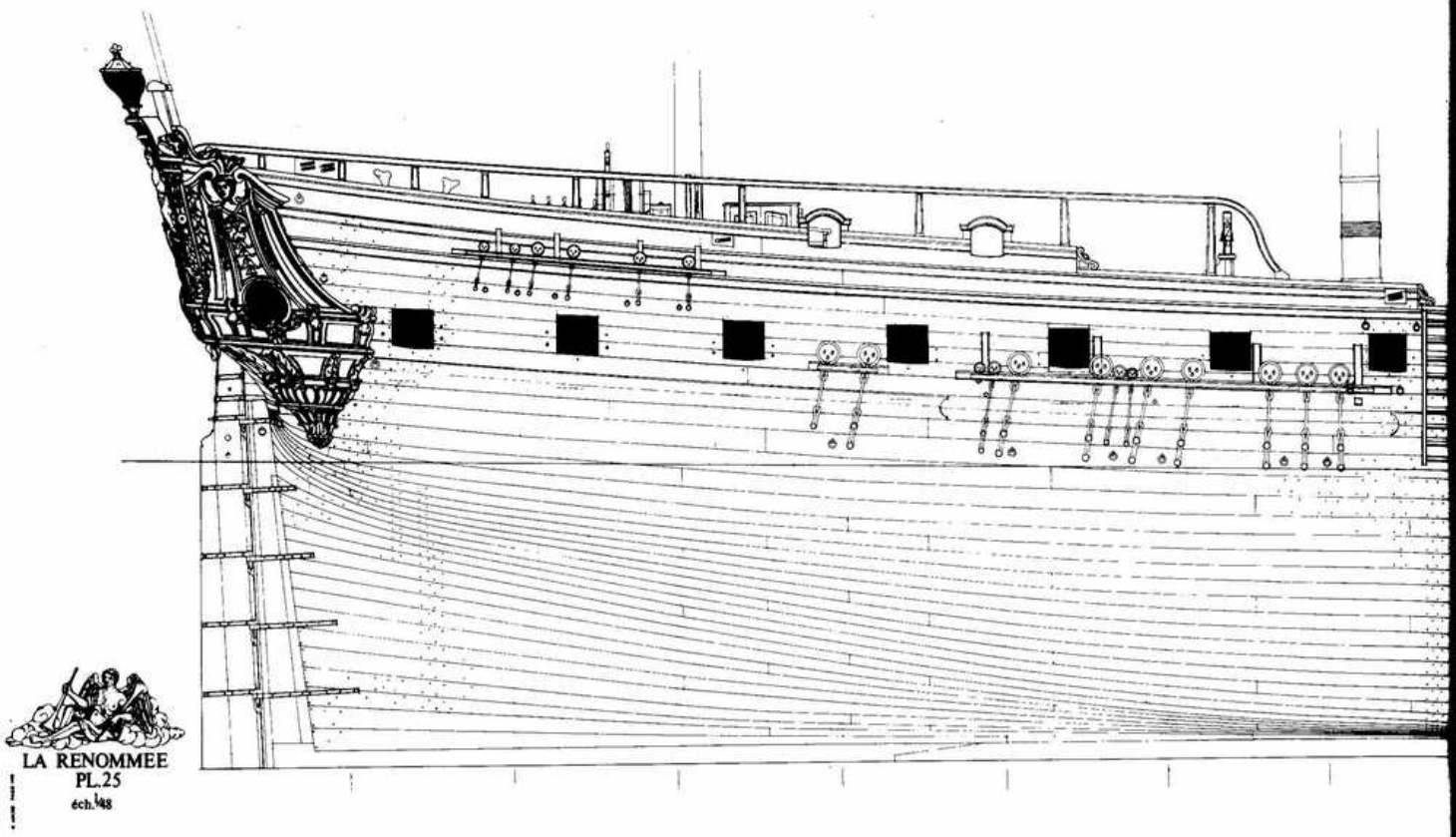
Profile of inboard works (Plate 24)

This Plate shows all the items already noted on the previous Plates, and marked with the same numbers. Here they are again in numerical order.

1. Plank sheer at the bow serving as a pin-rail.
2. Galley chimneys.
3. Fore topsail-sheet bitts.
4. Fore jeer bitts.
5. Fore jeer capstan.
6. Belfry of the main bell.
7. Belfry of the watch bell.
8. Watch bench.
9. Companion over the officers' ladderway.
10. Binnacles.
11. Steering wheel.
12. Ensign staff step.
13. Manger.
14. Bowsprit step.
15. Port galley fire.
16. Scuttle to the Bo'sun's storeroom.
17. Riding bitts.
18. Spare topmast.
19. Cable hatch.
20. Gangway ladders.
21. Main-hatch.
22. Main topsail-sheet bitts.
23. Main jeer bitts.
24. Crew's ladderway.
25. After-hatch.
26. Main capstan.
27. Officers' ladderway.
28. Cabin forward bulkhead.
29. Tiller-ropes.
30. Magazine hatch.
31. Second officer's cabin.
32. Great cabin.
33. Doorway to quarter-gallery.
34. Bo'sun's storeroom.
35. Scuttle to Bo'sun's storeroom.
36. Warrant officers' storerooms.
37. Sheep pen.
38. Spare anchor.
39. Bread oven.
40. Scuttle leading to the well.
41. Officers' storerooms (sea stock).
42. Sail locker.
43. Cockpit.
44. Gunroom bulkhead.
45. Gunroom.
46. Surgeon's berth.
47. Purser's berth.



48. Powder room scuttle.
49. Scuttle to lady's hole (Gunner's spares).
50. Forepeak and coal room.
51. Forward powder rooms.
52. Light room for the forward powder rooms.
53. Cable tier.
54. Ballast scuttles for the shifting ballast.
55. Bulkhead of the main hold.
56. Main hold.
57. Pump well.
58. After hold.
59. Issuing room.
60. Bread room passageway.
61. Lady's hole.
62. Magazine scuttle.
63. Light room scuttle.
64. Scuttle for passing up the powder.
65. Cofferdam bulkhead of the magazine.
66. Magazine.
67. Chests for filled cartridges.



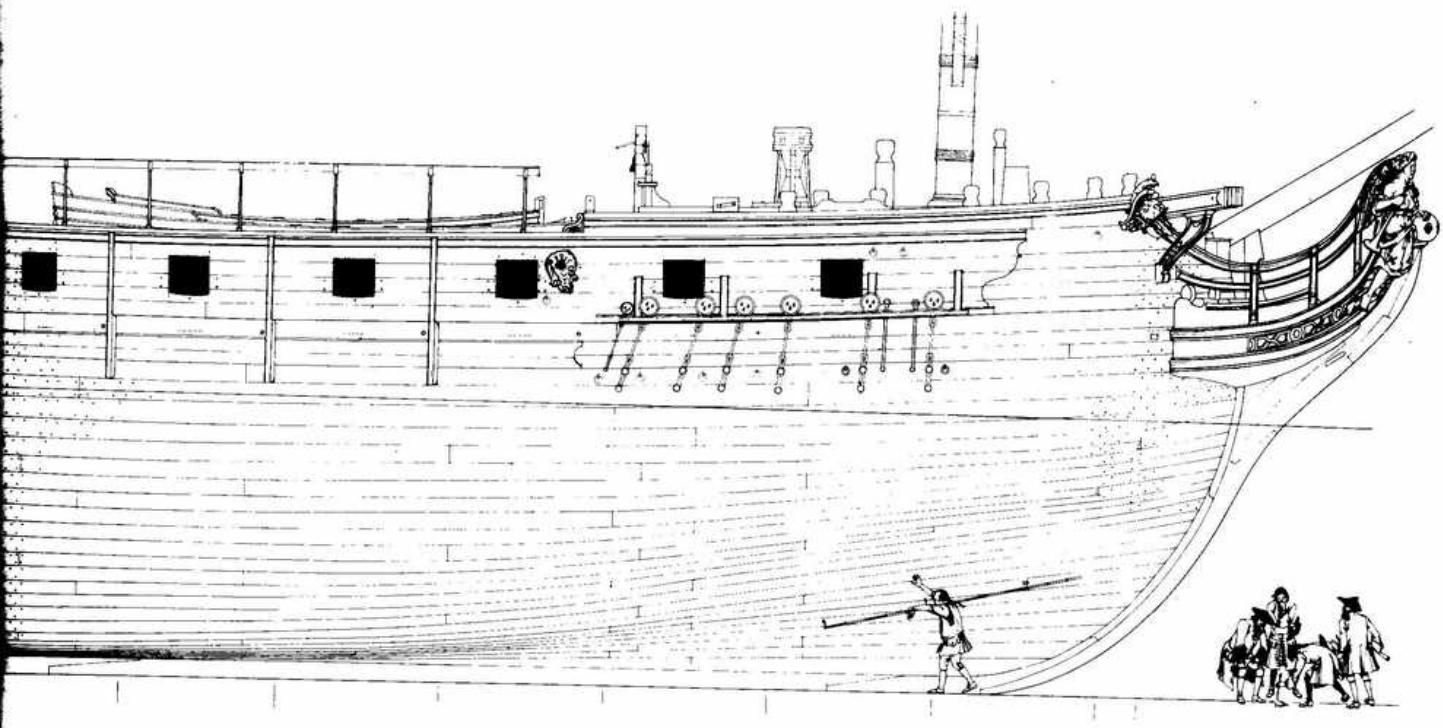
Profile of outboard works (Plate 25)

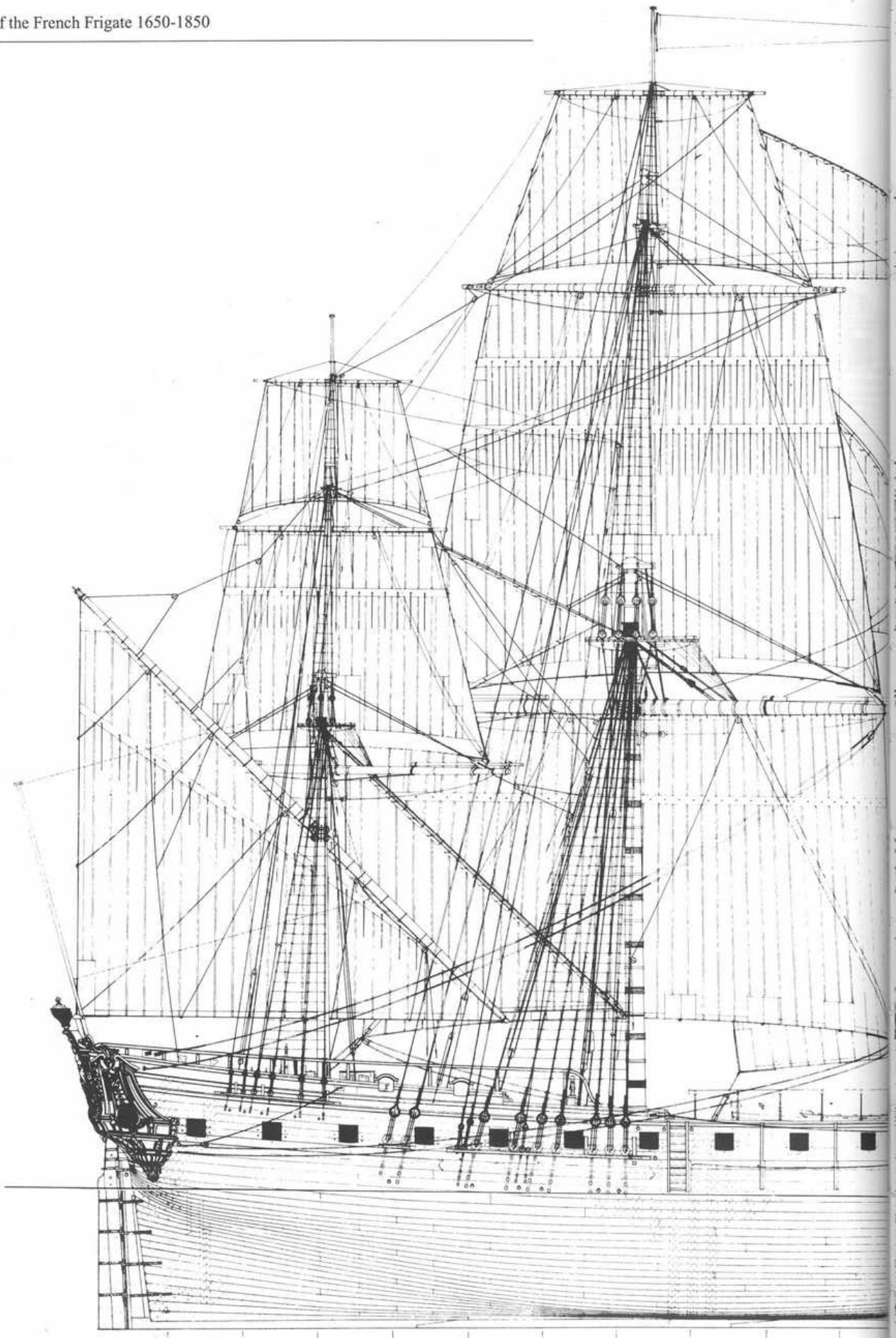
This drawing clearly shows the elegant build of the *Renommée*, due in large part to her flush lines, her harmonious sheer, and carved-work which is typical of the taste demonstrated by Caffiéri. The planking of the hull shows off the volumes of the underwater hull admirably, with a run aft which is more pinched than the entry.

Note that the main channels are in two parts, because of the positions of the gunports. The planking of the forecastle is almost flush with the upper edge of the fore drift rail, while the plank-sheer runs almost the full length of the hull with little break at the waist; there are two drift rails aft, and a handrail completes the upper works over the quarterdeck.
The height of gundeck sill amidships is 4 feet 8 inches.

Views of the head and the stern (Plate 26)

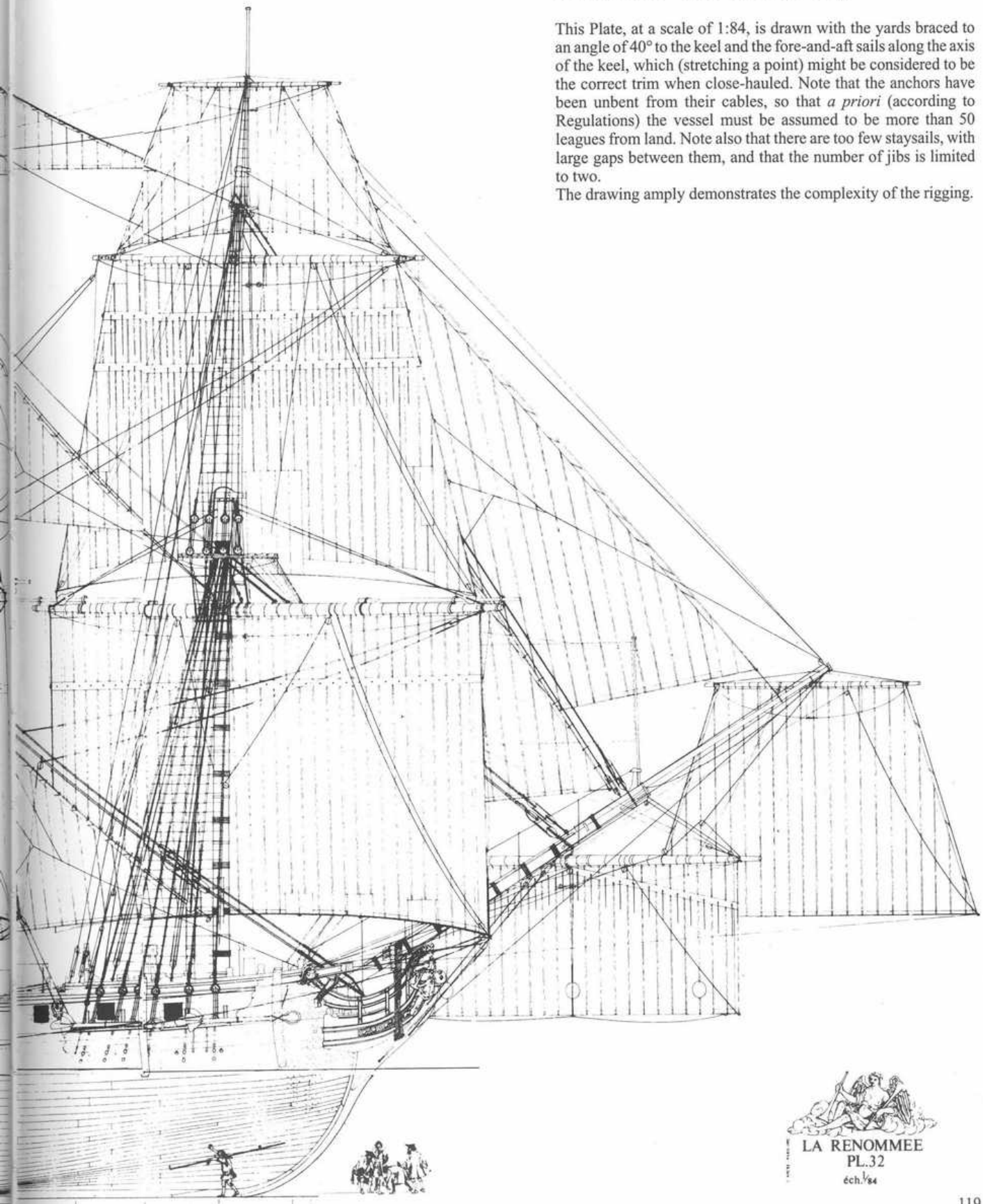
A figure of Renown, holding a trumpet in her right hand, rests her left hand on an orb decorated with three fleurs-de-lys. This drawing shows the pin-rail above the head, the cathead supporter passing in front of the main rail, and the anchor-lining forward of the fore channels.
The planking of the lower hull is marked by three stealers which do not finish in the rabbet of the stem.
The height of the taffarel at the stern is such as to allow a high-relief panel of carved-work representing a winged figure of Renown with trumpets and devices. The overall proportions of this façade are nicely calculated, the carved-work well arranged, and everything is pleasing to the eye. I should draw your attention to the fact that the stern-lights are leaded, since at this date small wooden frames were not yet common; note also that the oval lights of the quarter-galleries are false, containing a simple square scuttle which is well hidden.





La Renommée under sail (Plate 32)

This Plate, at a scale of 1:84, is drawn with the yards braced to an angle of 40° to the keel and the fore-and-aft sails along the axis of the keel, which (stretching a point) might be considered to be the correct trim when close-hauled. Note that the anchors have been unbent from their cables, so that *a priori* (according to Regulations) the vessel must be assumed to be more than 50 leagues from land. Note also that there are too few staysails, with large gaps between them, and that the number of jibs is limited to two.
The drawing amply demonstrates the complexity of the rigging.



LA RENOMMEE
PL.32
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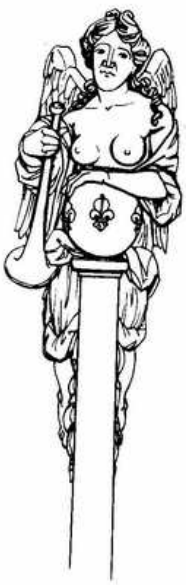
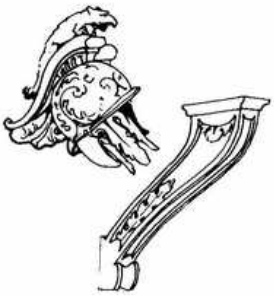
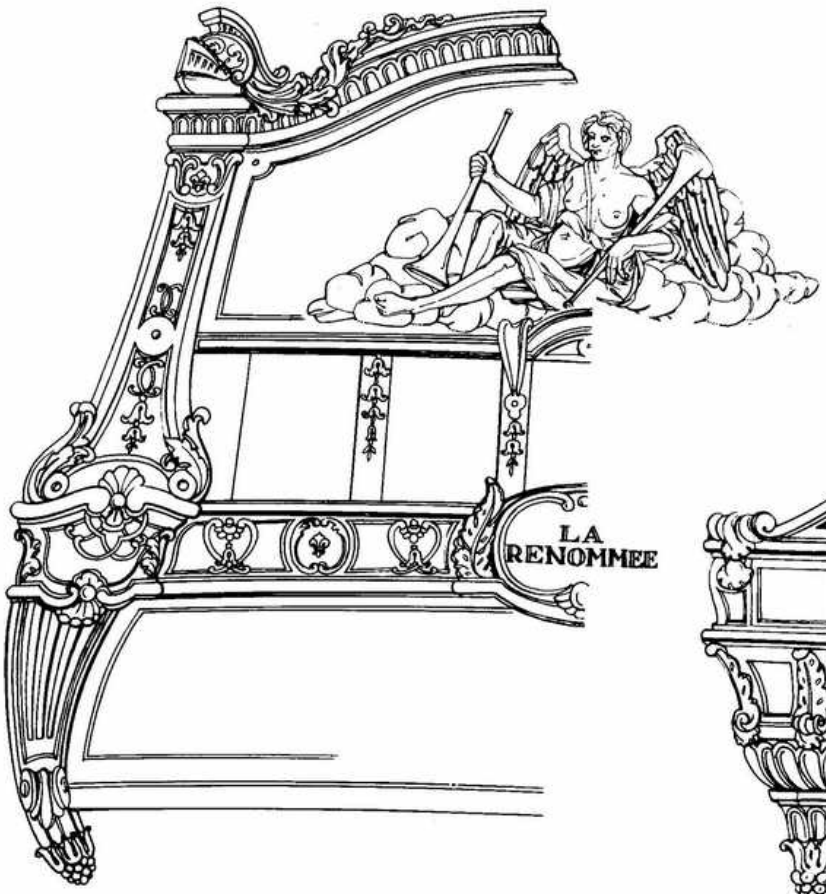
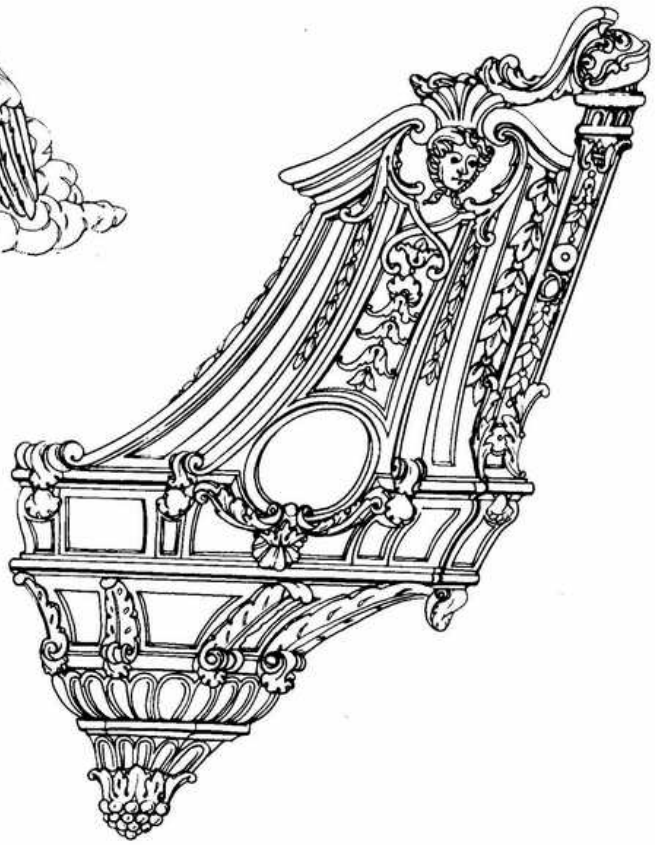
Carved-work

These drawings (by my friend Michel Pétard) are copied from the original drawings by Caffiéri, and group together the principal elements of the carved-work of the *Renommée*.









Chapter V
TWELVE-POUNDER FRIGATES

12-Pdr FRIGATES

The doubts expressed during the 1740s about the effectiveness of the two-decked frigates with 12-pdrs on their lower deck eventually led to the proposal that the same calibre should be employed on single-decked frigates like the 8-pdr class. The aim was to create an intermediate class of vessels, between the 8-pdr frigates and the 50- and 56-gun ships armed with 18-pdrs on the upper deck.

In a manuscript by Blaise Ollivier[1] dating from about 1740-1743, we read the following: "*If it is desired to build a frigate armed with thirty 12-pdrs on a single gundeck, the vessel must be 127 feet in length from stem to post, with but a single deck. The fifteen gunports which should be opened on either side to be 2 feet 4 inches wide and 5 feet 10 inches one from the other. The foremost gunport to be 14 feet 4 inches from the perpendicular of the stem, and the aftermost port to be six feet from the perpendicular of the post.*" In the same manuscript, Blaise Ollivier fixes the breadth at 38 1/8 lines per foot of length, giving a length to breadth ratio of 3.724, and the depth in hold at 63 lines per foot of breadth, a ratio of 0.437.

Blaise Ollivier's proposal was accepted[2], and in 1748 a "powerful frigate" was ordered to be built at Rochefort. Entrusted to Pierre Morineau, she was to be named the *Hermione*, with a length of 127 1/2 feet, but with only thirteen gunports a side, spaced 6 feet 4 inches apart; the length to breadth ratio was 3.787, in other words very close to the figure recommended by Ollivier; on the other hand, the ratio of depth in hold to breadth was increased to 0.584, which gave a height of gundeck sill of 7 feet: an enormous freeboard, considering that Blaise Ollivier had thought 5 feet adequate.

In 1750, a second 12-pdr frigate[3] was built at Toulon, to somewhat smaller dimensions. She was armed with 24 guns on the upper deck. In 1754, another 24-gun 12-pdr was built, also at Toulon.

These vessels should be considered as the first experiments with the new type, heralded by the *Hermione*, for it was not until 1757 that the Toulon shipwright J.-M.-B. Coulomb established, with the *Chimère*, the characteristics of the new class of frigates: they were to apply henceforth to the vast majority of the vessels of this class built right up to the end of the century.

Few 12-pdr frigates were built before 1763, by comparison with the 8-pdr class which remained the typical frigate of the Seven Years' War. However, at the close of this War, so disastrous for the French Navy, no less than sixteen 12-pdr frigates were built in the space of the three years 1766-8, of which all but four were pierced for 26 guns on the upper deck (there were three pierced for 28 and one for 30). Thereafter, and for a space of nearly ten years, not a single 12-pdr frigate was built, so that a quite exceptional building programme had to be undertaken on the eve of the American War of Independence, a programme which was kept up throughout the hostilities: thirty-nine frigates were built between 1777 and 1780, so that this class became the classic frigate of the War, the last of the 8-pdr class, as we have seen, being launched in 1772.

Twenty more frigates were laid down between 1781 and 1790. The 1786 programme for the Navy envisaged a total of 60 frigates, of which 40 should be of the 12-pdr class[4].

The Revolutionary Wars obliged the Navy to carry on building, so that nearly twenty more frigates were built. The last vessels of this type were built in 1798, when the 12-pdr frigate was abandoned in favour of the 18-pdr. In theory at least, the 12-pdr frigate had lasted for some fifty years.

It is interesting to examine how the frigate evolved over this period. The *Hermione* was the forerunner, but presents a number of oddities which incline me to think of her as an experiment, as do the 24-gun frigates of the same period. In fact, the 12-pdr frigate only "came of age" with the *Chimère*, built some ten years after the *Hermione*. The *Chimère* was 136 feet long, with a length to breadth ratio of 3.85, a depth in hold to breadth ratio of 0.474, and an average draught of 13 1/2 feet or 0.794 of the depth in hold; she had a height of gundeck sill of 6 feet, and the upper deck was armed with thirteen gunports on each side. Her displacement is unknown, but must have been of the order of 1,100 tons. She was thus very different from the frigates which had preceded her.

In his *Treatise on Shipbuilding*, published in 1787, H.-S. Vial du Clairbois states that the length of 12-pdr frigates varies between 135 and 136 feet, breadth 34 to 35 feet, depth in hold between 17 and 17 1/2 feet, and with an average draught of 13 to 14 feet. In other words, twenty years after the *Chimère*, its principal characteristics remained unchanged. The table on the opposite page shows that, once established, the characteristics of the 12-pdr frigate remained valid until its demise. As with the 8-pdr class, the design was innovative at the start, but thereafter remained locked in conservatism until the end of its active service.

True, there are a number of exceptions, with frigates armed for 30 guns on the upper deck, and other changes in the armament, notably by increasing the number of guns on the upper deck from 26 to 28 12-pdrs, but without increasing the dimensions significantly.

The fitting of secondary armament, always a controversial question, prevailed in the end, especially with the adoption of brass "carronades"[5] following the Regulations of 1786, and the replacement of the 6-pdrs by 8-pdrs (this latter measure was not in fact adopted).

During the Revolutionary Wars, there was a tendency to increase the armament, with 28 12-pdrs on the upper deck and up to 14 guns including 4 brass carronades on the forecastle and quarterdeck. All this was a far cry from the original formula, which called for only 26 12-pdrs on the upper deck, and no more than six 6-pdrs on the quarterdeck and forecastle: the classic 32-gun frigate thus gave way, by the end of the century, to 40- and 42-gun frigates.

Thus, in accordance with a well-established phenomenon, it was not the design of the frigate which evolved, but rather its armament, usually to the detriment of the vessel's performance.

Despite the promises contained in the 1786 fleet programme, the 12-pdr frigate gave way in the end to the 18-pdr, as part of the inexorable "escalation of calibres".

In England, the Royal Navy also adopted the 12-pdr frigate, the first of this class (*Richmond* and *Southampton*) being ordered in 1756, and launched respectively in November and May 1757. Nothing suggests that these vessels were in any way influenced by French example, since the *Hermione* was not captured until November 1757.

In total, rather more than one hundred 12-pdr frigates served in the French Navy, of which three quarters were built between 1777 and 1798.

1. In the collections of the Musée de la Marine, Paris, Cat. N° B.251.
2. On the recommendation of the office of the *Police des Ports*, a sort of expert committee advising the Minister.
3. This was the *Gracieuse*, designed by Joseph V.C. Chapelle. The design clearly shows that there was a degree of uncertainty concerning the new class of frigates, as indeed had been the case during the early years of the 8-pdr class.
4. The Navy List for March 1791 lists 49 12-pdr frigates in service.
5. A feeble reply to the English carronade, the French sea howitzer or brass (bronze) carronade had been established in the 1786 Regulations in three calibres: 18-, 24- and 36-pdrs. In the event, only the 36-pdr was ever cast. They were abandoned in 1806 in favour of iron carronades copied from those manufactured by the Carron Company in Scotland.
6. These details were kindly provided by David White, formerly in charge of the Draught Room at the National Maritime Museum. For a more detailed treatment of the early English frigate, see Robert Gardiner, *The First Frigates*, (1992).

Frigates armed with 26 12-pdrs on the upper deck. Names and Designers.	Length on the waterline*	Breadth extreme†	Depth in hold	Av. draught	Height of gundeck sill	Total displacement (tons)	Block coefficient	Distance of the c. of g. forward of the mid-point of the length	Distance below the load waterline	Height of the metacentre above the c. of g. of the hull.
Charmante 1777										
J.-D. Chevillard jnr	133′7″	34′6″	17′6″	13′3″	6′0″	1089.034	0.498	3′ 7″	4′11½″	11′1″
Vénus 1779										
J.-N. Sané	134′6½″	34′7½″	17′9″	13′6″	6′0″	1082.150	0.478	3′ 8½″	5′ 0¼″	10′7¾″
Astrée 1780										
P.-A. Lamothe	135′10″	34′6″	18′0″	13′9″	6′0″	1101.938	0.481	4′ 3″	5′ 1¼″	10′6½″
Félicité 1780										
P.-A. Forfait	136′0″	34′8½″	17′9″	13′6″	6′0″	1116.257	0.452	4′11½″	4′ 8½″	11′0¾″
Embuscade 1789										
H.-S. Vial du Clairbois	133′6″	34′7″	17′8″	13′5″	6′0″	1095.957	0.498	1′ 5″	4′ 9½″	11′3″
Fortunée 1790										
P.-A. Forfait	135′0″	34′8″	17′8″	13′5″	6′0″	1113.606	0.494	4′ 6″	4′11½″	10′9½″

*Length from rabbet to rabbet, to outside of plank.
†Breadth at the height of breadth to inside of plank.

The table shown above compares six frigates, all armed with twenty-six 12-pdrs on the upper deck, and it is taken from a much larger table which gives the same data for 56 vessels, from schooners to three-deckers. It is preserved in Rochefort Dockyard Archives (Cat. N° 2.G), and was probably drawn up by the shipwright Chaumont[1], although he was not necessarily responsible for doing all, or even any, of the calculations himself. As indicated, the data are given in French feet and inches, and in French tons of 2,000 French pounds, to three decimal places.
The breadth is to inside of plank, and the ratio of underwater hull volume to the circumscribed parallelogram (block coefficient) is based on this dimension, and not on the breadth to outside of plank, which would be more usual.
It is noteworthy that there is very little difference between the breadths, and likewise the depths in hold (no more than 3 inches). As for the lengths, the difference is more marked, but still remains relatively small at no more than 2′6″. All the vessels have the same height of gundeck sill (at 6 feet), and the displacement as fitted out and stored for sea service is very close to 1,100 tons at an average draught which varies between 17½ and 18 feet. The ratio[2] of the submerged volume to the circumscribed parallelogram varies from 0.491 to 0.498[3], or in other words, very slightly less than half. The position of the centre of gravity of the hull in relation to the mid-point of the vessel's length (from rabbet to rabbet) varies between 3½ and 4½ feet, with the notable exception of Vial du Clairbois' *Embuscade*, where it is only 1′5″ away. The position of the centre of gravity of the hull below the load waterline[4] varies from 4′8½″ to about 5′1″, while the metacentric height varies between 10″6½″ to about 11′3″. Values of this order indicate a good margin of stability for this class of frigate.
We will examine these figures again in a recapitulation table later in the book, when we come to compare all the various classes of frigate from the 8-pdr to the 30-pdr, where further examples will be taken from the same original source, notably Sané's *Vénus*.

1. Jean-François Chaumont (1774-1856) retired in 1835. A large number of draughts and papers belonging to this shipwright are now the collections of the *Service Historique de la Marine* at Vincennes. However, this table is in fact in the archives of Rochefort Dockyard. Most of the examples listed are vessels dating from the end of the Ancien Régime and the Premier Empire.
2. Calculated, it will be recalled, by multiplying the length from rabbet to rabbet at the load waterline by the breadth (in this instance to inside of plank), the total being multiplied in turn by the average draught. This gives a volume in (French) cubic feet; a cubic foot of sea water weighs 72 (French) pounds, so that 28 cubic feet equal one (French) ton of the circumscribed parallelogram. By dividing the volume of the underwater hull in tons by the number of tons of the parallelogram, the result is a ratio (the block coefficient) which is indicative of the fineness or fullness of the hull lines.
3. By comparison, this ratio is 0.60 for a Sané three-decker of 118 guns, 0.617 for a storeship of the *Normande* class designed by Forfait, and drops to 0.354 for an American schooner.
4. The centre of gravity of the whole vessel is approximately at the load waterline.

L'HERMIONE 1748

Built in 1748 at Rochefort to the draughts of Pierre Morineau, *l'Hermione* was the first of a new class of frigates armed with 26 12-pdrs on the upper deck. In England, the Royal Navy also adopted similarly-armed powerful frigates from 1756 onwards, without however copying the French design, and it is worth noting that only three 12-pdr frigates of this type were built in France prior to 1756.
The only known draught of the *Hermione*, reproduced overleaf, is preserved in the Danish National Archives. The document is relatively summary, but we can add to the information provided thanks to the manuscript by Morineau to which we have already referred. The principal dimensions are given on the right-hand side of the draught, in Danish: length from stem to post, 127′6″ – breadth, 33′8″ – depth in hold, 13′8″ – draught astern, 16′8″ – draught afore, 14′8″ – height of gundeck sill, 7 feet (all dimensions in French feet and inches).

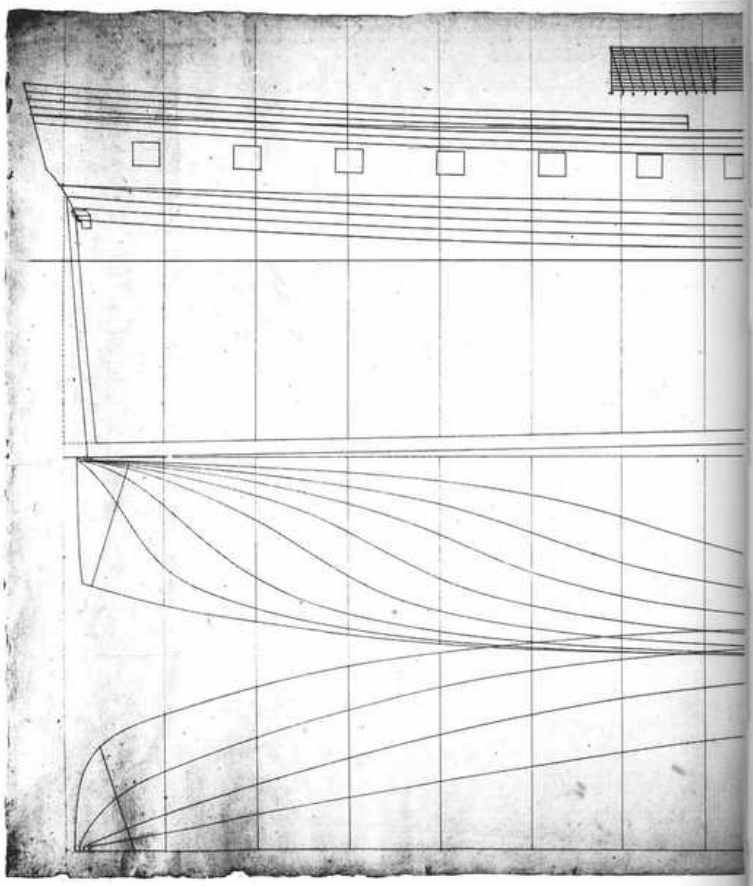
The length to breadth ratio of 3.787 is almost exactly the figure of 3.79 recommended by Blaise Ollivier (see p. 54). One dimension is however surprising, and that is the height of gundeck sill at 7 feet: by comparison with the 5 feet proposed by Ollivier, this figure is exceptional[1]. The reason is to be found in the breadth to depth in hold ratio, which, at 0.584[2] is significantly greater than the usual 0.5, while the average draught of 14′5″ is also considerable for a vessel of this type.

It is interesting to compare these figures with the dimensions of another frigate of the same class proposed by Pierre Morineau in his *Treatise*. This vessel has a length of 126 feet, and a breadth of 32′10″, giving a length to breadth ratio of 3.837, or slightly more than that of the *Hermione*. The depth in hold of 16 feet 9 inches 5 lines is also more than half of the breadth, with a ratio of 0.545. The average draught is 12 feet 10 inches 7 lines, considerably less than that of the *Hermione*, and the height of gundeck sill is six feet (as opposed to 4′9″ for the *Renommée*). The displacement is calculated at 959½ tons.

The significant differences which are highlighted above may be due to the presence of oar-ports on the lower deck of the *Hermione*[3], although these cannot be seen on the draught, unless they were cut in the black strake between the wales. It should perhaps be noted that oar ports were more common in vessels built in the Mediterranean than on the Atlantic seaboard.

To conclude, *Hermione* stands out as being markedly different from the other frigates of her class built later[4].

1. In 1764, the shipwright J.-B. Doumet put forward the draughts of a frigate armed with 26 12-pdrs and 7 feet 3 inches of height of gundeck sill! His proposal was turned down, the decision being explained by a fear that she would lack stability, a height of 6 feet being thought to be more than adequate.
2. Depth in hold of 13′8″ + 6′0″ = 19′8″ divided by the breadth of 33′8″.
3. The standard dimensions of oar ports were as follows: sill 27 inches above the gundeck (lower deck) and 30 inches above the load waterline amidships. The breadth of these diminutive ports is 10 inches, the height the same or greater.
4. Very few frigates were in fact built between 1748 and 1764: six in all, of which only three were armed with 26 guns on their upper deck.



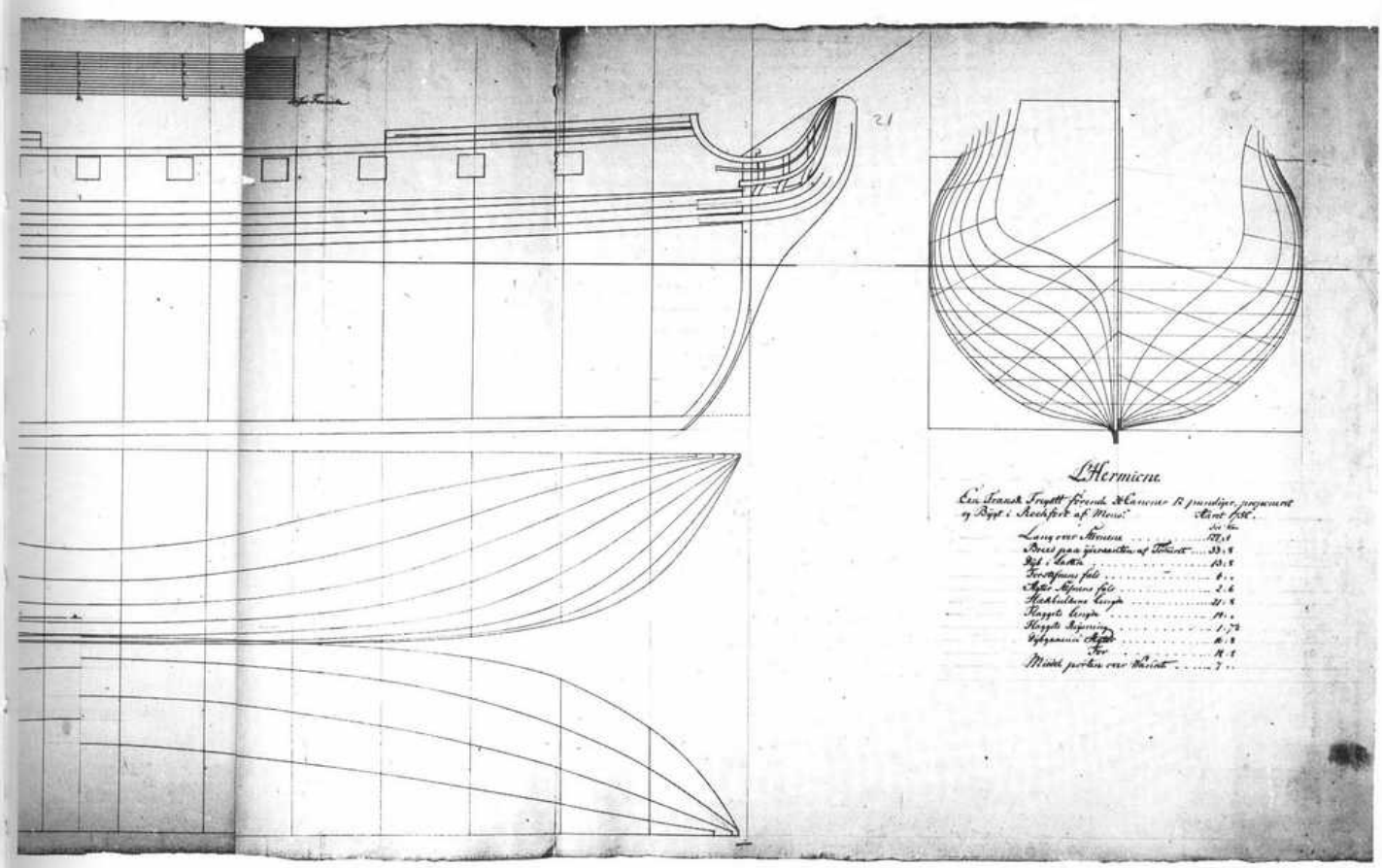
LA GRACIEUSE 1750

In May 1749, a few months after the laying down of the *Hermione* at Rochefort, the Toulon shipwright J.-V. Chapelle* put forward the draughts of a "powerful frigate" armed with 24 12-pdrs on the upper deck. Building started in 1750.

The draught shows the three principal dimensions of the *Gracieuse*: length 124′0″ – breadth 32′8″ – depth in hold 16′4″. The height of gundeck sill as taken off from the draught measures 5′10″, and the average draught is 12 feet. Note the small oar ports, each one directly below the mid-point separating the upper deck gunports. The displacement is not given, but cannot have been more than 900 tons in view of the modest draught of water. The length to breadth ratio is 3.674.

This 24-gun frigate shows that there was some hesitation initially in the adoption of the new design; however, this alternative design was to have no "issue", and it was in fact the frigate with 26 guns on the upper deck which was to prevail, until the end of the century.

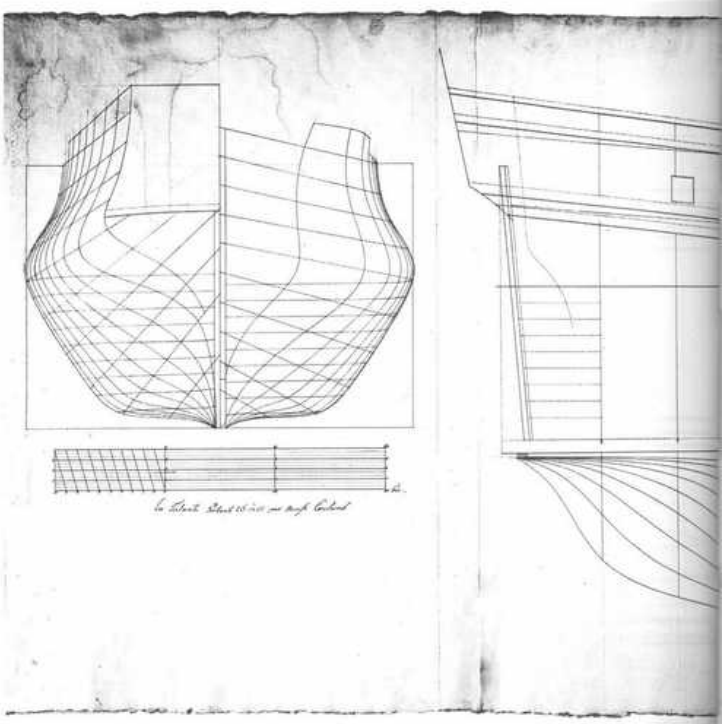
*Joseph V.-C. Chapelle spent several months in Dunkirk in 1747, and was promoted Master Shipwright in the same year. Returning to Toulon in 1748, it was in the following year that he proposed the design of this 24-gun frigate armed with 24 12-pdrs on the single gundeck, the crew being berthed on the lower deck, and with oar ports between the guns. He claimed that the proposed design would be considerably faster than the 30-gun frigates armed on two decks (12- and 8-pdrs), since the weight of the guns and of the upper works would be 3 feet lower. His proposal was accepted, and the result was the *Gracieuse* (*Archives Nationales*, Cat. N° G.48).



L'Hermione

PLAN DUNE FRÉGATE DE 24 CANONS.

L'ATALANTE 1767



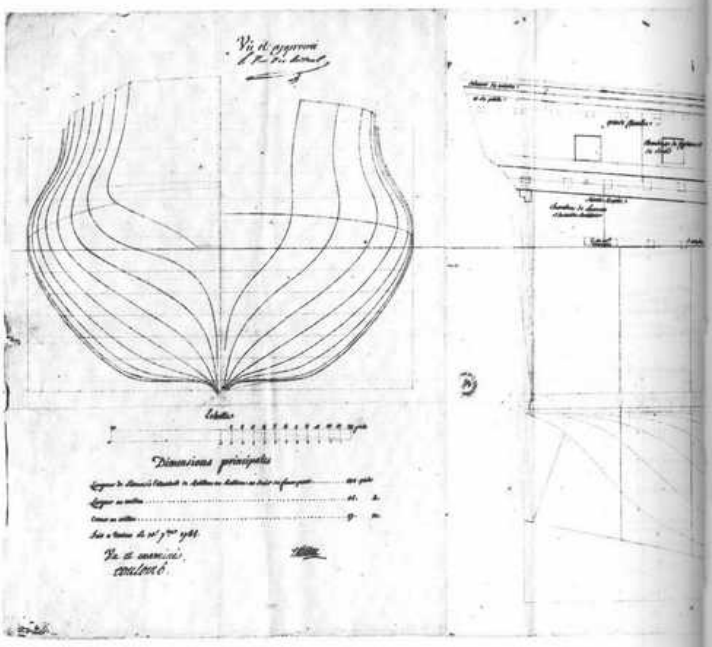
Here is an example from Toulon. I should have preferred to have taken as my example the *Chimère*, built in 1758, some ten years prior to the *Atalante*, but unfortunately her draughts have not survived. This is particularly regrettable, since after the two prototypes already examined, the *Hermione* and the 24-gun *Gracieuse*, the design acquired its definitive form with the *Chimère*, designed by Joseph-Marie-Blaise Coulomb (1728-1800). Her principal dimensions were as follows: length from stem to post, 136′0″ – breadth, 35′7″ – depth in hold 17′0″ – average draught, 13′6″ – 26 12-pdrs on the upper deck, no secondary armament. These figures can be compared with those of the frigates built at Bordeaux by L.-M. Guignace in 1765: length 136′0″ – breadth 34′4″ – depth in hold 17′6″ – average draught 13′4″; these dimensions were to remain essentially valid for all such frigates built up until the end of the Ancien Régime.

The *Atalante* was built in the pattern of the earlier Toulon-built frigates, and dates from 1767. Like the *Chimère*, she was designed by J.-M.-B. Coulomb. Her principal dimensions were: 137′0″ – 35′6″ – 17′9″ – average draught 13′6″ – height of gundeck sill 6 feet.

Note the outline of the frames in the upper part of the underwater hull, the futtocks turning steeply upwards almost in a straight line. This confers an angular appearance to her lines (they are very similar to those of certain xebecs – see the monograph on the *Requin*). It would appear that such lines were a peculiarity of Toulon design at the time.

The aftermost gunport is a long way from the stern, almost twenty feet. This leaves room for the Captain's sleeping cabin extending forward from the day cabin; there is no secondary armament on the quarterdeck.

L'ENGAGEANTE 1766

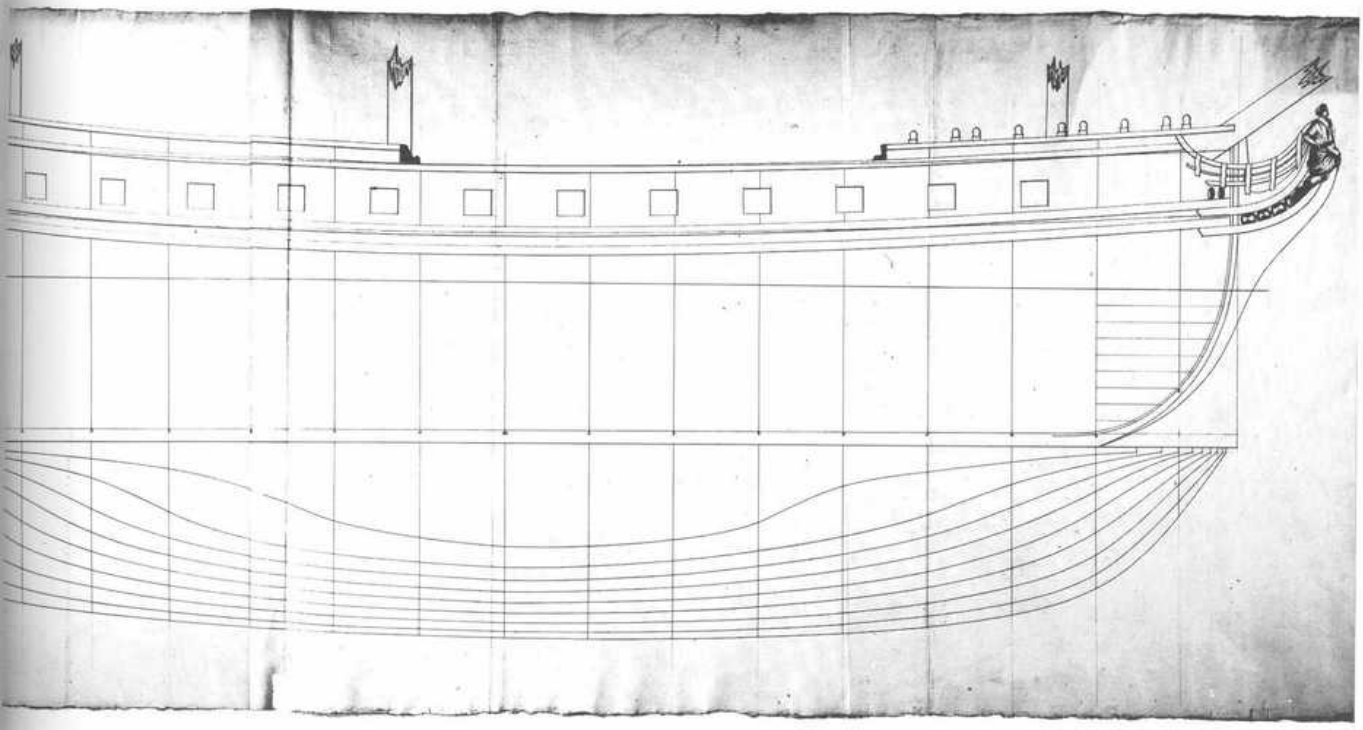


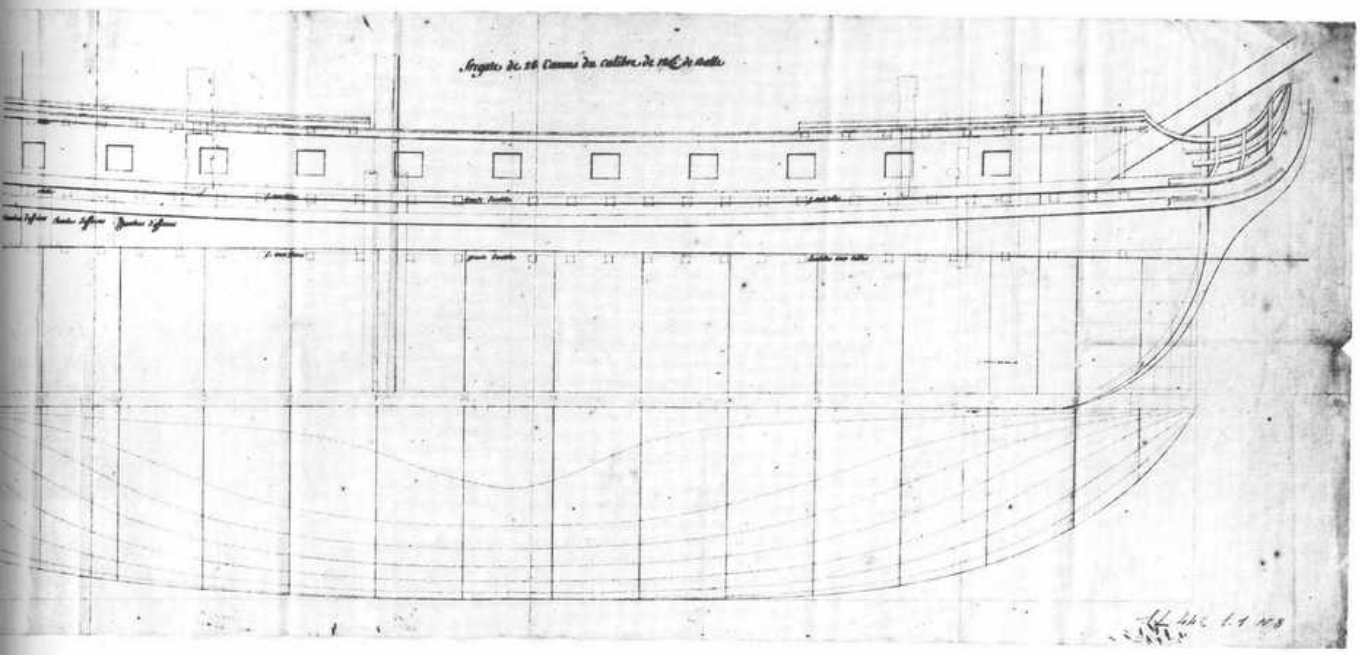
Here is another 12-pdr frigate, this time to the designs of Jean-François Étienne (1724-?)*. The draught indicates the three principal dimensions, as follows: 134′0″ – 35′4″ – 17′10″. Designed in 1766, this frigate is thus two feet shorter than the *Chimère*, but has the same breadth and depth in hold to within an inch or two. The rather indifferent frigates built in the same year by Ginoux at Le Havre (six, all to the same draughts) were smaller: 130′0″ – 34′0″ – 17′1″. Compare these with the dimensions of the frigates built in 1765 at Bordeaux by Guignace, which were considered to be well-designed: their length to breadth ratio and draughts were a little greater, while still retaining a height of gundeck sill of 6 feet, which in theory was what was expected of all the frigates of this class.

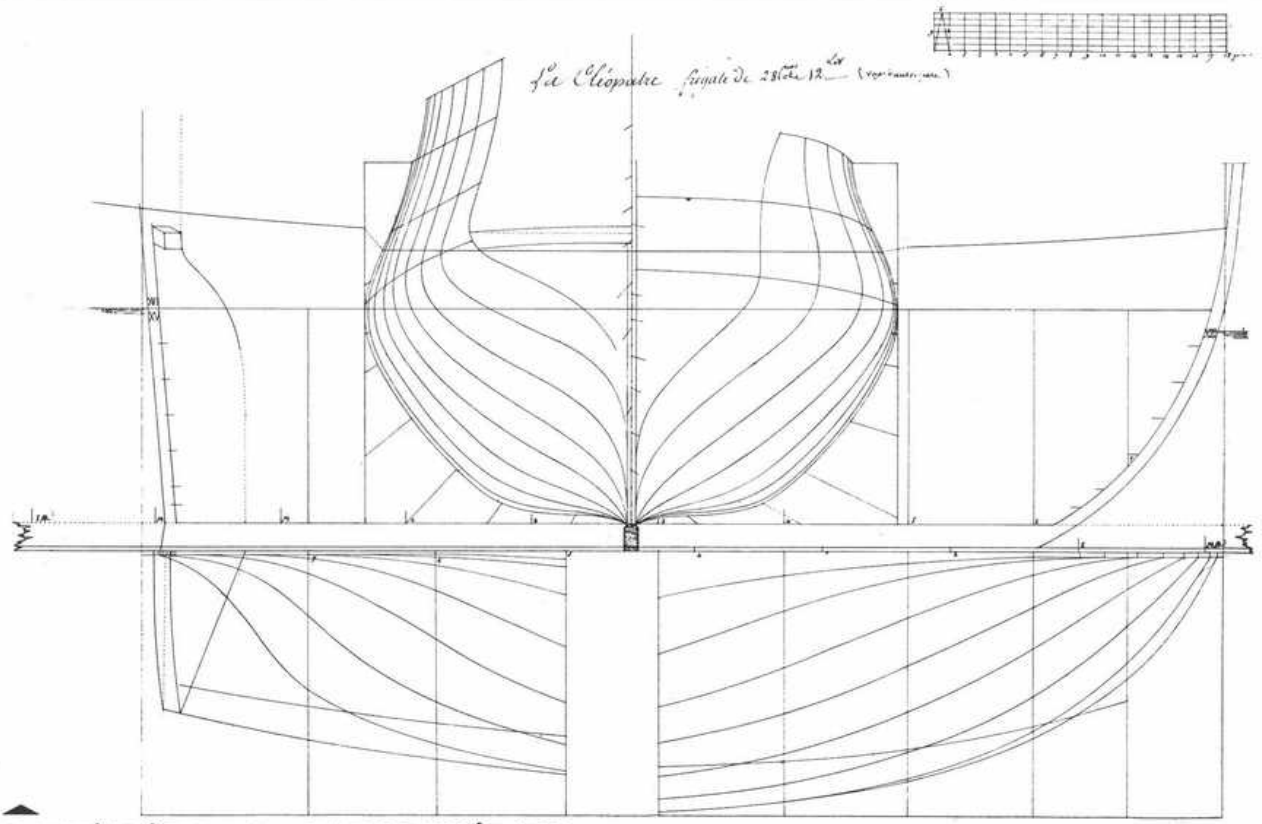
The underwater lines of the *Engageante* do not have the angularity of those of the *Atalante*, but are similar to the lines of the 8-pdr frigates of the same period. Once again we can recognise the influence of Blaise Ollivier, as is also true in the upper works, with their pronounced tumblehome.

The internal arrangements are only very summarily indicated on this draught. The Captain's cabin is to starboard, in the position corresponding to the second-to-last gunport, and following on from it is the great cabin, with the aftermost gun sited in it. On the quarterdeck, up against the stern, can be seen the deck-cabins of the Master and his mates. Note the absence of secondary armament on the quarterdeck or forecastle.

*Apprentice in 1749, Assistant in 1754 (details from the doctoral thesis of Mlle S. Ami, Nice, 1974).







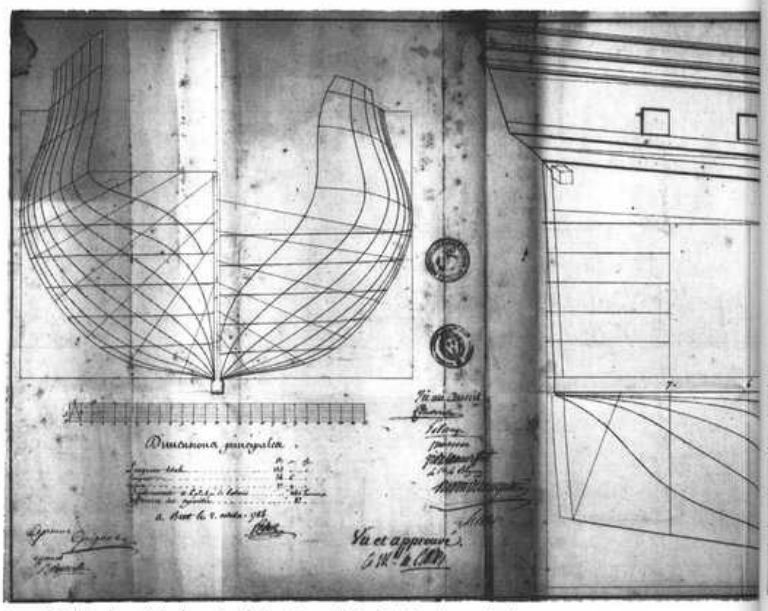
LA CLÉOPÂTRE 1781 – *LA FORTUNÉE* 1790

On this and on the opposite page I have juxtaposed two different frigate designs, both by extremely eminent shipwrights: the *Cléopâtre* (above), by Jacques-Noël Sané, and the *Fortunée** (opposite), by Pierre-Alexandre Forfait; the former, armed with 28 guns on the upper deck, was built at Saint-Malo in 1781, while the latter was armed with 26 guns and was built at Le Havre in 1790.

Both the draughts come from the Chaumont Papers. The principal characteristics of both vessels are extremely similar: thus, the length from rabbet to rabbet is 135 feet for the *Fortunée* and 134′6″ for the *Cléopâtre*, despite the fact that the latter carried two more guns on her upper deck. The displacement of the *Fortunée* is 1,186 tons, that of the *Cléopâtre* 1,158 tons 1,389 pounds (the weight of the two extra 12-pdrs including guncrew's implements, spares, powder and shot comes to 10,419 pounds, or about 5¼ tons).

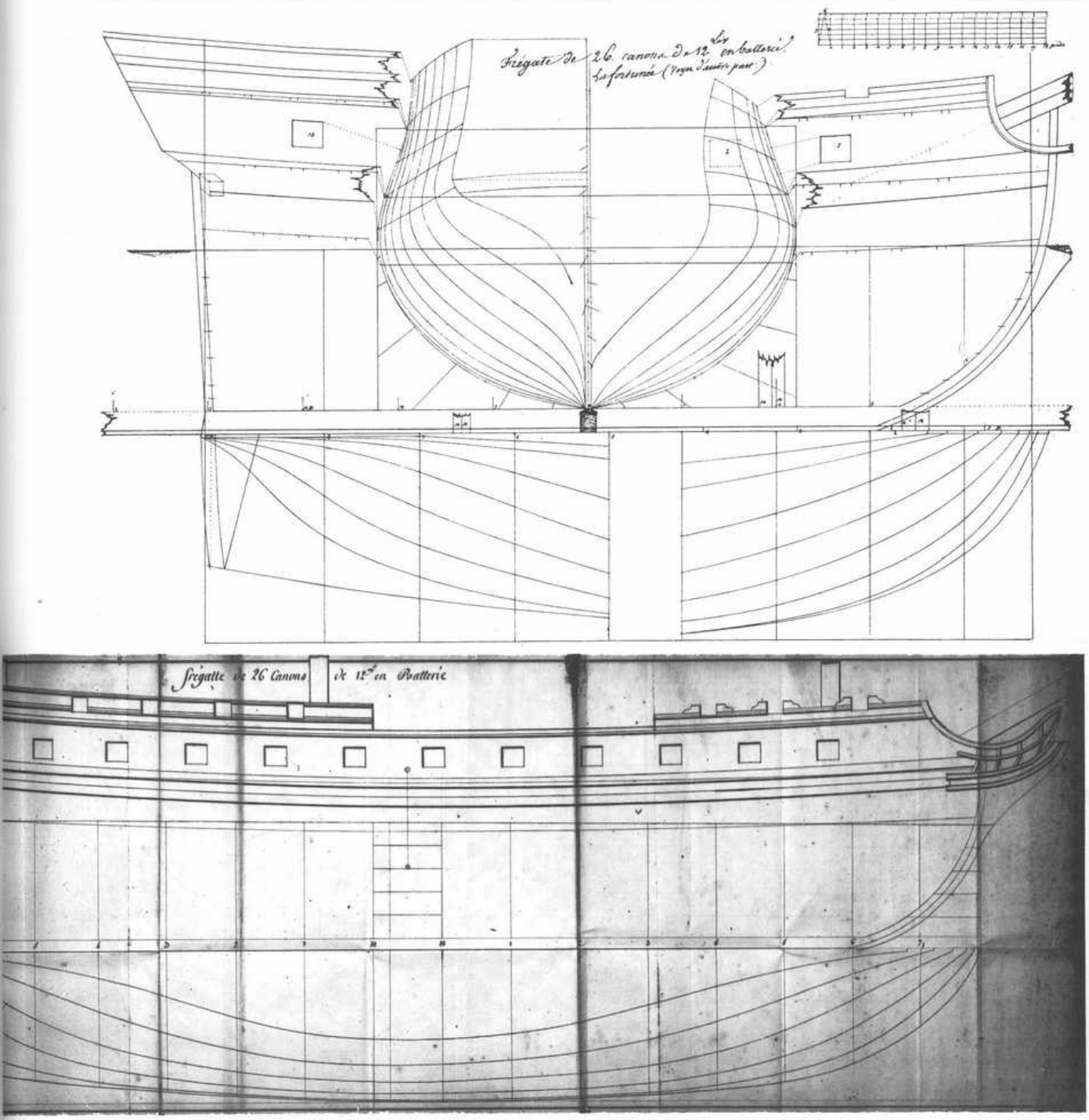
The 1762 Regulations established the distance between gunports for 12-pdrs at 6 feet 4 inches, but it is apparent that the shipwrights preferred a distance of 6′6″ for frigates with thirteen ports to a side, and 6′0″ for those with fourteen. The distance from the perpendicular of the stem to the foremost port varies from 12 to 17 feet, while the aftermost port is between 7 and 9 feet from the perpendicular of the post.These distances are governed by the position of the riding bitts forward and by the cabin arrangements if any at the stern. However, having said that, all the 12-pdr frigates, whether fitted for 13 or 14 gunports on the upper deck, have the same general arrangements.

A comparison of the body plans and the half breadth plans of the two frigates shows clearly the considerable differences in the underwater lines. Forfait has elected to give a considerable amount of deadrise to the floors amidships, thereby reducing the area of the midship bend and shifting the hull volumes towards the bow and the stern: this is immediately apparent from the curves of the waterlines. Sané, on the other hand, has adopted a more traditional approach, with only 1′7″ of deadrise at the midship bend, compared with Forfait's 2′5″ (the length of floor at the midship bend being half the breadth). Both these designers were to remain wedded to their particular philosophies, as we shall see with the 18-pdr frigates built to their designs.



These two vessels are thus almost identical as to their principal dimensions, but differ considerably in their underwater lines, both solutions being entirely valid: frigates built to either the one or the other design were to prove themselves indistinguishable in terms of their sailing qualities.

*This frigate should not be confused with the *Fortunée* of 1777, whose hull lines were very different, and by no means as original as those of the vessel of the same name built in 1790.



This draught illustrates very clearly the ultimate development of the 12-pdr frigate. Here the upper deck is pierced for thirteen guns, but it would be easy to cut a fourteenth port, simply by reducing the distance between ports. The forecastle and quarter-deck armament is relatively numerous, with no less than 14 6-pdrs – a far cry from the 6 guns of the original design. This particular draught dates from October 1785, and was also done by P.-A.-L. Forfait; it is that of the *Félicité* and the *Calypso*, built at Brest. It is possible that the draught is inspired directly by the earlier *Fortunée** of 1777, which had been built at Brest in 1777 and was captured in 1779.

The draught indicates the centre of gravity of the underwater hull and the metacentre, clear evidence of the calculations made by the designer.To the left, as usual, are the three principal dimensions: length 135′0″ – breadth 34′6″ – depth in hold 17′9″; also indicated are the displacement, 1,140 tons at 6′4″ of height of gundeck sill, and with a difference between the volumes of the fore- and afterbodies of 82 tons.

The draught bears the signature of approval of the Master Shipwright at Brest, L.-M. Guignace, together with those of Admiral de Briqueville, Director General of the Dockyard, and of Marshal de Castries, Minister of the Navy. These signatures are further backed by those of the members of the Navy Council, including Rear-Admiral the Comte d'Hector, the Commandant**.

*Assuming this vessel was designed by Forfait, who was at that time Assistant at Brest.

**See *The 74-G. S*, vol. I, for an explanation of the administrative organisation of the Dockyards.

Powerful 12-pdr Frigates

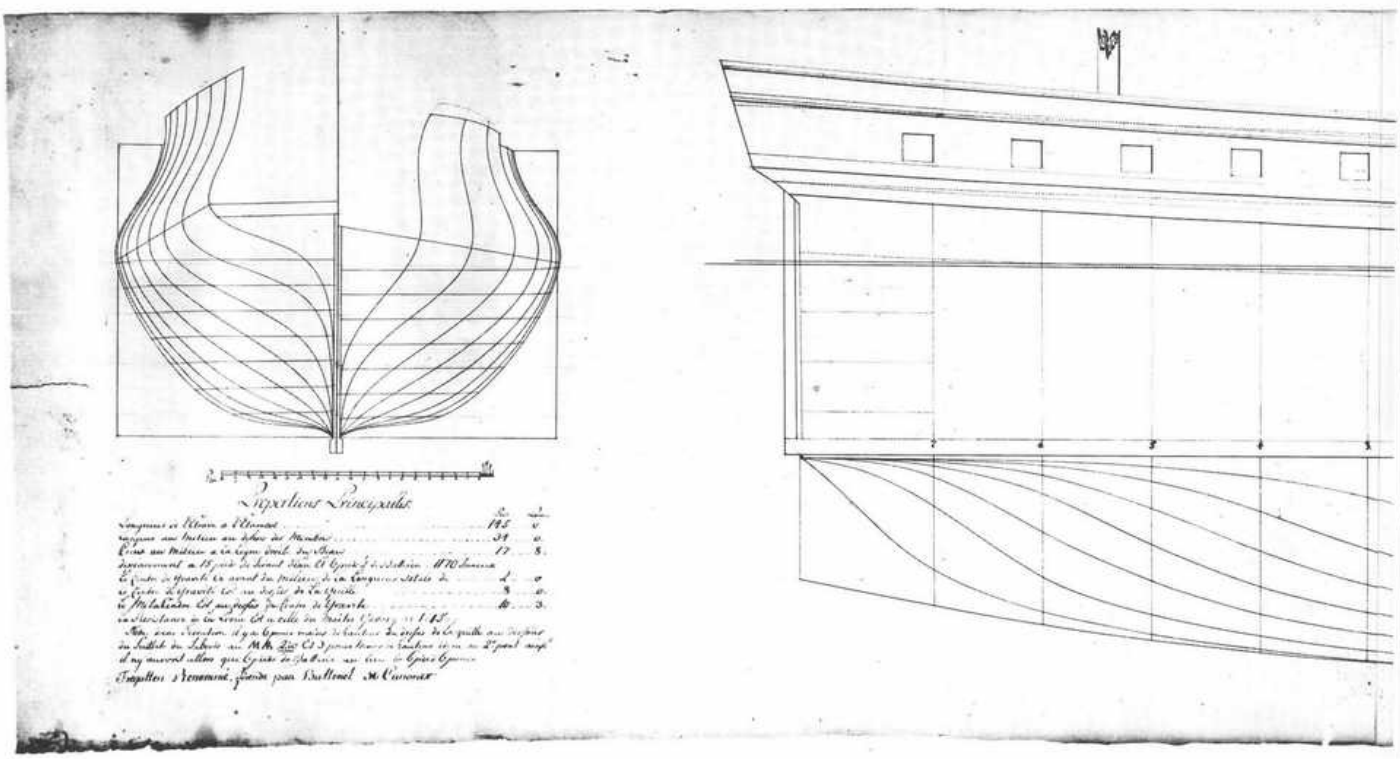
Between 1755 and 1767, three powerful 12-pdr frigates were built, armed with 30 guns on the upper deck. The best-known of these is the *Renommée* (1767), but she was in fact preceded by two other similar vessels, the *Terpsichore* in 1762, and the *Danäé* in 1755. These vessels deserve some words of explanation. The *Danäé* was built at Le Havre by J.-J. Ginoux*, and she was captured in 1759. Her draughts are preserved at the National Maritime Museum, and they are reproduced overleaf with some accompanying notes, by way of commentary on this unusual vessel: armed with 30 12-pdrs on the upper deck and with a further eight 6-pdrs on the forecastle and quarterdeck, she was the most powerful frigate of her day. She was in fact the same length as a 64-gun ship, which moreover would only have carried 26 guns on her upper deck. Blaise Ollivier had been very modest, as we saw at the beginning of this chapter, when he called for a length of 127 feet for a frigate of this class, with a length to breadth ratio of 3.72. Ginoux built his frigate to a length of 152½ feet, and with a ratio of 4.16. It is perhaps not insignificant that he had made something of a speciality at Le Havre of building storeships, which may have inclined him towards length to breadth ratios of this magnitude. The service career of the *Danäé* in the French Navy was too short for her to establish much of a reputation. Taken into the Royal Navy following her capture, a Sailing Quality Report dated September 1763 informs us that she was fast but leewardly (tending to fall off rather than come up into the wind); she was evidently more comfortable in a calm sea, but could do 11 knots in a topgallant gale. She was inclined to roll, but pitched easily (quoted by Robert Gardiner in his 1978 article in *Le Petit Perroquet*, N° 24).

Groignard was certainly aware of the precedent set by the *Danäé* when he designed the *Terpsichore* in 1762. He was well-known for his preference for long vessels with high length to breadth ratios, having already provided one frigate example with the *Sylphide*, built for the French East India Company at Lorient in 1756: she was armed with 30 12-pdrs, had an overall length of 142 feet, and a length to breadth ratio of 4.30. It is reasonable to suppose that the *Terpsichore* was very similar, since her length was only 18 inches shorter, with a length to breadth ratio of 4.22. Unfortunately, neither draughts nor sailing reports survive for either frigate.

The best-known of the powerful 12-pdr frigates is the *Renommée*, whose draughts are preserved not only at the National Maritime Museum, but also in the Danish Archives, and there are sailing reports in the *Archives Nationales* and in the *Musée de la Marine*. True, the draughts which are reproduced below omit many of the details which are to be found on English draughts, but they contain at least as much information as French draughts habitually provide, as we have often noted.

The *Renommée* has at least one peculiarity, in that her riding bitts are on the gundeck (lower deck) and not beneath the forecastle. This arrangement was normal practice in merchant ships, but not followed in the King's ships as a rule. With the bitts one deck lower, the hawseholes are cut between the cheeks of the head. In a memorandum describing the timbering of the vessel, Groignard writes as follows: "*If there be anything omitted from this specification, whether it be for the fastenings, the scantlings or for the internal arrangements, they are to be executed in accordance with the usual practices of Brest Dockyard and with what has been done in the King's frigate the* Terpsichore, *which is very similar to this vessel.*" This text seems to indicate that for the *Renommée* also, the hawseholes were in the same place.

In the specification, Groignard states that the *Renommée* was armed with 26 12-pdrs in peacetime and 30 in time of war, "*the two gunports outlined in red to be opened only in time of war, and to be berthed up within and without by the planking in order to*



strengthen her fastening, and there will be space between the 1st and 3rd gunports in the stern for cabins to be built for the Captain and Second Captain." Note that there is no secondary armament.
In his famous work published in 1768, *Architectura Navalis Mercatoria*, F.-H. Chapman illustrates on Plate XXXII the draughts of *a Swedish frigate*. In the *Encyclopédie Méthodique: Marine* (1780), Vial du Clairbois reproduces Chapman's draughts (figures 454 to 457). However, in the text relating to it (vol. II, p. 148), Vial du Clairbois takes the precaution of indicating that "*the frigate whose arrangements we are examining is Swedish, save that she has been reduced in the draughts to a breadth of 34′ 6″, whereas in reality her breadth was 37′ 4″*". A little later (p. 150), writing on the subject of the riding bitts and of the capstan, he states that in French frigates these are to be found on the lower deck, adding that it was only on the *Renommée* that these particular arrangements resembled those of the Swedish frigate. Admiral Pâris, in his *Souvenirs de Marine Conservés* (vol. V, Plate 260), reproduced the plates from the *Encyclopédie*, but having failed to read the accompanying remarks, he erroneously claimed that they represented the frigate *La Renommée*. This is perhaps a detail which should not detract from the respect which we owe to such a distinguished author, but a correction was nevertheless necessary in the context of the present work.
Having examined the group of frigates armed with thirty 12-pdrs on the lower deck, it is logical to move on to those with twenty-eight. Two frigates of this strength were built in 1766, and a further five during the American War. However, during the Revolutionary period this armament became more general, so that between 1793 and 1798 (when the last 12-pdr frigates were laid down), half of the eighteen 12-pdr class vessels were fitted with 14 armed ports to the upper deck tier.
Thus, out of a total of 105 12-pdr frigates, fifteen in all were pierced for fourteen ports on the upper deck and only three for fifteen (counting only the permanently armed ports).

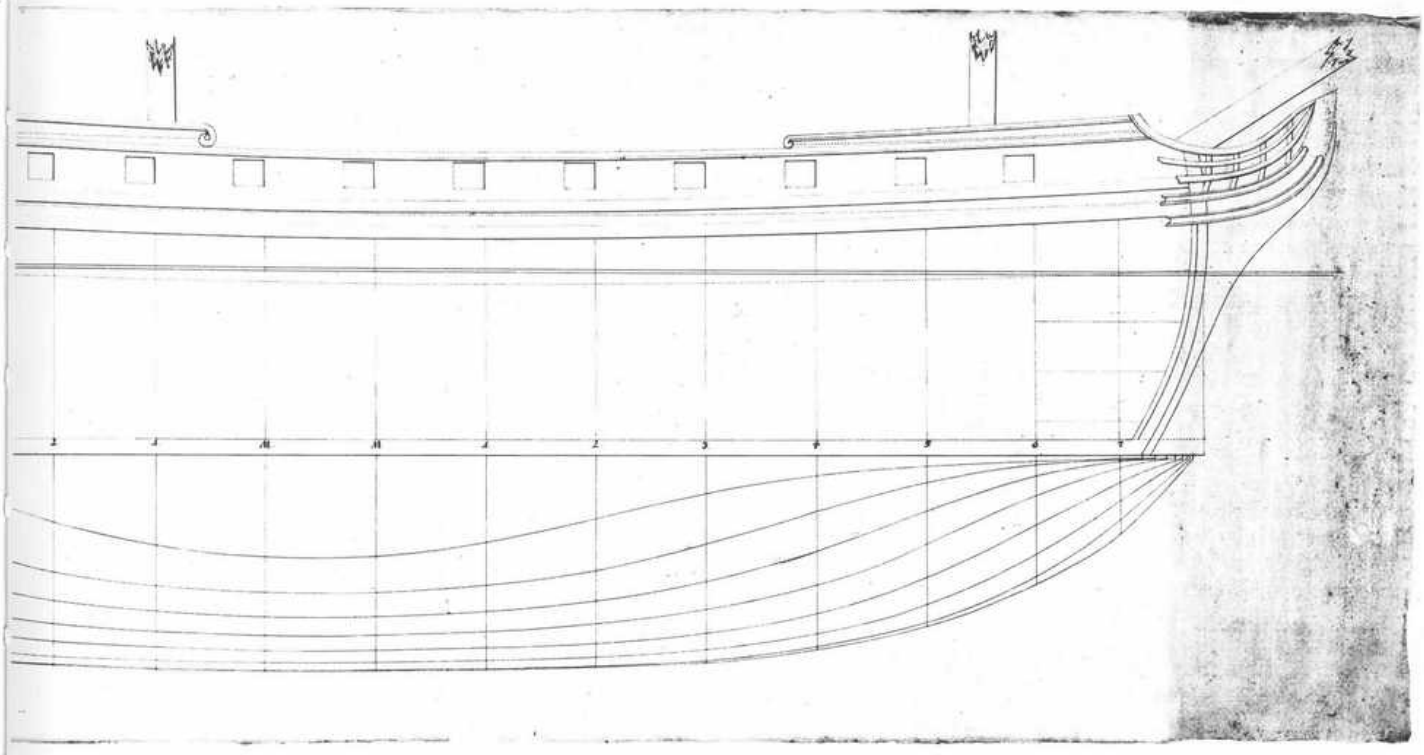
On the following page there is a table which summarises the principal characteristics of this small group of frigates which differed from the norm**, and a few comments follow.

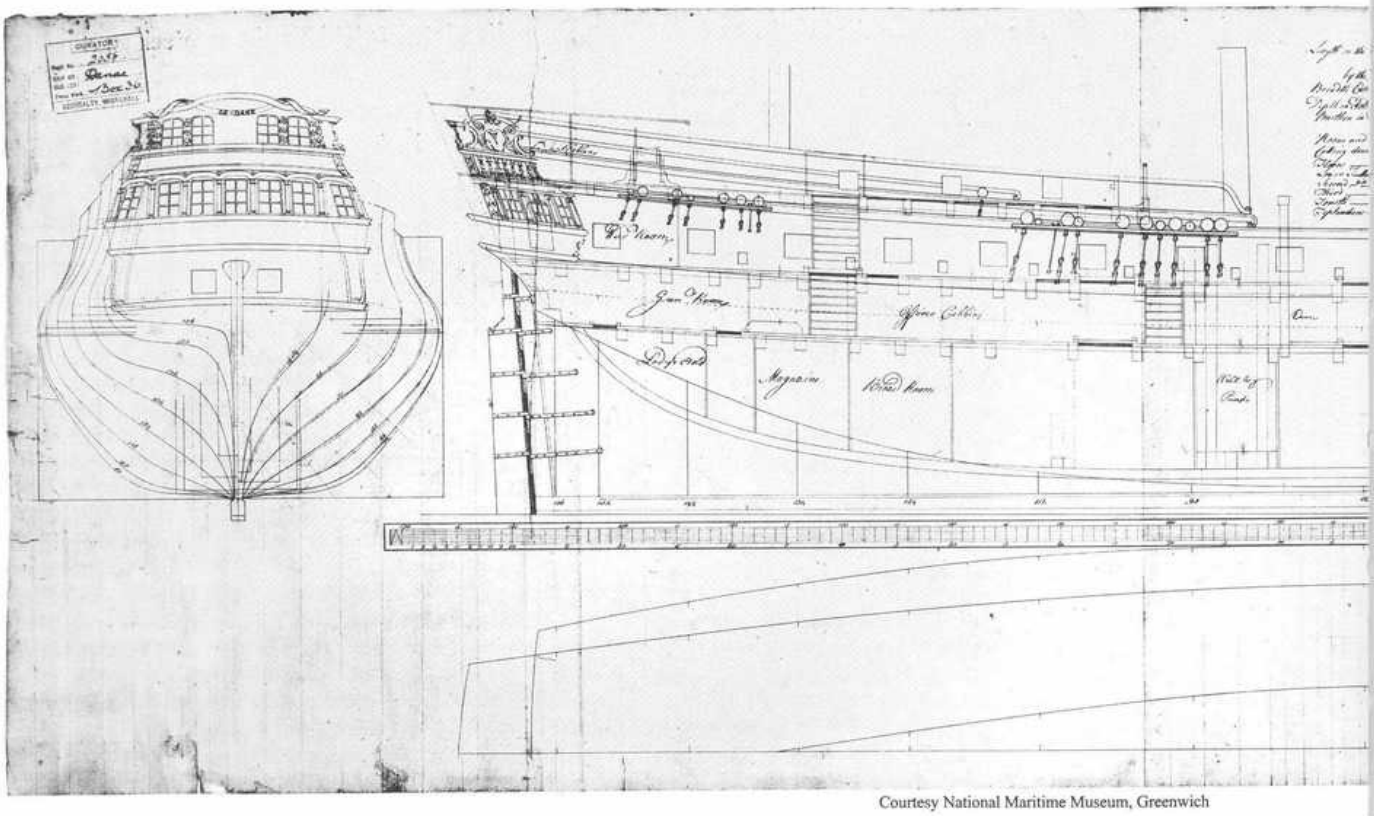
*In this context it is worth recalling the case of the 8-pdr frigate *Aréthuse*, built by J.-J. Ginoux in 1758, and also pierced for fourteen ports on the upper deck. Originally built as a privateer, she was acquired for the Navy, but she was a rarity in this class, along with the *Folle*, which had also been built as a privateer. The Report of the *Aréthuse* indicates that she was armed with four 12-pdrs on the lower deck, and that she also carried 8 4-pdrs as secondary armament.
**A Report dated 1790 in the *Archives Nationales* (D^1.18), and entitled *Current State of the Navy*, distinguishes only between two classes of frigate: those armed with 28 18-pdrs on the lower deck, and those armed with 26 12-pdrs.

LA RENOMMÉE

The long slim lines of the frigate can be clearly seen, and this impression is reinforced by the very slight and rather ugly rake to the stem and the complete absence of rake to the sternpost; these design features were characteristic of Groignard's work.
The numerical data are as follows: Length from stem to post, 145′0″ – Breadth to inside of plank, 34′0″ – Depth in hold amidships to the horizontal of the midship beam, 17′8″ – Displacement at a draught of fifteen feet and 6′6″ height of gundeck sill, 1,170 tons.
The centre of gravity* was 2 feet forward of the mid-point of the length, and 8 feet above the keel. The metacentre was situated 10′3″ above the centre of gravity. The ratio of the resistance of the bow** to that of the midship bend was 1:15.
Note: When the vessel was built, she measured 6 inches less from the upper face of the keel to the lower port sill at the after midship bend (MAR), with three inches less headroom on the upper deck at the same point. Thus she finally had only 6 feet of gundeck sill, rather than her design 6′6″.

*The centre of gravity of the underwater hull, as opposed to the centre of gravity of the vessel overall.
**A calculation which was commonly made by French shipwrights at this time, even though the result was entirely illusory, which is scarcely surprising, given the knowledge of hydrodynamics of the time.





Courtesy National Maritime Museum, Greenwich

LA DANÄÉ (armed with 30 12-pdrs)

Built at Le Havre in 1755 to the draughts of J.-J. Ginoux, and originally intended as a privateer, this large frigate was acquired for the French Navy and captured in 1759. In the absence of any detailed draughts for either of Groignard's frigates, we will examine those of the *Danäé*, taken off after her capture and preserved at the National Maritime Museum, Greenwich.

The frigate has a round bow, with relatively little rake to the stem (about 1/14th of the length overall). The forecastle extends as far as the third gunport, but despite its length it is only armed with a single 6-pdr on either side. The draught shows the distribution of the deck-beams. Also shown are the four breast-hooks, the fore-mast and the mainmast steps, and in the hold, the five riders, the upper futtocks* of which end at the shelf of the upper deck. The sleepers in the stern are not shown. Note the position of the oar ports on the upper deck. A pair of gallows-bitts can be seen forward of the mainmast, from which we can deduce that the spare spars rested at their fore end on the forecastle, with the gallows serving also as the main topsail-sheet bitts. The pumps are entirely of timber, and abaft the main jeer-bitts** can be seen the ladderway for the crew (there is no such ladderway in the fore part of the vessel). The quarterdeck breastwork is about 9 feet from the mainmast, and there are three 6-pdrs on either side. The after ladderway (for the officers) is clearly visible, with its lower flight giving onto the cockpit forward of the gunroom; underneath are shown in outline the magazine and breadroom.

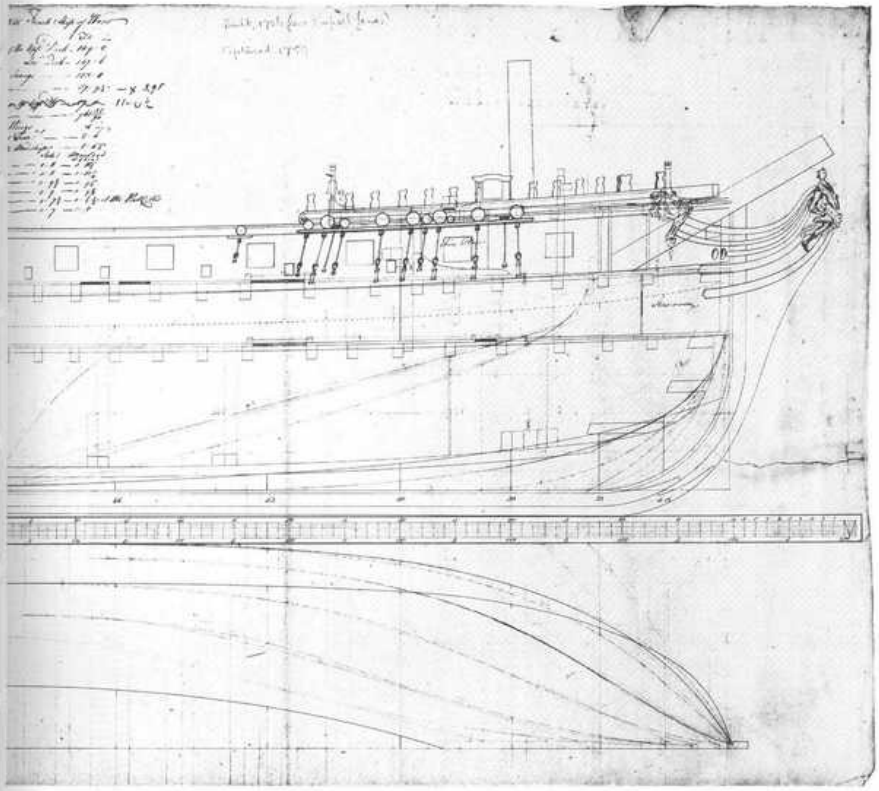
At the stern, on the level of the upper deck, is the great cabin, with the quarter-galleries leading off. On the quarterdeck and against the stern, there is a small poop over the two officers' cabins, for the Captain and his Second. It extends forward over the steerage. These arrangements mean that the upper works are relatively high, as can be seen from the depiction of the carved work of the stern.

The interest of these draughts in the collection of the National Maritime Museum, especially when they have been taken off shortly after the vessel's capture, is that they show their "true" appearance, evidence made even more important by the rarity of models from this period, which in any case have all too often been incorrectly restored.

*All the futtock-riders are laid forward of the floor-riders: they are not reversed in the after-body of the vessel.

**There is no sign of any fore jeer-bitts.

* * *



Scale 1:190

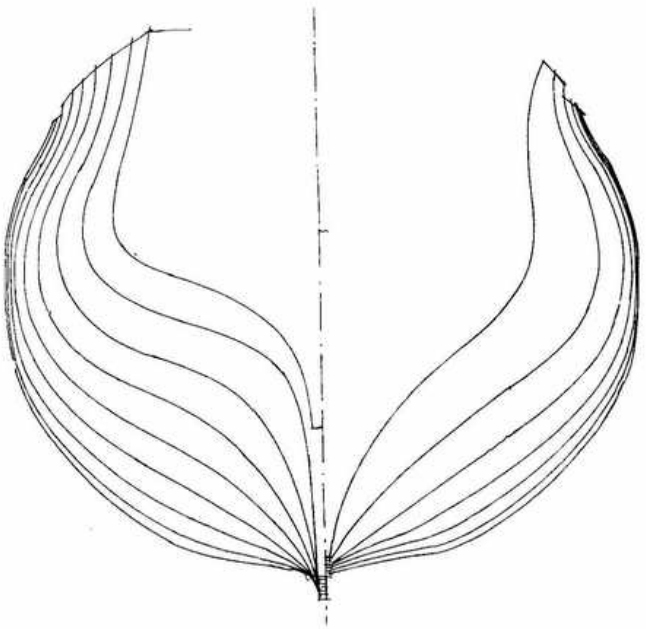
Frigates armed with 30 12-pdrs

Laid down	Name when launched	Builder	Place of building	Length	Breadth	Depth in hold	Lower deck	Fo'csle/ Q'deck
1755	*Danäé*	J.-J. Ginoux	Le Havre	152'6"	36'7"	19'0"	30x 12	8x 6
1762	*Terpsichore*	A. Groignard	Nantes	143'5"	34'0"	17'4"	30x 12	
1767	*Renommée*	A. Groignard	Brest	145'9"	34'6"	17'6"	30x 12	

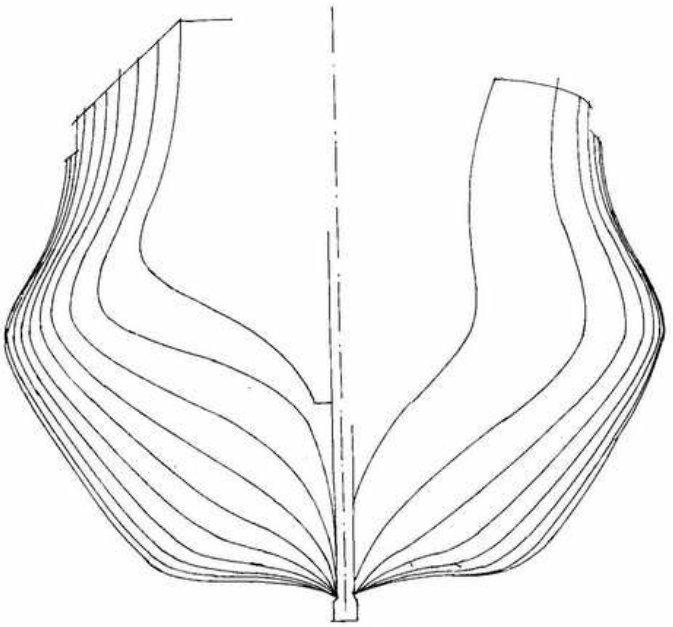
Frigates armed with 28 12-pdrs

1766	*Indiscrète*	Raffeau	Nantes	130'0"	33"0"	16'6"	28x 12	6x 6
1766	*Sensible*	Raffeau	Nantes	130'0"	33'0"	16'6"	28x 12	6x 6
1777	*Concorde*	H. Chevillard	Rochefort	136'0"	34'6"		28x 12	6x 6
1779	*Friponne*	J.-B. Segondat	Lorient	136'0"	34'6"	17'6"	28x 12	6x 6
1781	*Cléopâtre*	J.-N. Sané	St-Malo	137'0"	34'7"	17'3"	28x 12	6x 6
1782	*Danäé*	J.-B. Segondat	Lorient	136'0"	34'6"	17'6"	28x 12	6x 6
1793	*Bravoure*	P. Duhamel	St-Malo	136'0"	34'2"	17'1"	28x 12	12x 8
1793	*Régénérée*	P. Duhamel	Rochefort	136'0"	34'2"	17'1"	28x 12	14x 6
1793	*Panthère*						28x 12	12x 6
1793	*Cocarde*	P. Duhamel	St-Malo	136'0"	34'2"	17'1"	28x 12	12x 6
1794	*Patriote*		Bayonne	138'3"	34'8"	17'7"	28x 12	16x 6
1794	*Décade*		Bordeaux				28x 12	10x 6
1795	*Fidèle*	R.-A. Haran	Bayonne	138'3"	34"8"	17'7"	28x 12	16x 6
1798	*Thémis*	R.-A. Haran	Bayonne	138'3"	34'8"	17'7"	28x 12	12x 6
1798	*Franchise*	R.-A. Haran	Bayonne	137'6"	34'8"	17'7"	28x 12	12x 6

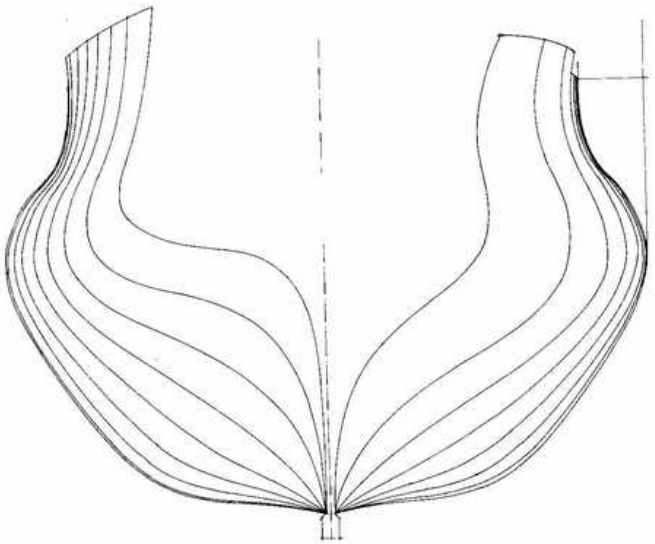
BODY PLAN EXAMPLES
12-Pdr FRIGATES (Scale 1:120)



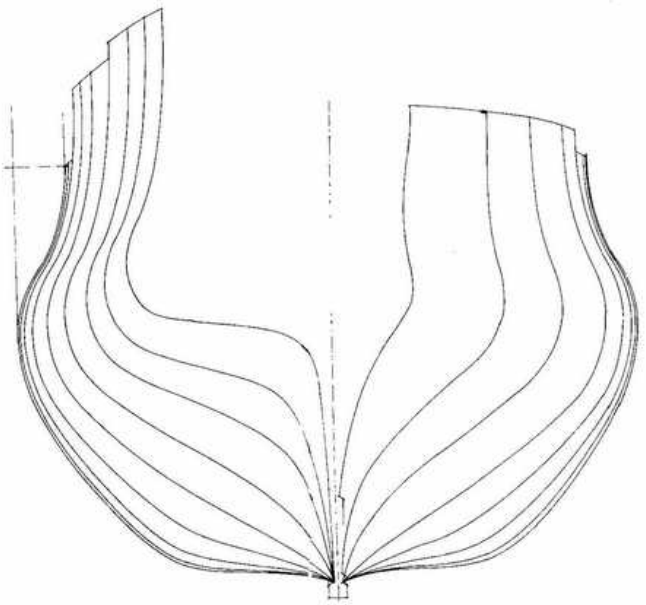
***L'Hermione* 1748**. By *Pierre Morineau*. The first of the "powerful frigates". Length 127'6" – breadth 33'8" – depth in hold 17'8". Note that the sections are shown perpendicular to the load waterline and not to the keel. In the central part of the vessel the rounded shape extends as far as the gunwale, with little tumblehome.



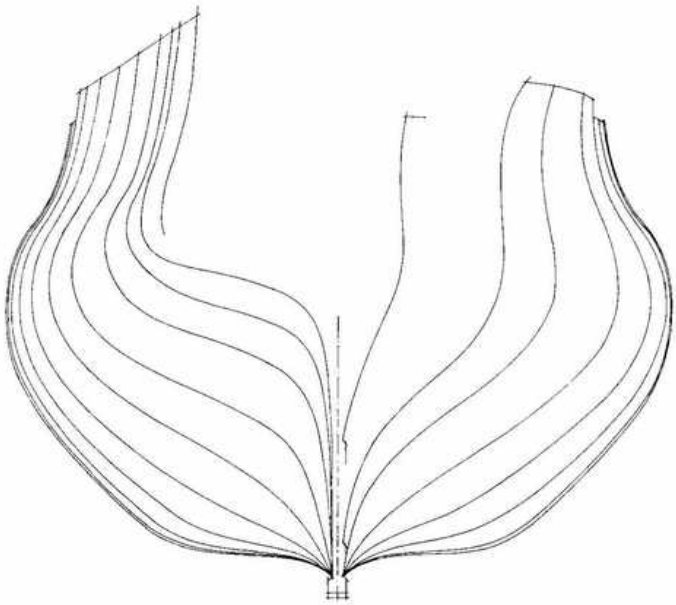
***L'Atalante* 1767**. By *Jacques-Luc Coulomb*. The lines appear very angular, which is far from æsthetic. Dimensions: 136'0" – 36'7" – 17'10". In the absence of any Sailing Quality Report, we have no way of knowing whether she performed well compared with other frigates of more conventional lines.



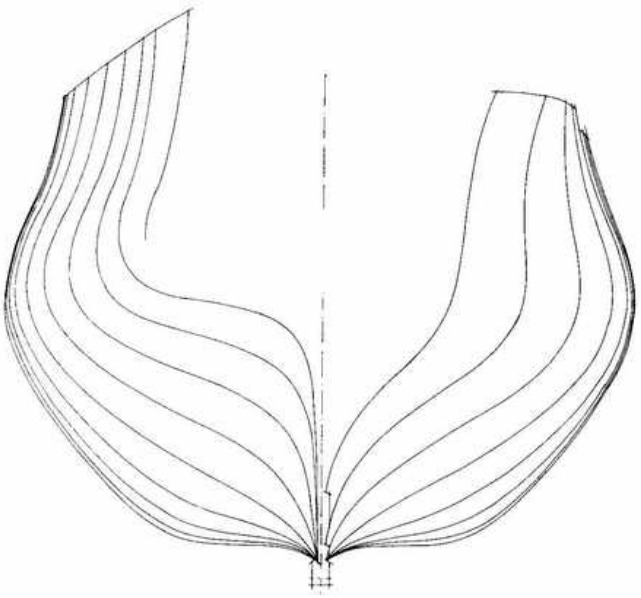
***La Belle-Poule* 1765**. By *Léon Guignace*. These are the lines of the four frigates built at Bordeaux in 1765-6. Dimensions: 134'0" – 34'6" – 17'6". The tumblehome appears all the more exaggerated in that it starts suddenly, immediately above the height of breadth. Considered excessive, it hindered the serving of the guns.



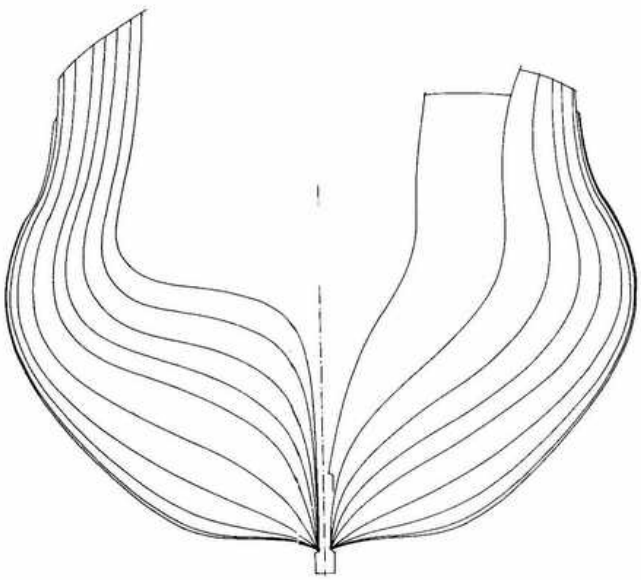
***La Prudente* 1778**. By *Léon Guignace*. The underwater lines are unchanged, in view of the excellent sailing qualities of this class, but the tumblehome has been reduced significantly. Nine frigates were built to these revised lines in 1777-1778.



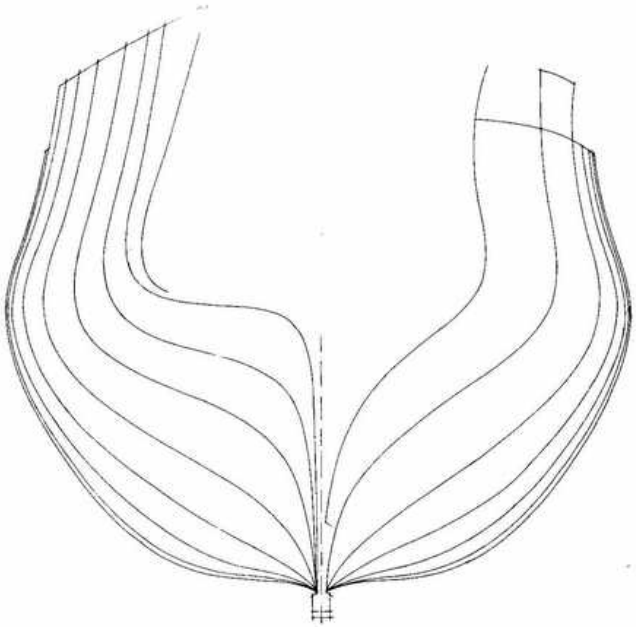
***La Magicienne* 1777**. By *Joseph-Marie-Blaise Coulomb*. Dimensions: 136′0″ – 35′6″ – 17′11″. Fifteen frigates were built to these draughts. Note the pinched lines in the lower hull, a certain sharpness of line at the bow, compensated no doubt by the greater breadth.



***La Néréïde* 1779**. By *Jacques-Noël Sané*. Six frigates were built to these draughts. Dimensions: 135′2″ – 34′6″ – 17′6″. The vertical sections of the body plan are particularly pleasing, with a less pronounced tumblehome, and an easy progression from the height of breadth. It is clear that this hallmark of Sané's style was already established with his 12-pdr frigate.



***La Concorde* 1777**. By *Henri Chevillard senior*. Four frigates were built to these draughts, which are not dissimilar to those of Sané. Dimensions: 136′9″ – 34′6″ – 17′6″. The length is somewhat longer, but the breadth and depth in hold are identical.



***La Dédaigneuse* 1797**. By *Raymond-Antoine Haran*. This is one of the last 12-pdr frigates to be built. Dimensions: 135′3″ – 34′3″ – 16′8″. The underwater lines are similar to those of the *Néréïde*, but this is not the case with the upper works, where the tumblehome is markedly less than in the other classes illustrated. Haran was to design six frigates in all, four of them to the draughts of the *Dédaigneuse*.

SAILING QUALITIES OF 12-Pdr FRIGATES

The analysis of nearly fifty Sailing Quality Reports for this class of frigate makes possible a real appreciation of their performance. Apart from a few rare exceptions, all *answer the helm* well; by the same token, they are all stiff vessels, *carrying their sail well*. With regard to *rolling and pitching motions*, although the majority of these frigates are easy, this quality is less marked than the two already quoted.

The principal quality demanded of a frigate, that of *speed of sailing close-hauled*, is confirmed for a minority of the vessels analysed – something of the order of a quarter, which is not enough. On this point of sailing, reported speeds vary from 8 to 10 knots[1].

As a rule, those vessels which are fast close-hauled tend to lose this advantage when *sailing large*[2], and conversely, those which are undistinguished close-hauled tend to show better performance running free, on their best point of sailing. Speeds in excess of 10 knots are by no means rare, and individual cases are reported of 13 to 14 knots in a topgallant gale.

Finally, when *sailing with the wind astern*, speeds are generally between these two extremes; as a rule the speed of sailing is unexceptional for those vessels which are faster close-hauled, but better for the others, with speeds approaching 11 knots.

The frigates *lie-to, scud and try* satisfactorily, have a tendency sometimes to *gripe* but are rarely *slack*, and for the most part they are *quick in stays*.

The criticisms which can be found in the Reports relate frequently to the tauntness (height) of the masts, considered to be excessive and to be insufficiently stayed because of a tumblehome which is also too great, restricting the service of the guns. Some vessels are thought to be too leewardly, others pitch harshly, apparently because their hull volumes at bow and stern are too slight; other Reports speak of frigates being pooped[3] or making sternway[4], especially when veering.

There is an interesting but anonymous comment, dating from about 1775, on the 12-pdr frigates of a decade or so earlier. Those designed by *Ginoux*[5] at Le Havre are roundly condemned: "*These six frigates are safe but slow sailers; they thus lack the whole purpose of their conception and are an expensive charge to the State. To fit out such vessels in time of war is to put every operation at risk, by delivering them to the enemy, and by spending our forces through the detention of their crews; it is thus of the greatest moment to substitute other frigates for these vessels, paying no heed to the present value of their hulls, whose immediate breaking would be greatly advantageous to the State, for then their rigging, their gear and their equipment might be employed in other hulls whose lines were better devised for speed of sailing, or in other words, truly synonymous with the name of frigate, which has been usurped by those which we denounce in the present article.*"

Having pronounced this judgement, the author goes on to praise the frigates built at Bordeaux to the draughts of *Guignace*:

"*These four vessels should be the model for all frigates of this Rate, for they have less tumblehome and are less broad relative to their beam than most of the other frigates, and by this they handle better, have more space to fight their guns, etc., they are better sailers than most others and they are more seaworthy. This type of frigate should thus be preferred above all others. They could be brought to perfection through the genius and the experience of their Builders.*"

The draughts of Ginoux' frigates have unfortunately not survived. They were 130 feet in length, 34 feet in breadth, thus with a length to breadth ratio of 3.82. The corresponding figures for the frigates designed by Guignace are as follows: 136 feet, 34 feet 4 inches, and 3.96. This tends to throw some doubt on the anonymous writer's assertions.

Let us now move on to consider a number of frigates, from different designers, for which Reports have survived in sufficient detail to "characterise" their individual qualities.

The Report for the *Terpsichore* by *A. Groignard* informs us that she carried her sail and answered the helm well, made little leeway when hove-to, rode easily, but that she was a little slow in stays and coming up. Her spars were too tall to be stayed adequately. Her speed of sailing was above average.

The *Sultane*, by *N. Poumet*, answered her helm well, carried her sail perfectly, pitched sweetly and evenly, rolled easily but rapidly. She sailed poorly close-hauled, but was no more leewardly than other frigates (!). Sailed well large, especially in a stiff breeze, but unexceptionally in light airs. She tried well, was quick in stays provided the sea was not rough and she was carrying plenty of sail, but otherwise tacked badly. She veered with no problems. The author noted that the frigates *Sérieuse*, *Lutine*, and *Flore* seldom fore-reached on her close-hauled.

The Reports on a number of the Ginoux frigates complement the anonymous memorandum quoted above, and qualify its criticisms somewhat. *L'Infidèle* sailed well a quarter free, but performed less well and scarcely made any headway with the sheets hauled hard in. Above average with the wind abeam, less good with the wind astern. Answered the helm perfectly, carried her sail to perfection, did not strain in a seaway or in a blow. Made considerable sternway in stays, but less if handled promptly. *La Sincère* answered the helm and carried her sail well, her motions were easy, and she put about with no difficulty. Her best point of sailing was not close-hauled, especially in a seaway. With the wind a point and a half to three points free, she sailed considerably better, 12½ knots on a reach with the wind three points free, with a calm sea and a fresh breeze, all sails set. Hove-to under mizen-course only she performed excellently[6]. The Report on the *Légère* is similar in content, adding that there was insufficient height of gundeck sill, so that as soon as there was a bit of sea and a press of sail the guns ploughed the water and the decks were always wet. *La Blanche* sailed best large and in a stiff gale, logging 80 leagues[7] in 24 hours, but in light airs she was very slow. Other Reports confirm these observations.

The frigates built by *Guignace* were extremely successful, and the Reports make that clear. The *Belle-Poule* sailed excellently close-hauled and also large, but less well with the wind astern, although she still out-performed the *Terpsichore* on this point of sailing. On several occasions, whether close-hauled or with the wind on the quarter or astern, she came up in three or four hours with other vessels which had been 3 or 4 leagues ahead, and then lost sight of them astern 3 or 4 hours later; the vessels all sailing the same course as the frigate and under more or less the same sail.

In general, her best point of sailing was close-hauled, where she made little leeway, being rather weatherly, rising easily to the waves and with gentle rolling and pitching motions; she was perhaps a little slow in stays. She needed to be pushed when going about, and hove-to she rode better under some sail, either the mizen- or the maincourse, otherwise tending to make sternway.

From her Reports, the *Dédaigneuse* exhibited the same qualities: she made prodigious sternway when putting about, her entry being too fine at the waterline. She outsailed two thirds of the other frigates, logging 10 to 11 knots with the wind a quarter free,

on the other hand her performance was unsatisfactory with the wind astern. *L'Amphitrite* (ex-*Impérieuse*) needed to be trimmed significantly by the stern (22 inches). She sailed very well close-hauled, and combined all the qualities which could be demanded in a frigate.

The frigates built in 1778 performed in a very similar manner to those built in 1766. The Reports of the *Bellone* and the *Médée* indicate speeds of 8½ to 9 knots close-hauled, 10½ knots with the wind on the beam, and 11 knots with the wind astern. Note however that their ability to carry their sail was considered (respectively) average and poor.

The frigates built by *Raffeau* can be judged from the Reports on the *Boudeuse*, the *Indiscrète* and the *Sensible*. They answered the helm and carried their sail well, and they were easy in a seaway. The *Boudeuse* sailed badly close-hauled, no better than average when sailing large, and well with the wind astern. As for the *Indiscrète*, "*we can affirm that she distinguishes by her performance*". There is no indication of the speed of sailing of the *Sensible*, which griped so badly that in anything of a wind she was unable to use any of her after sails.

The frigates built by *J.-M.-B. Coulomb*, like Raffeau's designs, cannot be considered successful, if we are to believe the Reports on the *Sérieuse*, the *Alceste* and the *Iris*. They carried their sail and answered the helm well, but they rolled rapidly and pitched viciously, "*being timid of a head sea because of the slenderness of the bow*". They sailed badly close-hauled, well with the wind astern, and their best point of sailing was large. They tried well, and held a weather helm rather than being slack, being quick and easy in stays.

The frigates built by *Chevillard junior* were excellent, as we learn from the Reports on the *Aurore*, the *Gracieuse* and the *Hermione*. They answered the helm better than most, carried their sail well, rolled and pitched easily, and tried excellently. They performed well close-hauled, with the notable advantage of being able to work to windward and hold their wind. *L'Aurore* logged 8 to 9 knots under single-reefed topsails, sailed large well (her best point of sailing provided the wind was strong), her performance with the wind astern was satisfactory and with little tendency to roll. The vessels held a weather helm rather than being slack, which is essential in order to hold a course, and they veered remarkably well. They out-performed all other frigates, especially with the wind on the quarter, but were best not overcharged with canvas aloft.

The frigates designed by *J.-N. Sané*, if we are to believe the Report on the *Néréïde*, answered the helm perfectly, were not very stiff, had a lively pitching motion but rolled easily. They sailed reasonably well close-hauled in a calm sea, large and with the wind astern excellently. Stayed and veered perfectly.

The Reports on the *Danäé*, built by *Segondat-Duvernet*, informs us that she was an excellent sailer, answered the helm very well, carried her sail exceptionally well, and that her best point of sailing was close-hauled.

There is one case which would appear to be exceptional, that of the *Régénérée*, designed by *P. Duhamel*. She steered and carried her sail equally well, with easy motions. Close-hauled she performed above average, sailed large with advantage provided she was not carrying too great a press of canvas, sailed excellently with the wind astern save in a heavy head sea, tried admirably under her main-topsail. She neither griped nor was slack, and was quick in stays. Sailed very well on all points of sailing except in a head sea, but even then she sailed as well as the best of her rivals. Rarely are Reports so full of praise.

The study of all these Sailing Quality Reports show that the majority of frigates possessed the same good qualities, with the exception of their performance close-hauled, by far the most important of those looked-for in a frigate, where they were very unevenly matched.

There is a most interesting study by Robert Gardiner of French frigates captured by the Royal Navy during the War of Austrian Succession and the Seven Years' War, based on the Sailing Quality Reports drawn up by their commanders. The study was originally published in detail in *Le Petit Perroquet*, and has since been summarised in his excellent recent publication, *The First Frigates*. Here is the gist of his comments:

In general, French frigates are criticised for their light scantlings (a detailed study of the scantlings of two frigates of comparable date and size, one French and the other English, would be a useful exercise). However, more than the scantlings, it is probably true that the longitudinal stiffening in French vessels was less effective than in their English counterparts.

French frigates were believed to be faster in good conditions, but they lost their advantage in anything of a seaway. The French Sailing Reports provide little evidence for this, and it has to be said that their performance when trying was generally considered to be satisfactory.

The excessive tumblehome and height of their spars were criticised in equal measure by officers of both Navies. In short, the two principal criticisms concern the lightness of their construction and their mediocre performance in a seaway. It has to be admitted that in the Royal Navy frigates were commissioned much more frequently than in the French Navy, so that they were subject to greater wear and tear and needed to be more robust.

1. Superior performance close-hauled also implies a vessel which is less leewardly (see *74-G. S.*, vol. IV, p. 203), since leeway tends to increase as speed falls off.
2. Note however the case of the *Médée* of 1778 by Guignace, which logged 10½ knots close-hauled, 13 knots large, and 11 knots before the wind.
3. When pitching, a vessel may crash down at the stern so brutally as to stove in her timbers.
4. To make sternway is in effect to sail backwards.
5. Ginoux was something of a specialist in the buiulding of storeships, and would appear to have allowed this to influence his frigate designs!
6. Her commander requested that the mainmast be shortened by three feet, the main-topmast by two feet but with the hounds lengthened, and the topgallant-mast by two feet. The foremast to be shortened in proportion. The topsail-yards were adjudged to be too heavy. Similar requests were noted from the Captain of the *Blanche*.
7. One French nautical league equalled 1/20th of a degree, or 2,850.4 *toises* of 6 *pieds* (5,565 metres).

*

* *

LA NYMPHE (P.-A. Lamothe). Built in 1778 at Brest, this frigate was captured in 1780. Her draughts date from the same year.

The upper deck is pierced for thirteen guns, plus a chase-port, with two gun positions on the forecastle and five on the quarterdeck. The absence of a poop makes it a simple matter to open up two stern-chase ports in the stern. The *Nymphe* is thus powerfully armed with 40 guns (the original establishment called for 32 guns only), and there are moreover four stocks on either side for swivels.

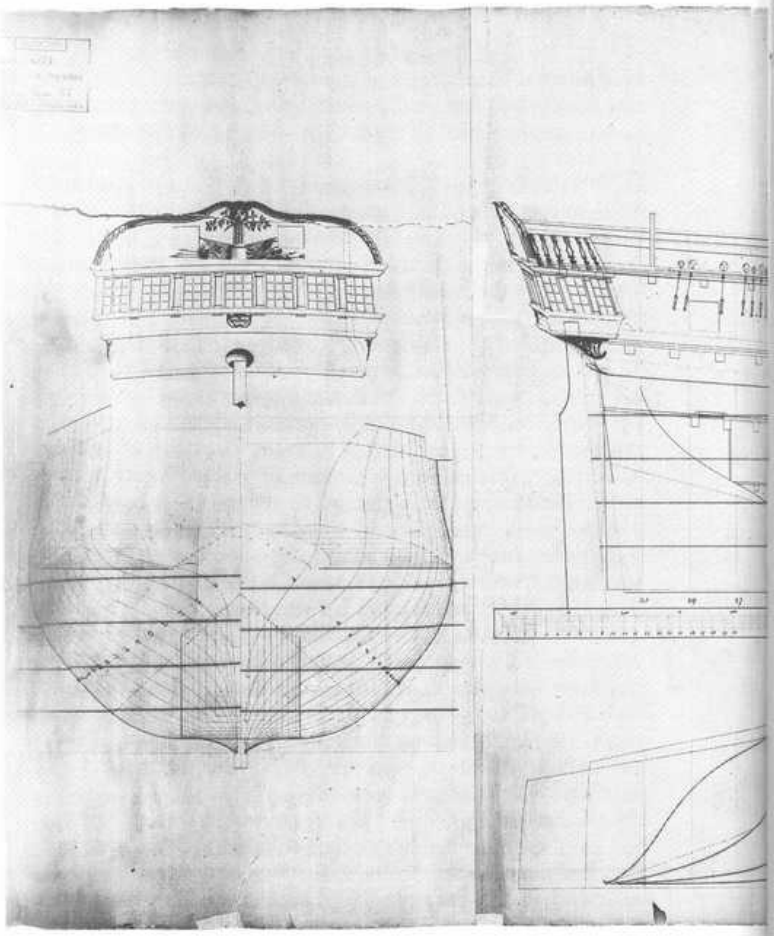
The underwater hull has a pronounced inflexion at the rabbet of the keel, which, like the false keel, was believed to afford better lateral support. Her tumblehome is much reduced.

You may be puzzled by the lines shown on the body plan. These are in accordance with English practice, and correspond firstly to the rising line of floor, at the rungheads of each frame, and secondly to the toptimber breadth line, whose ordinate is the half-breadth of each frame at the top of the highest toptimber. These lines allow a cross-reference to the sheer draught and half-breadth plan.

The steeve of the bowsprit is such that it must be stepped on the gundeck. The spindle of the fore jeer capstan is supported by the cross-piece of the riding bitts, while the cable hatch is placed abaft the galley. There are chestrees, the pumps are entirely made of wood, and there are no jeer-bitts. There are several gratings both afore and abaft the main capstan, and the after hatch and magazine hatch are in their usual places. The figure is a lion bearing a shield with the Arms of France, which is a sort of universal emblem*.

The quarter-galleries are cramped and their upper finishing rather ugly, the carved-work of the stern is minimal, and the range of stern-lights running round into the galleries, whether false or real, gives an impression of fragility.

*A ministerial text dating from January 1777 ordered that figures should be replaced by lions, which should bear a shield with the arms of one of the provinces of France only in the case of vessels christened after such a province.



LA TRIBUNE (R.-A. Haran). Built in 1794 at Rochefort, this frigate, which was originally called the *Charente-Inférieure*, was captured in 1796. Her draughts date from the same year.

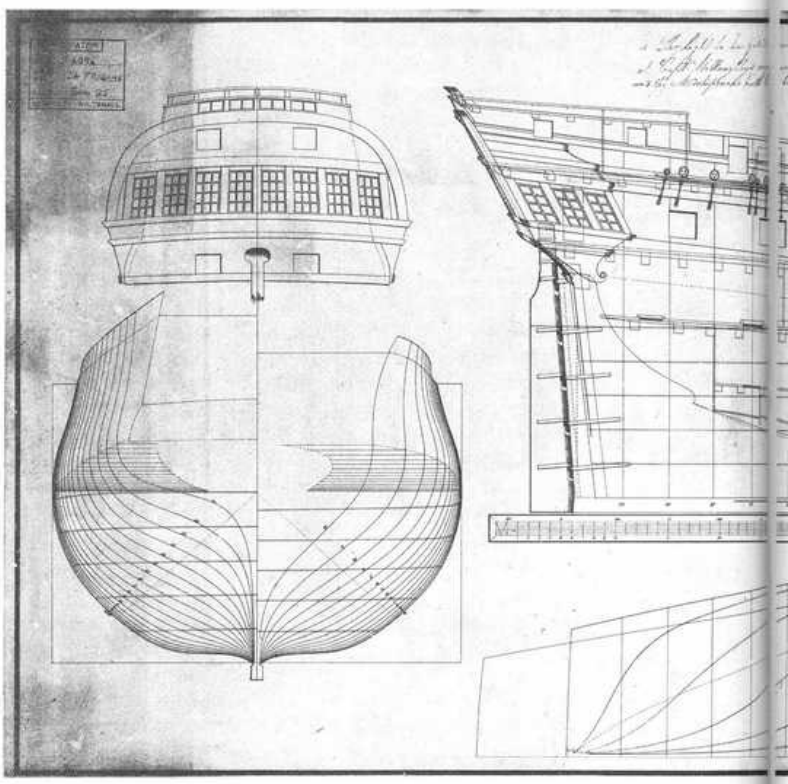
If we compare her lines with those of *La Nymphe*, we find that they are not dissimilar: considerable inflexion in her underwater lines, albeit less than for *La Nymphe*, and rather more tumblehome; the curve of the stem is somewhat different, and the rake is also less.

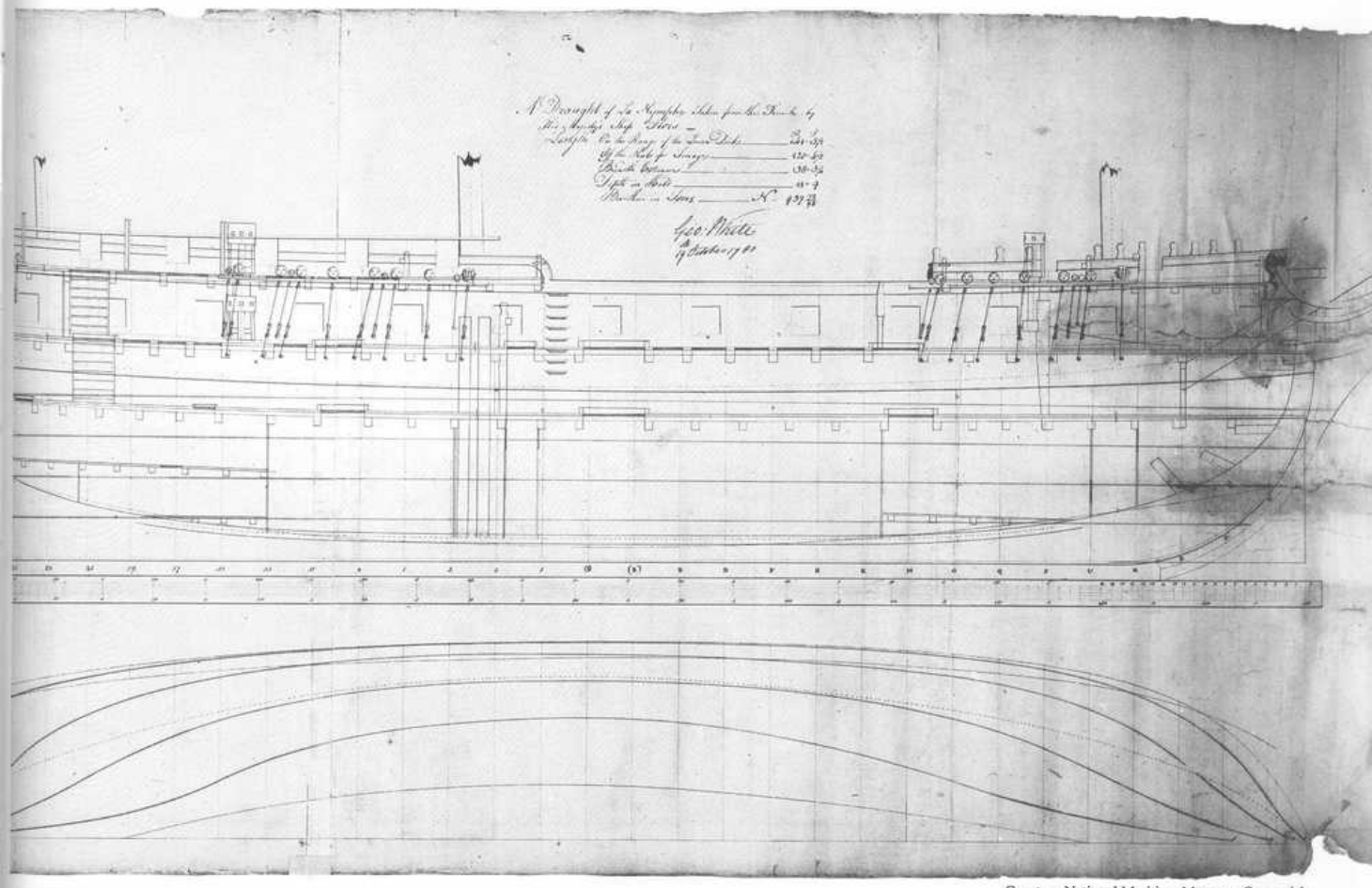
The upper deck has fourteen ports, but the foremost port serves only as a bowchase port. There are three gun positions on the forecastle, six on the quarterdeck, and it would appear that one of these was for a sea howitzer.

A poop rises above the quarterdeck, and there are two sternchase ports in the wardroom, with lights above them, and there are additional scuttles on either side which serve for light and ventilation only and should not be confused with gunports; the same applies to the sleeping cabin scuttles.

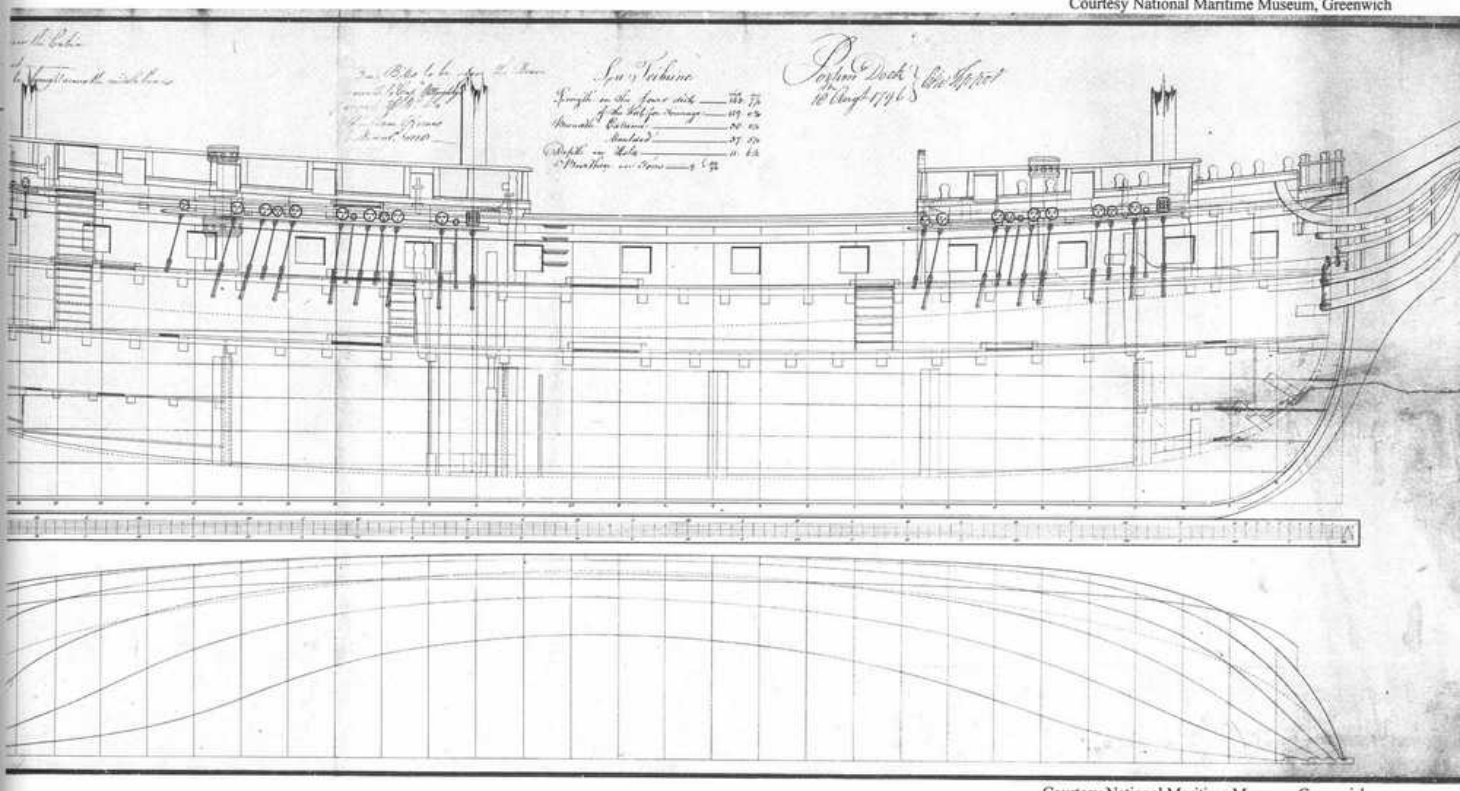
There is a curious omission, in that there is no cable-hatch shown on the upper deck. There are six breasthooks and deckhooks and five riders, running up as far as the gundeck. The main topsail-sheet bitts are on the quarterdeck, with the cross-piece abaft the pins. An English-style chain-pump is shown abaft the mainmast. Note the presence of jeer-bitts. The axes of the capstans are perpendicular to the keel rather than to the sheer of the decks.

A hatchway is shown on the upper deck forward of the after ladderway; this cannot be designed to provide light to the cockpit since there is no coresponding hatch above it. Perhaps it is for supplying powder to the guns, since there is another hatchway further forward on the gundeck.

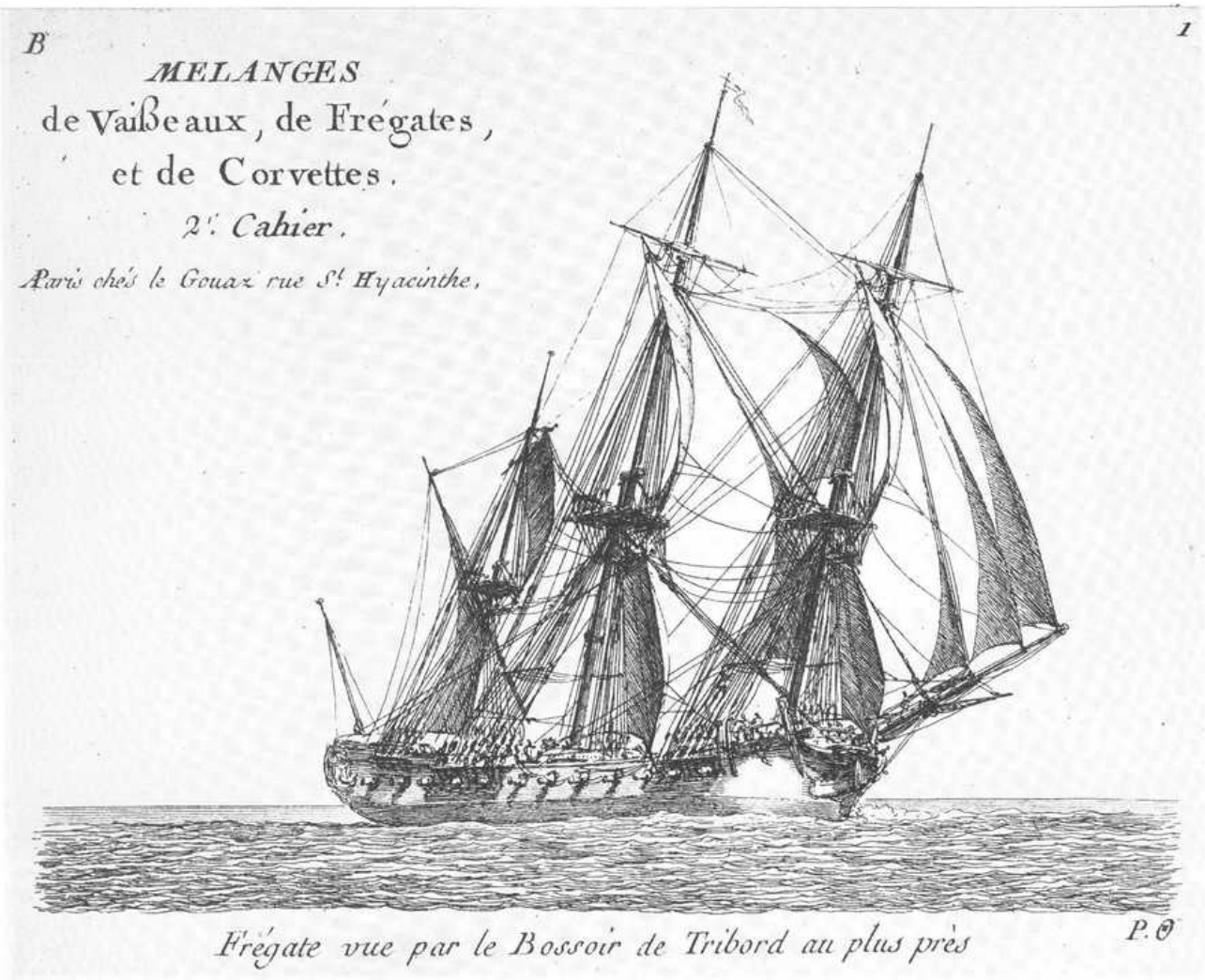




Courtesy National Maritime Museum, Greenwich



Courtesy National Maritime Museum, Greenwich

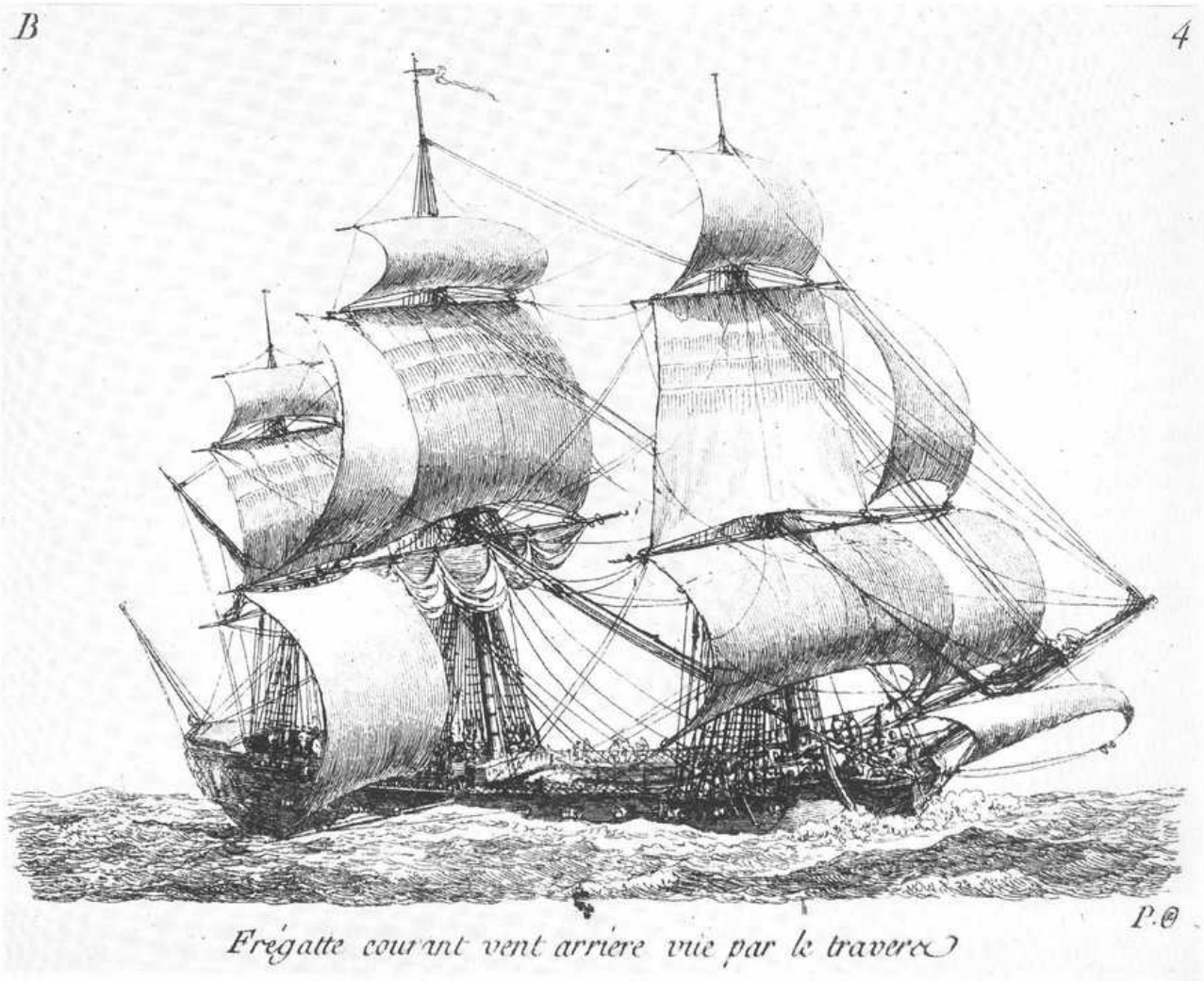


It would seem that the six engravings by Pierre Ozanne which appear on the following pages all depict the same frigate armed with twenty-six 12-pdrs. They date from the 1780s. The one above is entitled *A frigate seen from the starboard bow close-hauled.*

The pronounced heel and the fact that the topgallant-yards are brought down to the topmast caps suggest a fresh gale (wind speed 29 km/h), with the vessel running under courses and topsails. She is also carrying three jibs, a main-topmast staysail and middle staysail.

This very spectacular engraving, entitled *A frigate seen from abeam running before the wind*, shows the same 12-pdr class vessel. The angle of view shows the forecastle and quarterdeck. At the bow can be seen the beakhead bulkhead, with the figure and the gammoning before it. The anchors are in their place, with the stock of one of the bowers visible abaft the cathead in the fore channels, while the two stocks of the stream anchors can also be seen. There are nets set up along the gangways on the outboard side. Between the gangways are the boats, resting on their chocks on the upper deck. Looking carefully, it is possible to distinguish the cutter nested inside the barge, which in turn is inside the longboat. The spare spars are arranged on either side of the boats, a considerable encumbrance on the upper deck, both for sail-handling and above all, for the recoil of the guns: in short, the arrangement found on many vessels of stowing these spars on gallows-bitts has not been adopted here.

There is no bell over the quarterdeck breastwork, but chicken-coops may be seen backing onto it, and there is what looks like a scuttlebutt to starboard of the mainmast. The quarterdeck is covered by a short poop, affording space for two cabins for the Captain and the Second. The central part of the taffarel extends outboard slightly beyond the upper part of the quarter-galleries. Abaft the mizen-mast, the wheel can just be made out, and the helmsman, and the stern-lantern abaft the ensign staff.



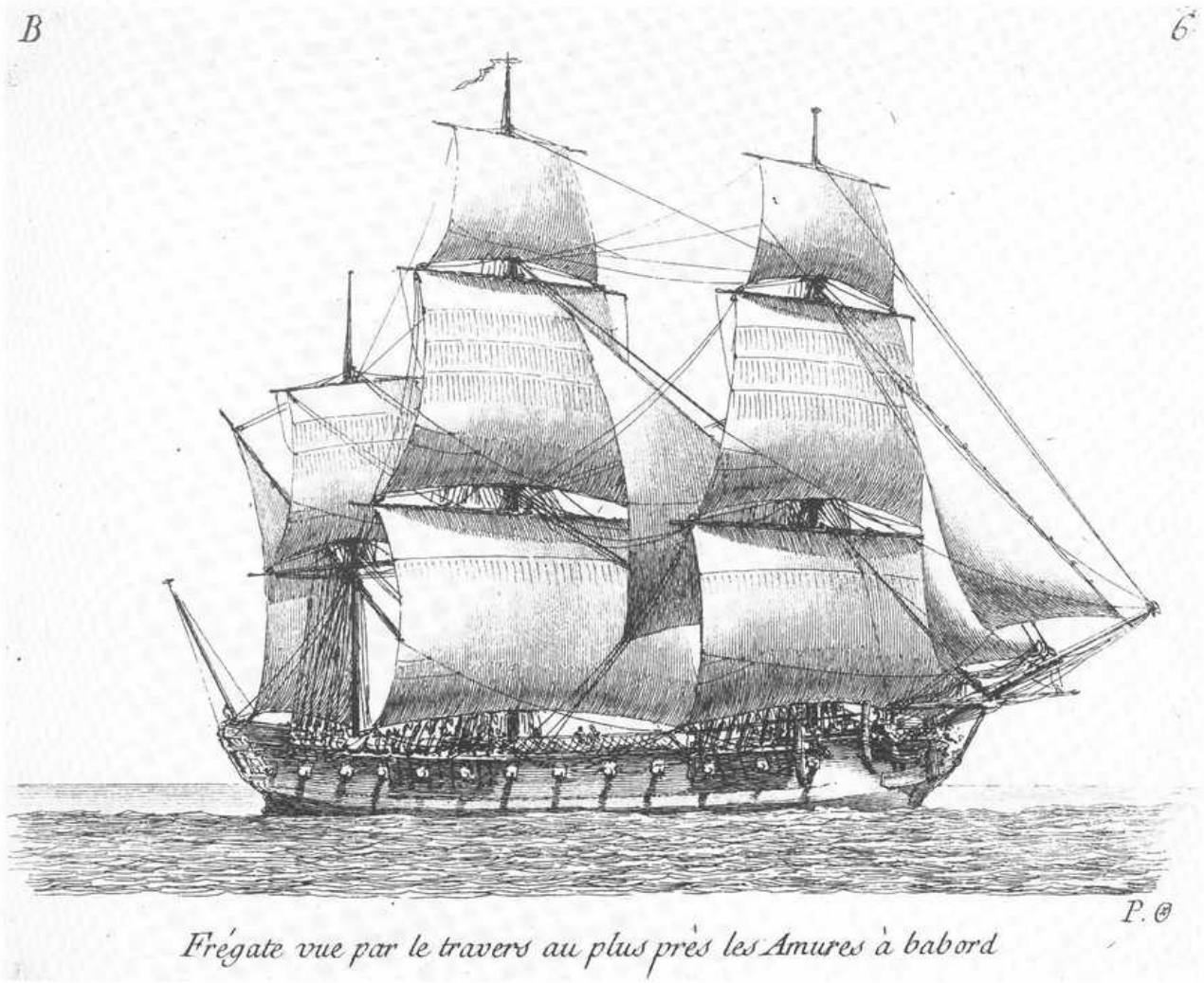
The sails spread are characteristic of this point of sailing, with the wind astern: the maincourse is brailed up in order not to mask the forecourse; the same is not true of the main-topsail which does indeed steal the wind from the fore-topsail; however, the latter provides valuable help in restraining yawing or lee-lurches, always a danger when running; for all that, the fore-topmast staysail is usually considered to be more effective in this regard. The main topgallant-yard is lowered half way, allowing the sail to belly and yet still give plenty of wind to the fore-topgallant. The spritsail course takes advantage of the wind passing under the foot of the forecourse, the sheets having been slacked off. The jibs have been taken in: the fore-topmast staysail furled in its netting, and the inner jib ahead of it, its canvas bundled up on the jibboom which has been run in for part of its length. Presumably, in the event of a sudden change in the wind causing the vessel to broach, this jib could be quickly hoisted to prevent her from being taken aback for long.

The studdingsails are set asymmetrically, on the port side for the fore-topmast and lower fore studdingsails and to starboard for the main-topmast and lower main. There is too much wind to hoist the topgallant studdingsails; assuming the vessel carried mizen studdingsails, these would not be set with the wind astern since they interfere with the sail bent on the mainmast.

The lower main studdingsail is extended by a swinging-boom which is clearly visible with its guys, and there is also a boom extending the lower fore studdingsail (see *74-G.S.*, vol. III), holding down the outboard clue. A boom extends the topsail-yard along the head of the lower studdingsail, which is shown here without a yard or even a half-yard. This same boom serves to extend the foot of the topmast studdingsail, which has a yard at its head; the halliard of this short yard reeves through a block lashed to the yardarm. The rigging of these studdingsails is meticulously represented, so that it is easy to make out how these fair weather sails are rigged.

Other details can be made out concerning the sails: the reef-bands, robands, reef-tackles. The mizen-topsail has two reef-bands, and a mizen-topgallant is also shown. The length of the poleheads of the topgallant-masts is such as to allow royals to be hoisted if necessary. The mizen-course has been furled round its yard, and the staysails have presumably been stowed in the tops, the catharpins or at the foot of the masts, but this detail cannot be seen.

These few comments are sufficient to demonstrate the documentary value of Pierre Ozanne's engravings, and it is only to be regretted that there are so few representations of frigates in the artist's work.

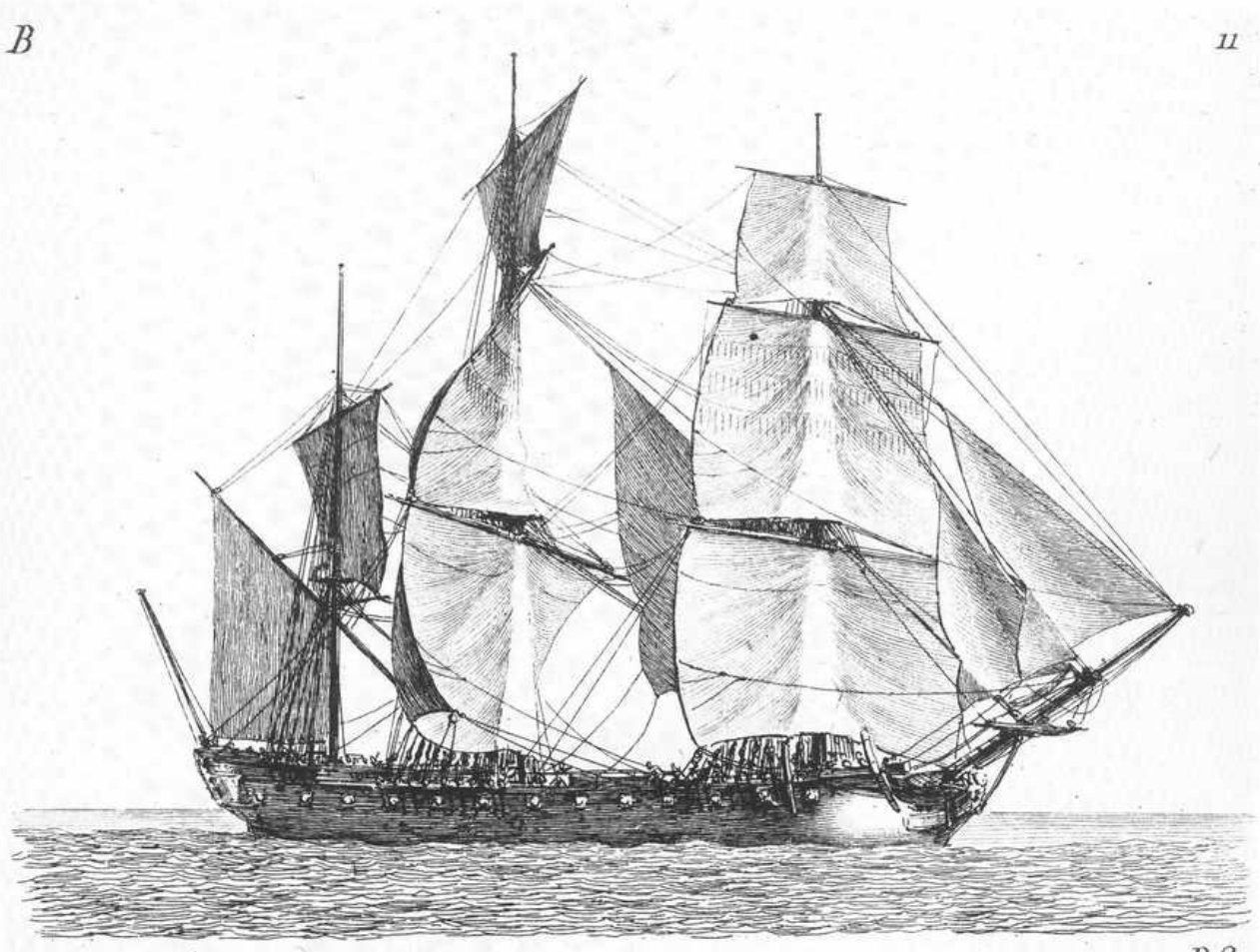


In this *View of a frigate seen from abeam close-hauled on the port tack*, the thirteen gunports on the upper deck can be clearly counted, but there is no way of knowing whether the forecastle and quarterdeck are armed or not. It is not really possible to describe the details of the upper works, and we must restrict our comments to the rigging.

To judge by the sail carried by the frigate, the wind must be a "light gale" (wind speed 14 km/h), or perhaps a little fresher. The number of sails spread is limited, but it is true that the vessel has no poleheads capable of carrying royals, nor a flying jibboom; note the full mizen-yard. There is no sprit-topsail, and the spritsail course is furled on its yard. The inner jib has its traveller near to the outboard end of the jibboom. Thus, the outer jib is not in place, and the fore-topmast staysail is bent to its stay. The square sails on the foremast are slacked off, so that presumably the vessel is sailing a point or two free. The single reef-band of the forecourse is fitted with reef-points, which is unusual in view of the fact that it is rare to reef the courses. The fore-topsail has three reef-bands as was customary at the time (two reef-bands in the 17th century, four in the 19th).

The robands are not shown, but perhaps they are stretched out along the yard. The square sails of the mainmast are arranged similarly. There is only one staysail, the main-topmast staysail, so that it would seem that her Captain did not want carry too much sail aloft. Thus the mizen-mast is devoid of a mizen-topgallant, despite a topmast polehead long enough to carry one. The frigate has no national ensign at the stern, and the presence of the pendant at the main truck confirms that the vessel is sailing under private orders.

This engraving follows on from the preceding one, and is entitled *Frigate seen from abeam putting about into the wind and filling astern*; it represents the vessel close-hauled on the port tack, coming up into the wind in a light gale. The sea is calm, the frigate is making at least six knots, and this speed can be increased by allowing her to pay off slightly so that the rudder will act more effectively as the helm is put up gently so as not to slow her down as she crosses the eye of the wind. As she luffs, the mizen-course is sheeted hard home, the square sails shiver, the sheets of the jibs and staysails are allowed to run out, and the sheets and tacks of the maincourse and forecourse are cast off. As the frigate pays off, crossing the eye of the wind, the after sails must be allowed to fill, which is precisely the manœuvre depicted by Ozanne: this requires a change of tack, with the after sails set out to starboard. The same manœuvre is also evidenced by the sails of the main-mast: note the difference in the bracing of the yards, the upper yards being easier to haul. The mizen-topsail is masked, the mizen-course sheeted hard home, while the sheets of the main-topmast staysail and the jibs have been cast loose. The square sails of the foremast are backed.



This engraving illustrates the second phase of the manœuvre, *filling ahead*. As soon as the frigate passes through the eye of the wind, the jibs and staysail are sheeted home while the after sails are braced hard up.

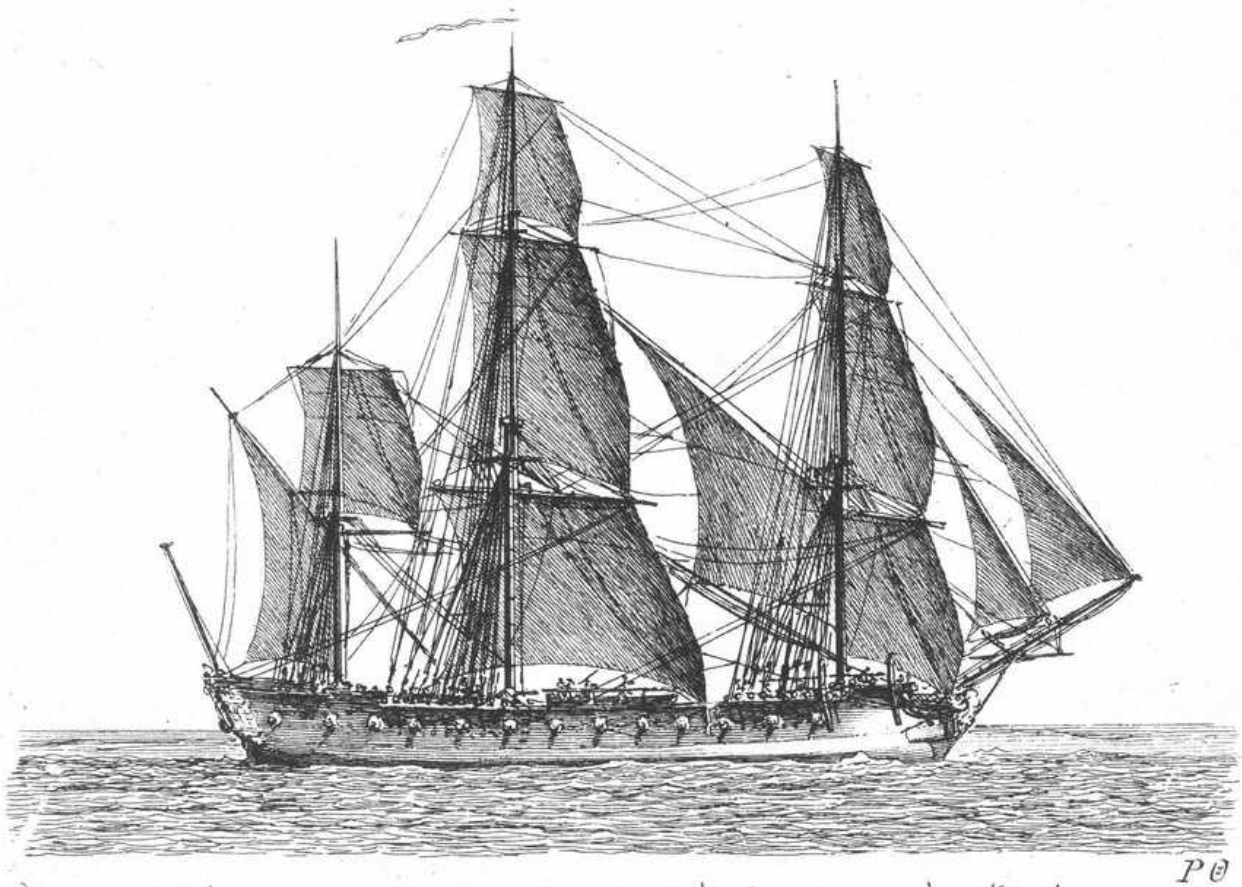
Once the frigate has paid off sufficiently, with the after sails correctly braced and pulling, the forward sails can be braced over and set out to starboard.

As can be seen in the engraving, the after sails are pulling well, the mainsheet has not yet been hauled, so that the frigate has fallen off by some three or four points. The fore yards are being braced, and the jibs are sheeted home.

If the change of tack has been executed quickly and with precision, the frigate ought to have made to windward, keeping way on her, without touching the tiller.

This manœuvre is much more delicate in anything of a seaway, since the frigate will make sternway in the second part of the manoeuvre, all the more so when the wind requires two reefs to be taken. In a strong gale and a very rough sea, it may be necessary to renounce altogether any attempt to put about with the wind ahead and to veer wind astern instead.

Once the vessel has put about, the alignment of the yards is corrected, the tacks and sheets are hauled, and the weather braces set taut, the lee braces slacked off. In order to find the wind better and pick up speed, the frigate may be allowed to fall off two or three points before coming back close-hauled. The length of the manœuvre in the conditions shown (calm sea, close-hauled at 5 to 6 knots, a light gale of about 14 km/h) is about five to six minutes.



Frégate vue par le travers au plus près les Amures à tribord.

This last engraving, showing *A frigate seen from abeam close-hauled on the starboard tack* might very well represent the vessel following the change of tack which we have just seen. Likewise, the first engraving in the series may represent her prior to carrying out this manœuvre while still on the port tack.

There is little to add on the subject of this engraving, which is slightly less attractive than the first, by reason of the sharp bracing of the yards, which lessens the visual impact of the sails. As can be seen from the tighter setting of the bowlines, the frigate is sailing closer to the wind, which is also blowing fresher.

ADDITIONAL NOTES ON 12-Pdr FRIGATES

Extracts from Pierre Morineau's *Treatise*. This manuscript[1] was written, it will be recalled, between 1752 and 1762, and is a mine of information concerning French naval architecture. In the extracts quoted below we find precious material relating to the early history of the 12-pdr class.

Frigate armed with 26 12-pdrs on a single gundeck

This frigate to have two decks, a quarterdeck extending by one beam forward of the mainmast, a forecastle measuring 31 feet in length from the outside of the stem; these may be joined in the waist by a gangway of gratings, such that the inboard carlings leave sufficient space for stowing the longboat and the spare topmasts which are on the upper deck, with the cables bitted between the forecastle and the upper deck. The hawseholes to be cut flush with the deck, their diameter above.

The galley fires to be set up amidships afore the bitts, yet not backing each other but rather placed one afore the foremast and the other abaft, such that the Captain's galley be to starboard and the crew's to port.

The fore side of the foremost gunport to be placed 15 feet abaft the outer face of the stem, 28 inches in breadth abaft that point, with a bowchase port placed 6 feet clear and afore it, its breadth measured afore that point. The after side of the aftermost port to be 4 1/2 feet afore the outer face of the post, its breadth 28 inches measured afore that point.

10 feet afore the latter gunport, another gunport to be cut, its breadth measured afore that point, so that the captain's cabin may be placed between the two ports, unless it is preferred to back the cabin against the stern, in which case the aftermost port will have its after side 8 1/2 feet afore the after face of the post, its breadth measured afore that point, all the other intermediate ports to be 6 feet clear one from the other, excluding their breadth, all these breadths and distances between ports added together giving the length from outside of stem to outside of post, ... 126 feet.

The breadth at the height of breadth and the midship bend to be 3 inches 1 1/2 lines for every foot of this breadth, making 32 feet 10 inches.

The height of the gundeck and of the upper deck, supposing the load waterline to be 12 feet 10 inches 7 lines above the upper face of the keel, to which must be added 6 feet for the height of gundeck sill at the midships gunport, giving 18 feet 10 inches 7 lines from which 20 inches must be deducted for the height of the lower sill above the deck. Leaving 17 feet 2 inches 7 lines for the height from the upper face of the keel to the upper face of the plank of the deck on the gundeck amidships. This height to be proportioned by 6 inches 4 lines for each foot of the breadth overall. From this last height must be deducted the height between decks, to be 5 feet 4 inches, beam and plank included, giving for the height from the upper face of the keel to the upper face of the plank of the gundeck 12 feet 10 inches 9 lines, this latter height to be proportioned by 4 inches 5 lines 5 points for each foot of the breadth overall.

The round-up of the gundeck at the post to be 2 3/4 lines for each foot of the length overall, that of the said deck at the stem to be a quarter of the round-up at the stern. The rake of the stem and the post to be in the proportions already explained[2]. The tumblehome at the midship bend to be one 11th part of the breadth at the main drift.

The horizontal line of the wing transom to be 22 to 24 inches below the upper deck transom, in order to leave room to cut two air-ports between the two transoms to admit light to the gunroom, and the sternpost to rise no higher than 10 inches below the lower face of the said deck transom so that the tiller may pass freely and rest on its sweep which is to be fastened beneath the beams of the upper deck (the horizontal line of the wing transom to be one quarter of the half-breadth above the load waterline).

The upper face of the lower lacing to be above the load waterline on the stem by one 40th part of the length overall, its breadth measured below that point. The second or upper lacing to be above the first by its own breadth so as to form a space or frieze between these two lacings equal to the breadth of each one of them, which is the same as the breadth of the lower wale, the wales being but single-straked in such frigates, with double wales only below the lower sills of the upper deck ports, these wales to be allowed a hanging in their sheer as has already been explained[3].

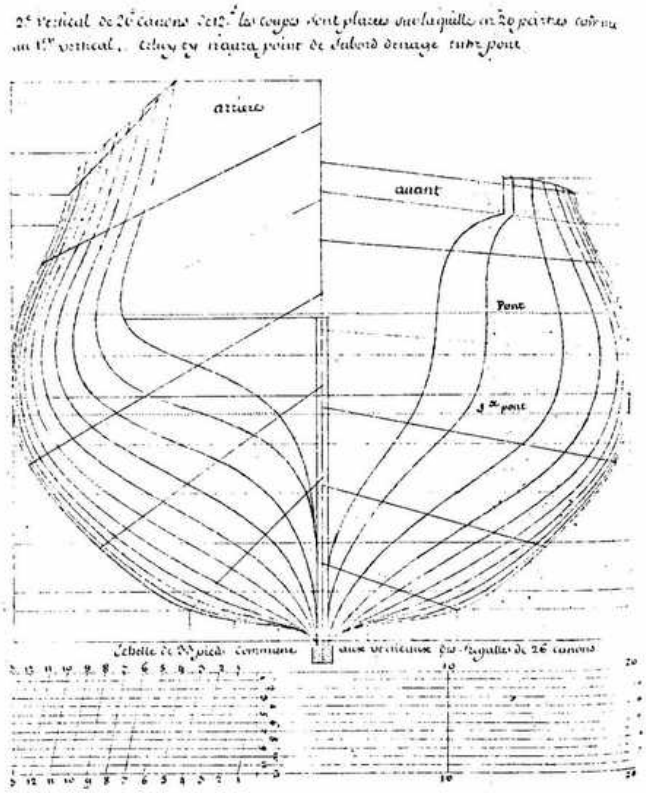
The height on the gundeck amidships to be 4 feet 1/2 clear of beam and plank, height ditto at the break of the quarterdeck 5 feet 1 inch, height ditto at the forecastle 4 feet 10 inches, the gunwale to be 4 feet 8 inches amidships above the plank of the upper deck, the lower sills of the gunports 20 inches above this deck.

The keel to be 13 1/2 inches in height, by 11 inches 1/2 wide. The stem to be 16 to 17 inches broad, the post 18 to 19 inches at its heel and 13 1/2 inches at its head. The beams of the gundeck not having to bear the weight of any guns, to be but 8 1/2 inches thick and 10 broad, those of the upper deck to measure 10 inches thick by 11 to 12 broad, the longest of these beams to round up 7 1/2 inches, the beams of the forecastle and quarterdeck to be 5 1/2 inches thick by 7 to 8 broad, the plank of the bottom to be 3 inches up to 6 or 7 strakes of the lower wale, after which to increase in thickness. The timbers to be sided 8 inches, with 9 to 10 inches space between the fillings, the wing transom to be 13 inches thick and 11 1/2 inches fore-and-aft, and to round aft by one third of its length in feet reduced to inches, the round-up to be as for the beams in proportion to its length.

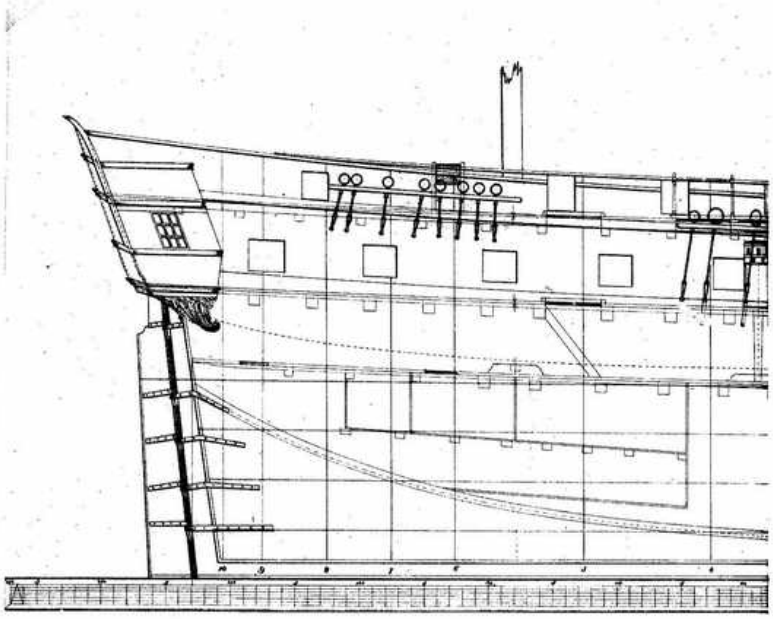
1. *Archives Nationales*, Fonds Marine, G.246.
2. Pierre Morineau fixed the rake of the stem at 1/14th of the length overall, and the arc of a circle for the underwater part of the stem equivalent to 1/6th of the length overall. The rake of the post was to be 1/5th of the rake of the stem.
3. The wales are drawn out keeping a distance of 3 inches clear of the lower sill of the foremost port, 9 inches below the sill of the midships port, and at the aftermost port the sill cuts into the wale by one third of the height of the wale.

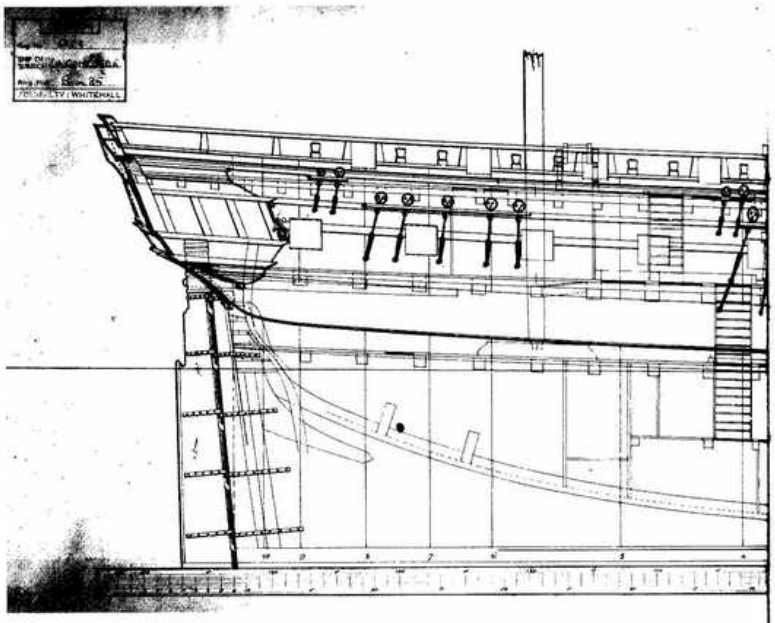
Reading these details in Morineau's manuscript calls for some attention, but it contains a great deal of useful information. Thus, the position of the galley fires, that of the bowchase port, the two alternative placings for the Captain's cabin, the calculation of the frigate's length, breadth and depth in hold measured from the gundeck and upper deck. The sheer of the decks, the position of the wing transom, and (an important detail), the space to allow for the tiller. The hanging of the wales is defined. Finally, Morineau gives the scantlings of the principal timbers, with the very large space of 9 to 10 inches between the frames.

Pierre Morineau gives two examples of 12-pdr frigates, with and without sweep-ports on the gundeck. Of these, I have retained only the second formula. The body plan is shown below, with the keel divided into 20 equal parts. To these 19 stations must be added the sections corresponding to the beakhead frame and the fashion piece, presumed to be parallel to the others (see page 30). Morineau indicates a draught forward of 13 feet 3 inches, and a draught aft of 15 feet. The displacement of the frigate fitted out for sea is 975 tons, that of the fore body being greater than that of the afterbody by 20 tons.
The weight of the guns is 71 tons 103, or 5,857 pounds per gun (including guncrew's implements, powder and shot).



LA CONCORDE





(Comparing French and British practice). This frigate was built in 1777 at Rochefort to the draughts of Chevillard Senior, and was captured in February 1783 by H.M.S. *Magnifique*. Taken into the Royal Navy, her lines were taken off in November 1783 (upper draught), or not long after her capture. Her lines were taken off again in September 1791 (lower draught), so that a comparison of the two draughts allows some interesting conclusions to be drawn concerning several practices peculiar to the Royal Navy.

Firstly, it is clear that by the time the *Concorde* was captured, her quarterdeck armament had been reinforced: originally armed with only six 6-pdrs, this had been increased to 16 of the same calibre. In addition to the fourteen gunports on the upper deck, there is a fifteenth bowchase port[1].

Having made these initial points, let us now examine the two draughts in detail, moving from right to left. The steeve of the bowsprit is 22 degrees in the lower, "Royal Navy" version, while it is 28 degrees in her "*Marine Royale*" guise. This relatively modest steeve is characteristic of British ships, and enabled the vessels of the two nations to be readily distinguished even at a distance. The modest steeve may make it harder to use the spritsail course, but the pull of the forestay and fore preventer-stay is better resisted at this angle, and the jibs can be set with advantage. The reduction in steeve in turn imposes some modification to the head, which is less curved. The lower rail finishes under the cathead, forming the supporter, which is typical of the Royal Navy. Note also the very sharp angle of the cathead. The lower part of the stem at the gripe is markedly convex, this being thought to reduce leeway when sailing close-hauled; however, the *Marine Royale* remained in ignorance of these supposed advantages, and the characteristic protuberance is only to be found on English ships. Note in passing that the bollard timbers or knightheads are shaped differently in the two navies.

In accordance with Royal Navy practice, the fore jeer capstan on the forecastle has been done away with, and it looks as though the forecastle armament has also been removed. Beneath the forecastle can be seen the double riding bitts[2], once again peculiar to the Royal Navy; the pins of the first pair of bitts run right down into the hold. This arrangement had been abandoned by the *Marine Royale* by the middle of the 18th century, with the pins carried down only as far as the gundeck. The foremast-step, like that of the mainmast, is much simpler than in French vessels.

The distribution of the beams has been changed, with the cable hatch moved further aft, followed by the forward ladderway for the crew, and a further ladderway just forward of the main-hatch. This latter arrangement means that the boats and the spare spars have to be stowed at the level of the gangways on skids; the same arrangement is shown on the earlier draught, but this does not accord with French practice, so that it may be presumed that some changes had already been made in the few months following her capture. The *Concorde*'s four pumps, which are not "royal pumps" with working barrels of bronze but plain elm-tree pumps, have been replaced by chain-pumps, the only type employed by the Royal Navy. The after ladderway for the crew has been done away with. The main capstan has two barrels of a shape typical of the Royal Navy, and the spindle runs down into the hold, whereas the original capstan of the *Concorde* was single-barrelled, but with two sets of bar-holes, and its spindle was stepped on the gundeck beams.

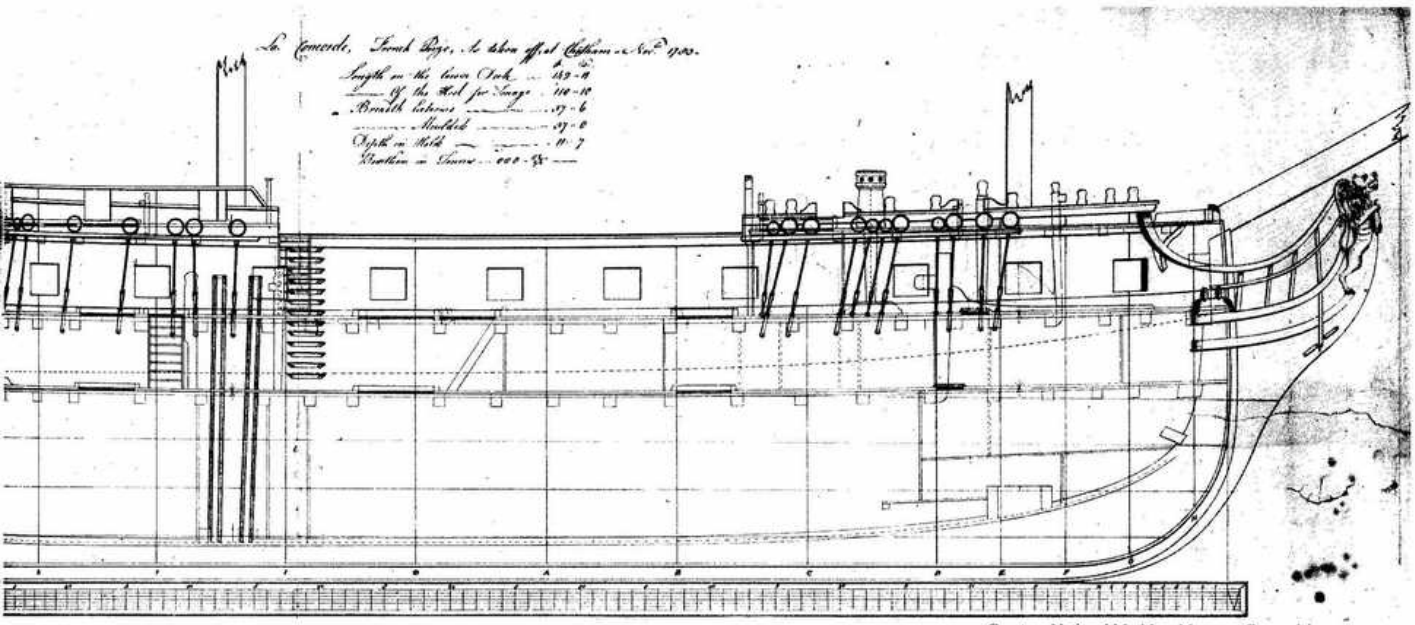
In French vessels the steering wheel was placed abaft the mizen-mast, whereas at this period in the Royal Navy it was forward of the mast; this means that the after ladderway must be moved further forward.

The upper works have been slightly modified, raised higher over the forecastle and changed over the quarterdeck; æsthetically this is a success, making the vessel appear more graceful, especially with the removal of the very ugly quarter-galleries, replaced by new and much better-proportioned ones.

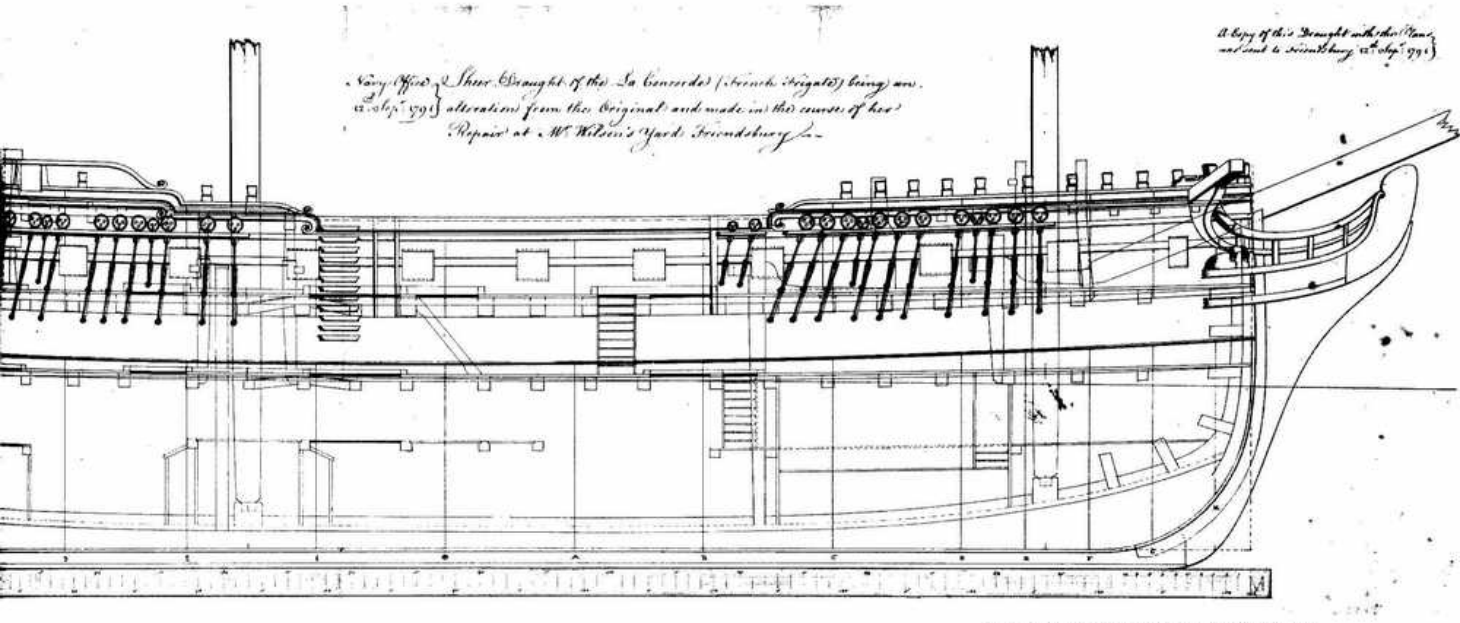
Having noted that the beams are arranged differently, it is worth commenting also that some are reinforced by spurs, especially those forward of the mainmast and the mizen.

English practice was to make the blade of the rudder wider, and the mainpiece is reinforced accordingly.

That completes this quick comparison of the two draughts. No



Courtesy National Maritime Museum, Greenwich



Courtesy National Maritime Museum, Greenwich

Modified draught

doubt much more could be said, but the main points have been covered, and I did not wish to place too great an emphasis on such comparisons, it being beyond the scope of this book to comment in detail on the differences in internal arrangements between the two navies.

1. In the 17th century the presence of a bowchase port was by no means uncommon in ships of the line. In his *Treatise* written in the 1740s, Blaise Ollivier specifies that the practice had been abandoned since the beginning of the century, since it had been believed that this weakened the structure at the bow. However, in the second half of the century there is no shortage of examples of vessels featuring bowchase ports. See also the transcription of another Ollivier text on the same subject on page 162. A Ministerial letter dating from April 1787 recommended its adoption on the lower deck of ships of the line and in frigates (SHM.320).
2. The English justified the presence of a second pair of bitts for the following reason: where there are only single bitts, as in French ships, if a cable should sheer and a second anchor is dropped on the same side as the sheered cable, the former must first be unbitted before the replacement can be got over the bitts. In certain French First and Second Rates in the 17th century there were also two pairs of bitts.

HULL PROTECTION

This text was first published in the monograph of La Belle-Poule, *and is included here for the sake of completeness, since she was one of the first vessels in the French Navy to be coppered. It does not appear in the French original of this volume. [Trans.]*

Wooden sheathing

The problem of protecting ships' hulls from attack by marine borers and the proliferation of encrustation by weed and barnacles is not a new one.

Shipworm (*teredo navalis*) flourishes in waters with high salinity and temperature, and is a mollusc of the bivalve family. It can grow to about thirty centimetres in length, and to the diameter of the human finger. Its head consists of two scales forming a veritable drill-head (from which the Latin name originates), and it fastens itself to the planking of the hull, into which it bores its way; as it grows it tunnels long galleries, causing extensive damage.

Less dangerous, but nevertheless a serious inconvenience, is the growth of **weed**, particularly in the area about the waterline, and **barnacles**, which have a long tail up to twenty centimetres long. Obviously, such growth has serious consequences on the rate of sailing of a vessel.

Keeping the hulls clean requires that ships be hove down from time to time[1] (see *74-G.S.*, vol. III, pp. 232 *et seq.*) in order to pay them with a fresh coat of *stuff*, which is a protective coating composed of tallow, sulphur and pitch. The old coat is burned off, and the marine borers are destroyed[2], together with the weed. This careening operation is sometimes restricted to *boot-topping*, by means of a so-called *parliament heel*, whereby the vessel is only partly heeled, rather than hove down "keel-out" (with the keel flush with the water).

Between careenings, the hull must be cleaned by scraping it in order to remove the weed; this is done with the aid of a sort of stiff brush called a *hog*, which has however the disadvantage of sometimes tearing out the oakum from the seams.

These few introductory remarks explain the serious problem posed by the maintenance of the underwater hull.

As early as Classical times (as can be seen from several wrecks which have been excavated), hulls were protected with a sheathing of thin boards, generally of a light timber such as fir or pine, or better still (but much more expensively), with lead. Another alternative was to pay the hull with a hard coating consisting primarily of lime[3].

Over the centuries, none of these processes was forgotten, although they were not always employed. Long voyages in tropical seas made some form of hull protection obligatory, using first of all a sheathing of boards half to three-quarters of an inch thick, coated on the inside with a layer of tar and hair (dog or cow hair) and crushed glass, which was believed to arrest the progress of the worm once it had penetrated the outer sheathing.

Filling

For long voyages, sheathing with boards proved inadequate, and in France the East India Company adopted the process known as **filling** or sheathing its ships with nails. As a rule, this was carried out after a ship had made its first return voyage. A layer of stuff, composed of 50% pitch-oil and 50% tar, was applied to the carefully caulked underwater hull. Over the top of this sticky mixture, a layer of thick brown paper or canvas was then applied, and tarred. Over the top of this initial coating the pine sheathing was then fastened, by means of a large number of short nails (in order to spare the hull planking as much as possible).

It was to this outer sheathing that the filling was carried out, using nails with a large flat head of a diameter of 6 to 8 lines, the nails being slightly shorter than the thickness of the wooden sheathing, up to a maximum of one inch in length. These nails were hammered in so closely that their heads touched, and no less than 2,700 were needed for every square metre! Thus a 900-ton East Indiaman required nearly two million filling nails. It is obvious that such a procedure was both lengthy and expensive to carry out, but it was effective against the worm, in that the oxydation of the nail-heads spread a coating of rust over the interstices until an unbroken layer was achieved. On the other hand, the roughness of the surface provided an ideal purchase for weed and barnacles. The hog could be used energetically, but it was still necessary to take care not to tear out the nails.

It is worth noting in passing that this process was used as late as 1784, for the hulls of the vessels used by the Lapérouse expedition. The reason put forward was that filling-nails were easier to maintain than copper sheathing, but I am inclined to believe that it was more because of the problems occasioned by electrolysis, since the *Astrolabe* was built in 1782 and the *Boussole* in 1783, but both storeships used iron fastenings throughout; this despite the Royal patronage of the expedition, and the fact that the English Admiralty had adopted bronze fastenings in 1783.

Lead sheathing

In France, the only form of sheathing employed was that of wooden boards, with or without the addition of filling-nails. By contrast, lead sheathing was already in use in England in the 17th century: although less common than wooden sheathing, twenty vessels were sheathed with sheet-lead fastened with copper nails between 1670 and 1691. In theory, this form of hull protection was very effective, but in practice it was discovered that lead wore quickly when subjected to the friction of the water and the sheets tended to fall off. Lead sheathing continued to be used in the 18th century in England, and as late as 1770 two vessels were thus sheathed. Nevertheless, wooden sheathing remained by far the most common practice.

Copper sheathing

The best solution for the protection of the underwater hulls of ships against both worm and weed proved to be to sheathe them with thin sheets of copper.

The English, more alert to the problem than the French, and with a more advanced industrial base, were the first to employ this process, on the 32-gun frigate *Alarm* (Admiralty Order of October 1761). The frigate, bound for an extended commission in the West Indies, was carefully examined on her return. It was discovered that while the copper sheathing had admirably protected her hull, the iron bolts of the underwater hull and above all her rudder-irons had suffered badly.

In 1769, another vessel, the *Aurora* was sheathed in the same manner, but in the light of the experience with the *Alarm*, measures were taken to protect the iron bolts from rusting, their heads being covered with "stuff", with a piece of canvas, and finally with a thin square of lead[4]. The rudder-irons were covered with thin sheets of lead.

Another vessel, the *Stag*, was treated in the same manner in the same year, and her hull was carefully examined in 1773; it was discovered that her sheathing was still whole, although some of the sheets had worn very thin and others were beginning to come away. But the iron fastenings, despite all the precautions taken for their protection, had been seriously eaten away, right through to the frames.

These English experiments did not pass unnoticed in France. As early as 1764 reports were made, and they were followed especially by Sieur Boux, a former merchant officer[5] and at the time a Lieutenant in the King's service; he proposed that vessels destined for service in the West Indies should be copper-sheathed. The first trial was to take place on the sloop *Cunégonde*, bound for Martinique, but in the end this was abandoned. It was not until 1767 that the first French ship was copper-sheathed: this was the *Gorée*, a schooner intended for service in Senegal, and the copper sheets were fastened with iron nails! In the same year, Boux, by now a Captain (*capitaine de brûlot*) and with very good contacts with the Minister Choiseul-Praslin, obtained permission to build a sloop of an original design. This sloop was the *Expérience*, and she was copper-sheathed.

We will meet Boux again, since he was involved in the early development of the 24-pdr frigate, but suffice to say for the moment that he eventually fell from favour in 1774. He was however the first person in France to fully understand the significance of the trials taking place in England. The *Expérience*, which had been coppered at Le Havre, was first of all attached to Rochefort, and then later to Brest, where she was laid up in Ordinary for several years before being sold to a private buyer, apparently without any attempt having been made to examine her hull in the meantime.

Another trial was undertaken in 1771 on the *Belle-Poule* (the subject of the following chapter), which had been ordered to carry the Chevalier de Ternay, new Governor of Île de France, to his post. Since the commission was scheduled to last several years in the Indian Ocean, the experiment would provide ample evidence of the merits or otherwise of copper sheathing, in waters where the shipworm was particularly active. The *Belle-Poule* was coppered by caulkers at Brest, in the last quarter of 1771[6], but if we are to believe Forfait, her copper sheathing was removed as soon as she reached her destination, without however any other changes being made to her underwater hull. Thus, neither of the two trials undertaken, on the *Expérience* and the *Belle-Poule*, were to provide any useful information in the end[7].

It was not until the outbreak of the American War that copper sheathing was seriously considered for the French Navy. In July 1773 the frigate *Iphigénie* captured a carvel-built English cutter which was found to be copper-sheathed, the very thin sheets being nailed straight onto the planking of the hull which had simply been given a coat of white paint[8]. It was the arrival of the prize at Brest which was the origin of the decision to copper the frigate which had taken her; following deliberations by the Dockyard officers, the work was carried out that July.

1. Hulls must be hove down fully at least every three years, with periodic *parliament heels* in between.
2. Any defective planks were replaced at the same time.
3. Bourdé de Vilehuët (*Manuel des Marins*, 1773), gives the "recipe" for a sort of stuff called *gul-gul*, made from fresh lime from crushed shells, dried and then mixed with palm-oil, mustard or nut-oil and a small amount of pitch. This mixture was commonly used in India, dried rock-hard, and was an extremely effective protection against worm. It was laid under a layer of wooden sheathing, caulked with cotton and with the seams paid with *sarangousti*, a special putty-like substance made from the same ingredients as gul-gul.
4. Sheet-lead was also used in France to protect certain parts of the hull, especially the stem, and any seams prone to "spitting their oakum" (notably abreast the masts and in the way of the pumps).
5. "*Officier bleu*": see *74-G.S.*, vol. IV, p. 13.
6. It would appear that this copper sheathing was combined with filling-nails, but no details are given.
7. This is a subject which in principle ought to have been a major preoccupation for the *Académie de Marine*, rather than the realms of higher mathematics, more properly the province of the *Académie des Sciences*: in 1772, the Comte d'Estaing, Commandant at Brest, noted the extreme oxydation of the the rudder-irons of the *Expérience*. In the report which d'Estaing requested from the *Académie de Marine* (which had its headquarters in Brest itself), the Comte le Bègue, President of the Academy, concluded that the reason for the oxydation was the poor quality of the iron, apparently completely ignorant of the phenomenon of electrolysis, and of the experiments carried out in England.
8. Presumably this simplified sheathing was designed simply to improve the cutter's speed of sailing.

* * *

The following details concerning the copper sheathing of the *Iphigénie* were written by Forfait, and appear in the *Encyclopédie Méthodique: Marine*, vol. II (1786).

After carefully checking the caulking of the underwater hull, all the seams were caulked with glaziers' putty, which is made of common oil and whiting; next, a coarse and loosely-woven material called sack-cloth was stretched over the hull, and stuck with an amalgam of bastard-pitch and tallow; the sack-cloth was then covered with a thick layer of dry pitch. The copper sheathing was laid over the top of this cloth; each copper sheet overlapped its neighbour by 1 1/2 inches, over the sheet behind and the one below. The nails used all round the edges of the sheet were fastened at 1 1/2 inch centres; for the middle part, the two diagonals were drawn on each sheet, with other lines parallel to them and three inches apart; the points where these lines intersected thus formed a chequerboard pattern, and marked where the nails were to be placed; the copper was then pierced with a sharpened punch, the point of which was the same diameter as the shank of the nails and a little shorter; above the point, the punch had a collar or reinforce, to prevent a clumsy workman from driving it too far into the wood; finally, the nails were made in the Dockyard smitheries from copper of the first quality, known as Swedish rosettes.

In addition to the information provided here, we also have a report written by Forfait in 1780, from which we learn that the copper sheets came from Villedieu in Normandy, and measured 5 feet by 1 foot 8 inches; they were 1/3 of a line (0.75 mm) thick.

The frigates *Gentille* and *Amazone* were sheathed in November 1778 like the *Iphigénie*, save that a strand of spun-yarn 4 lines in diameter was used to caulk the seams of the first-named.

Experience in use was to show that the copper degenerated, and that the method of fastening the sheets was defective, or rather that the preparatory work was inappropriate: the sack-cloth was too stiff, and the strands from which it was woven were unequal in thickness and with frequent knots; these caused bumps and hollows to form, as did the spun-yarn caulking. Wherever there were projections, the copper wore more rapidly from the increased friction of the water. The sack-cloth and the heavy caulking was thus abandoned in favour of Olonne or Locronan sailcloth (see *74-G.S.*, vol. III), which was laid over a hull which had first been smoothed with files and planes, with a coat of pitch underneath and tar on top; a simple coat of white paint was also tried. Nevertheless, the rate of wear of the copper sheets remained considerable, revealing the areas of the hull which experienced the greatest "shock of the fluid": the bows, the entry, and the rungheads amidships showed marked signs of wear, but the worst affected area was that about the waterline, where the sheets wore out within a few months; the best preserved areas were a couple

of feet above and below the rungheads, and the run aft. The thickness of the sheets could not be increased without a significant price penalty, and above all they then became difficult to work[9], since it was essential that they were closely moulded to the form of the hull: the slightest gap between the bottom-planking and the copper caused the copper to tear or the sheets to be ripped off, the danger being increased by the vessel's motions.
A large number of experiments were carried out using various types of protective varnish, but to no effect. The quality of the copper[10] was called into question, as was the method of manufacture, which consisted of hammering with fifty-pound hammers. This was thought to cause the metal to curl, and to rupture its grain. Cold-rolling was infinitely to be preferred, but the first copper rolling-mills in France were not installed until 1780, with a subsidy from the King, at Romilly on the banks of the river Andèle and near its mouth, four leagues from Rouen[11].
Still quoting from Forfait, copper sheathing was applied from the keel upwards. The shape of the hull meant that the first few strakes of sheathing boards, starting from the keel, tended to fall away at their ends: starting 15 or 20 feet from the stern, three or four rows of sheets were cut to a point, thus allowing the subsequent rows to rise correctly; at the bow however, the full width of the sheets had to be left[12].
Approaching the waterline, a line was marked on the hull and the copper sheets brought up to it. Up to that point, all the sheets ran from bow to stern at their full breadth, so that they were tapered where they finished on the line. A wooden lath was then nailed over the edge, using cast copper nails 3 or 4 inches in length. The sheets of copper employed had to be completely clean, without the slightest trace of tar or tallow, which immediately allowed the underwater growths to fasten themselves to the copper.
To conclude the first part of this examination, we have included below, *in extenso*, an anonymous memorandum probably written between 1781 and 1783. The method of fastening the sheets is described in detail, and differs somewhat from that recommended by Forfait above. It was this latter method which was finally adopted.
Admiral Thévenard, in volume III of his *Mémoires Relatifs à la Marine*, gives the hull cost in 1778 of various types of vessel in the French Navy (see pp. 284-5 below, where these are reproduced in detail). An 18-pdr frigate, with copper and bronze fastenings and sheathed with copper cost 201,304 *livres*, the copper sheathing amounting to 18% of the total and the value of the hull representing roughly half the cost of the vessel fitted-out and armed for sea.
According to Forfait, the weight of the sheathing amounted to about one percent of the total burthen, the nails representing one sixth (Costé, in his *Manuel du Gréement* published in 1826, gives one ninth rather than one sixth).
From a tactical point of view copper sheathing offered considerable advantages, and in this context I will once again quote Forfait, whose judgement, as a shipwright of considerable merit, is extremely interesting[13].

The principal effect of copper sheathing, and that which is deserving of the greatest attention, especially in a Navy, is that of increasing in a very great measure the speed of sailing. It was noteworthy how, during the recent war, vessels which had never distinguished themselves particularly in this regard, acquired new qualities once they were coppered: thus the Ville de Paris, *the* Invincible, *and the* Glorieux *sailed slowly, made much leeway and were slow in all their manœuvres, throughout the time that they sailed with bare planks; yet no sooner had they been coppered, than they became quick sailers and very sensitive to their helm; but what is most noteworthy, is that this advantage is given to ships almost in inverse proportion to their original qualities; such that a ship which naturally sails badly, gains more through being coppered, that does a vessel which without this sheathing already sails with advantage. Coppering thereby narrows the gap in the performance of ships, allowing them to follow each other more closely when sailing in company, and to make their evolutions in near the same time; and this is of incalculable benefit.*

9. The *Bretagne* was coppered with sheets only 6 to 7 points thick (1.1-1.3 mm), as was the *Gloire* frigate.
10. In place of almost pure red copper, it was recommended that brass be substituted.
11. See the entry "laminoirs" by Forfait in the *Encyclopédie Méthodique: Marine*. Before rolling mills were set up in France, sheet copper was also imported from Hamburg; the sheets were 5 feet long and 1 foot 6 inches wide (2 inches narrower than the original sheets from Villedieu); the weight was correspondingly lighter, at 14 pounds.
12. For details on how coppering was carried out on a clinker-built hull, see J. Boudriot: Cutter *Le Cerf* (1779-80).
13. *Encyclopédie Méthodique: Marine*, vol. II, p. 35. The *Encyclopédie* has been reprinted in facsimile by Éditions Oméga, Nice, and is also available from Jean Boudriot Publications.

DETAILED MEMORANDUM ON THE METHODS TO BE ADOPTED WHEN COPPERING SHIPS

The vessel must be breamed, caulked with the greatest care, and then the planks, nails, bolts and treenails must be inspected, to ensure that there is nothing which might cause a leak later, then the seams and butts must be payed in the usual way, to preserve the nails and the bolts from the corrosive effect caused by the dissolution of the copper, their heads should be covered with glaziers' putty. After having taken all these precautions the planking of the hull is payed with hot bastard pitch, over which canvas is immediately applied, of the type called tarpaulin, this canvas must not be too heavy but must nevertheless be relatively tightly woven; next, two or three coats of Baltic pitch are applied, heating it in order to make it easier to spread and better able to penetrate the canvas and thus preserve it better from the humidity. Hitherto we have used canvas on almost all the frigates which have been coppered at Brest Dockyard; however, having had a sheet of copper sent to me from an English vessel the ROWERT[1], *I found that the hull had been covered with heavy paper which had been tarred, such that both the paper and the copper had been well preserved. I employed this method on the frigate* ATALANTE[2], *but not having paper of sufficient thickness, I had them use two layers of that which we call cartridge paper, taking care to place the second layer fairly across the first, so as to cover the joins between the sheets.*
The English have also employed the practice of painting the hull with white paint, with which they have payed the whole surface of the underwater hull, having first filled all the seams with glaziers' putty, which they use also to preserve the heads of the bolts and the nails; but in order to carry out this operation, the vessel must first be put into dry-dock, where she must stay long enough for the paint to dry completely, before the sheets of copper be applied, the summer season must be the best time to carry out this method, yet I believe it to be better suited to English ships than to our own, since we employ infinitely more iron in the form of bolts and nails in our ships than they do in theirs, so that canvas or heavy tarred paper seems to me to be more likely to procure a situation more impenetrable to the dissolution of the copper, than a simple coat of paint.
After all these preliminary operations, the copper sheets are

applied, taking care that those which start at the bow at the side of the stem overlap those behind, all the way to the stern; and likewise, that those which start at the keel overlap those above, as far as the waterline. The under side of the keel, or false-keel if the vessel has one, must also be coppered, and to prevent the sheathing from being torn off by cables or hawsers, they are covered by an oak or beech plank about three inches thick; care is taken to fasten it with copper nails; iron nails would be dissolved too rapidly, and the cramps used to secure this plank to the keel must also be of copper, and if the vessel originally had a false keel fastened in the usual manner with iron cramps, these must be replaced, or at the least supplemented with copper ones, to take the place of the original ones once they have been eaten away. The overlap of the sheets of copper, both at their ends and at their sides, should be one and a half inches, and to ensure that this be exactly followed, the workmen must mark out a square one and a half inches inside the edge of every sheet, with a line and with white lead. To prevent them wasting nails, and to compel them to set the nails in an even manner across the length and the width of each sheet, they trace with a line the two diagonals of the oblong formed by the copper sheet; then, with the aid of a small piece of wood three inches wide which two workmen offer up parallel to the two diagonals, they mark out identical lozenges across the whole area of the sheet, and it is at the corners of each lozenge that the nails are placed, at the top and bottom edges and the sides the nails are hammered in at the middle of the overlap, in other words three-quarters of an inch from the edge of each sheet, and so that the workmen place these nails precisely in line, another square is traced round that indicating the overlap and three-quarters of an inch away.

The nails at the edges should be placed at one and a half inch centres, with those at the ends of the sheet one inch apart so that they provide better resistance to the sheet being torn off.

The copper sheets should be five feet long and eighteen inches wide and four and a quarter points[3] thick, which is to say a little more than a third of a line. The nails should be sixteen to seventeen lines long and they should be cast, their head should be flat and round, of a diameter of eight to nine lines and half a line thick.

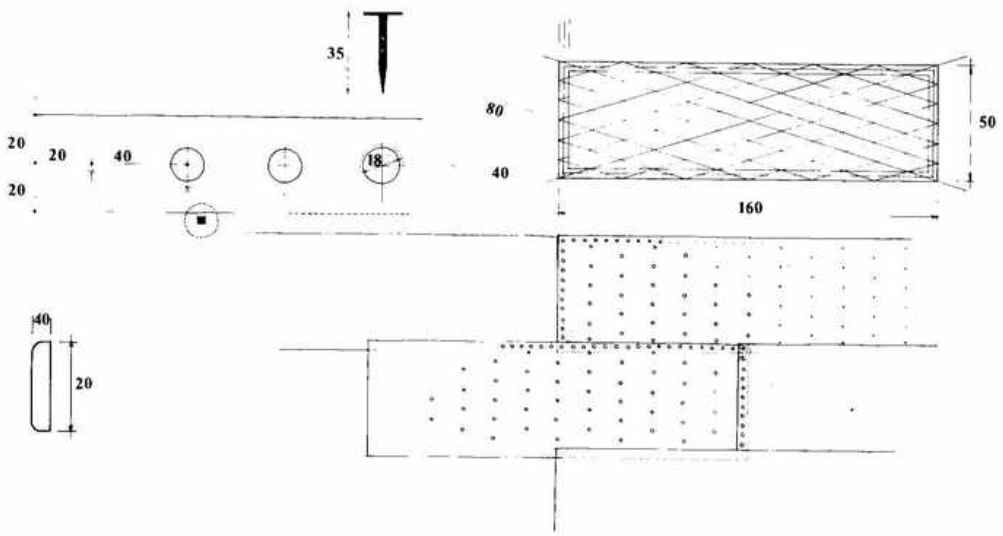
To prick the nails into the copper, the sheet is pierced with the aid of a hammer and an iron punch, the punch to be six inches long overall and nine to ten lines thick, wrought to an eight-square, at its end it has a well-tempered and sharpened round point eight lines in length: this point should be one and a half lines thick at the collar, where the round part meets the eight-square, and have a diameter of three-quarters of a line at the tip. The square at the collar above the point prevents the hole in the plank from being too large, should the workman strike the punch too hard, which would destroy the holding power of the nail.

Each workman fastens a small canvas bag about his waist, in which he puts the nails, the punch, and the hammer, there must be at least three times as many punches as there are workmen employed at sheathing. So as to replace any punch where the point breaks, which is an accident which occurs very frequently, they are repaired by re-grinding a new point.

This memorandum, which is reproduced here *in extenso*, is preserved in the *Archives Nationales*, fonds marine, D[1].8. It is anonymous and undated, but it is reasonable to suppose that it was written by P.A.L. Forfait, who was an Assistant (*sous-ingénieur constructeur*) at Brest between 1777 and 1783.

The memorandum describes very precisely the techniques employed for copper sheathing at the time, and gives details of the use of a paper lining, the coppering of the false keel, the use of cramp-irons (keel-staples), and the way the final row of sheets is fastened at the waterline. It goes on (in the second part, transcribed overleaf) to describe the precautions taken to protect the rudder-irons[4], the use of fir to sheathe the rudder itself, the protection of the rabbets of the stem and the post with strips of lead, and the sheathing of the gripe and lacing of the stem.

1. *Sic*: the *Rover*, sloop-of-war, ex-*Cumberland*, captured from the Americans by the Royal Navy in 1777, and then taken by the French on September 13th 1780.
2. *L'Atalante*, 12-pdr frigate, built at Toulon in 1767 to the draughts of J.L. Coulomb, and coppered at Brest in 1780.
3. See page 6 for an explanation of old French measurements.
4. The adoption of bronze pintles and googings for the rudder (which continued to be called "rudder-irons" despite the change in metal), preceded and indeed heralded the adoption in 1785 of bronze fastenings (bolts and nails). Rudder-irons were subsequently cast from an alloy of 93% copper, 5% tin and 2% zinc.



This drawing, taken from volume III of *The Seventy-Four Gun Ship*, shows how the copper sheets are overlapped (the bow of the vessel is to the right of the drawing), as well as the lines marked out for the positioning of the nails: each sheet requires 103 nails, including 42 round the edges (making allowance for the fact that the sheets overlap).The drawing of the nail is in accordance with the original designs; from the beginning of the 19th century onwards, stronger nails were introduced, with a thicker head and shank.

Bronze fastenings: nails and bolts

As we have seen, the first indications of electrolytic action manifested themselves in the rudder-irons, but the full extent of the damage was not appreciated until the various repairs carried out at the end of or shortly after the American War of Independence. Despite all the precautions taken to protect the heads of nails and bolts, and which we have already described, they were extremely corroded. The very fastening of the ship was at risk, and the significance of the iron fastenings in timber structures cannot be over-estimated.

The French Navy was all the more affected in that the planks of the underwater hull were habitually fastened half with nails and half with treenails, whereas English ships employed treenails only. The nails were completely eaten away, and even the bolts were seriously weakened for several feet of their length The rudder-irons were only half as thick as they should have been.

The only possible action to remedy this defect was to substitute bronze fastenings for iron for the whole of the underwater hull, and to use bronze rudder-irons. The English took this decision in Admiralty orders dated August and October 1783, and the French Navy followed their example in 1785 (Ministerial dispatch dated July). In order to reduce the quantity of bronze needed, the number of treenails was increased, and nails were finally abandoned for fastening the planks of the underwater hull.

The quantity of bronze employed became very considerable: according to Costé, the bolts, nails and copper sheets demanded a quantity of copper equivalent in kilogrammes to two-fifths of the cube of the midship beam expressed in feet. In the same calculations, he gives the quantity of copper required for sheathing as five and a half times the square of the midship beam. Note also that the cost of copper is six to seven times that of iron from the Berry.

The building of a new navy entirely copper-sheathed and with bronze fastenings demanded a very considerable investment: if we take the theoretical force of the French Navy as laid down in the *Ordonnance* of 1786, the following quantities of copper were called for:

*	9 118-gun ships	midship beam 50 feet	= 562 tons
	12 80-gun ships	midship beam 47 feet	= 415 tons
	60 74-gun ships	midship beam 44 feet	= 2,045 tons
	20 18-pdr frigates	midship beam 37 feet	= 405 tons
	40 12-pdr frigates	midship beam 34 feet	= 628 tons
†	20 8-pdr sloops	midship beam 30 feet	= 180 tons
	20 6-pdr sloops	midship beam 28 feet	= 146 tons
	20 brigs	midship beam 26 feet	= 117 tons
	10 750-ton storeships	midship beam 32 feet	= 109 tons
	10 2 to 500-ton transports	midship beam 27 feet	= 196 tons
			Total 4,803 tons

* Quantity of copper equal to half the cube of the midship beam for three-deckers.
† Quantity equal to one third for sloops and smaller vessels, and for storeships and transports.

At an average price of 2,500 *livres* per ton (2,000 French pounds weight), the investment in raw material alone comes to 12 million *livres*, which can be compared with the cost of a complete 74-gun ship fitted out and stored for a six-month commission of 1 million *livres*. Note that at the time the average cost of a day's labour for a shipwright was 1 *livre* 3 *sols*.

A contemporary manuscript by Mr de Najac[1] estimated that the service life of copper sheathing was five years, equivalent to five breamings. The cost of two sheathings with filling nails was the same as that of a single copper sheathing, and two sheathings with wood had about the same service life of five years.

All this is somewhat subjective, but it is worth noting that in the light of the comparative cost of labour and that of copper, vessels were unsheathed as soon as they were laid up in Ordinary. Regulations laid down the circumstances under which vessels were unsheathed, and the re-use of the copper sheets. In principle, ships' bottoms were sheathed with sheets which had already served, up to a height which varied according to the vessel type. Thus storeships and transports were entitled to only two strakes of new copper at the waterline, while ships and frigates used old sheets only up to the fifteenth strake of bottom-planking. Naturally, when a ship was broken up, all the nails and bolts were recovered.

In the figures given above, no account has been taken of the cost of the rudder-irons; these were cast in bronze, from moulds taken off the vessel, and only the irons above the waterline were fashioned from wrought-iron. The rudder-pendants were also made of bronze chain.

The replacement of iron fastenings with bronze called for experiments to estimate the strength of the new metal. Admiral Thévenard, in his *Mémoires Relatifs à la Marine*, devotes an entire chapter to the subject, and there were a number of reports prepared at the three major Dockyards in 1785[2], but the main points to retain are that iron is stronger than copper in the proportion of 1,000 to 813, and moreover its frictional coefficient is very different when driven into timber.

For contemporary texts concerning bronze fastenings, I will start with a brief report by C.N. Sané drawn up sometime under the Empire, probably around 1810, and preserved in the Archives of Rochefort Dockyard.

It was at the time of the Colonial War of Independence that we began to employ copper for sheathing warships. It was very soon realised that this form of sheathing resulted in the very rapid destruction of the ironwork in the underwater part of the hull, and the only cause to be found was the combination of copper oxides and hydrochloric acid.

Various means were tried in vain to combat this disastrous effect, until it was found that the only solution was to employ copper nails and bolts in this part of the ship. The Government took this decision in 1785, and sent to Brest Dockyard an artisan from the Romilly works who had been employed in this type of work in England; he it was who directed the fastening with copper of the 74-gun ship LA PATRIOTE[3]*, and since copper does not have the same strength as iron, it was judged necessary to increase the dimensions of the bolts and the nails by a suitable proportion.*

1. Mr de Najac was Commissioner at Brest. The manuscript in question was written in 1780 and is preserved at the *Service Historique de la Marine* at Vincennes, under reference n° MS.89. It gives a considerable amount of information, including some on the coppering of the 12-pdr frigate *Iphigénie*
2. The Dockyard reports are preserved in the Rochefort Dockyard Archives, ref. 2G[1].
3. The *Patriote* was a Sané-class 74 launched at Brest on October 3rd 1785, and struck from the lists in 1821.

THE USE OF COPPER FASTENINGS IN SHIPS

The bolts are fashioned from copper bars used in their full thickness and thus simply cut to length. The heads are formed by the blows of the maul used to drive them; to this end, they apply to the end of the bar a tool called a Punch *or* Drift *which is concave so as to round the head and prevent it from splitting.*

The long bolts of the stem and sternpost, which would be unable to resist the strain for the whole of their length, are reduced in diameter by 3 to 7 millimetres for the last third of their length. This operation, which can only be performed by heating the bars, has the effect of weakening them, and can thus only be employed with caution.*

One bolt and two nails are inserted at each butt, into the frame on which it lands, and no others are employed at all. The planks are offered up and set to by means of wrain-staves and wedges, and it is only when such means are insufficient and the planks threaten to split (as in the narrowing of the head and stern) that one or two extra nails are employed as well.

The planks are finally fastened in place by means of four treenails into each frame, save that the number is reduced proportionately where bolts are used to secure the riders, the shelf of the orlop, and the vertical arm of the knees of the gundeck.

Since first trials are always improved by experience, it was later discovered that it was better to fasten the garboard strakes and the two strakes immediately above by means of nails only, since it was found that it was very difficult to drive treenails firmly in this part of the vessel, and that moreover they could not be wedged inside the belly of the crotches but would have had to have been blind-driven, and this would not have procured the solidity required. These three strakes must be fastened with two ragged bolts into each bend, and another into each filling-frame. The hooding-ends of the planks, where they land in the rabbets of the stem and post, require to be further strengthened by means of a bolt and two nails, and the same applies to any very wide planks finishing at the sternpost, which need two bolts and four nails.

The nails measure twice the thickness of the plank in the shank, plus 54 millimetres.

The use of treenails to secure the plank of the bottom is much superior to nails of whatever metal, since the latter tend to bend when hammered into the frame timbers, especially when the timber is very dense such as that from Provence or Italy.

The treenail, on the other hand, passes right through the plank, the frame timber and the internal planking of the hold, and it is wedged within as it is also wedged without. It thus performs the function of a double-headed or double-clenched bolt. Moreover, the treenail, by reason of its flexibility, adapts itself better to the working of the ship at sea, and is not subject to sheering, as is a bolt. The English are so familiar with the advantages to be procured through the use of treenails that they even employ them to fasten the planking of the upper works, and use very few nails at all. To this day, and since 1785, all the vessels of whatever rate which have been built in the dockyards of the Atlantic seaboard have been fastened in the manner described above, without the slightest problem occurring.

Additional remarks

If a ship be hove down to copper her, it is then very easy once she is keel-out to copper the keel and the false-keel, and to cover the sheathing with a plank, as has been described; but if the operation be carried out in dry-dock, the plank should first be laid over the middle of the keel-blocks before the vessel be taken into dock, and copper sheets nailed to it, taking care to overlap them fore and aft in the same manner as I have indicated for a ship hove down, and then the sides of these sheets are carefully folded up and nailed to the keel, together with the first rows of sheets rising from the keel towards the waterline.

The rudder-irons must be made of copper, at least those which are under water; those above the load waterline can be of iron, of the usual type, since they are not exposed to the corrosive effect of the copper. If it should prove impossible to obtain the copper necessary for this work, or for some other reason it is necessary to employ iron pintles and googings, then they must be covered with well-tarred canvas followed by sheet lead one line in thickness, and the same must be done to their arms, and if the ship be destined for tropical service, the rudder should be sheathed with softwood, taking care to fasten the sheathing with copper nails.

Once the major part of the vessel has been coppered, it is then necessary to mark the height of gundeck sill at which the coppering should finish, this height to be four feet in ships of the line and five feet in frigates; a line is stretched accordingly from stem to stern, at the proper height, in order to give a regular run to the rows of sheets above the waterline; those that mark the end of the coppering are then fastened, and the sheathing is then continued downwards until it meets that which has already been completed. It is often necessary to taper the sheets at the bow and the stern, but when commencing the sheathing it is best to allow the sheets to rise naturally, without cutting into them.

No coating of any kind should ever be applied to the copper, indeed the sheets must be carefully cleaned of all traces of tar or pitch which might have dripped onto them during the work; to this end, fine sand is used, together with wads of oakum; if this precaution be not taken, the natural advantage of copper in preventing the adhesion of weed or marine growths, and in stopping other dirt from fouling it, would be quite lost.

The rabbets of the stem and the post must be covered with lead, as should all the faces of the gripe and lacing, all the way up to the load waterline.

Once the coppering is entirely finished, the last two and a half inches at the top are overlapped by a strip of oak five inches wide and two inches thick, and this strip or plank must be fastened with copper nails. Its thickness should also be diminished at the top and at the bottom, by chamfering it, so that its full thickness of two inches is retained only in the middle.

If the men should encounter a nail or bolt when punching holes in the copper, so that they are unable to insert a copper nail, this false hole must be filled with glaziers' putty of a type which hardens under water, and the same technique is employed if the head of a nail should break off.

The use of bronze nails and bolts made it possible to abandon the practice of covering the hull-planking with canvas, sheets of felt or sheathing paper, since their sole purpose was then to stop a small leak, and it was by no means always effective in this. As a rule it was thought sufficient simply to plane the hull carefully, removing any irregularities, and then to caulk it very painstakingly before paying it with a coat of bastard-pitch, for which was substituted on occasions a coat of hydraulic lime or quicklime mixed with oil.

These were the methods employed for coppering ships in France, right up until the end of the wooden sailing navy.

I will conclude by remarking that various experiments were undertaken during the first half of the 19th century to improve the quality of the copper sheets, with comparative test of pure copper, bronze and brass, and alloys of copper, tin and zinc.

*For a 118-gun three-decker, the bolts at the stern may be as much as 4 metres long and about 4 centimetres in diameter.

List of 12-pdr frigates in the French Navy (1748-1798)

Laid down	Name when launched	Builder	Place of building	Length	Breadth	Depth in hold	Upper deck	Fo'csle/ Q'deck	Total	Struck from lists	Notes
1748	***Hermione***	P. Morineau	Rochefort	127'6"	33'8"	17'8"	26x 12		26	1757	Dr. DNA-AR
1750	***Gracieuse***	J.-V. Chapelle jr.	Toulon	124'0"	33'0"	16'6"	24x 12		24	1783	Dr. AT
1756	***Danaé***	J.-J. Ginoux	Le Havre	152'6"	36'7"	17'4"	30x 12	8x 6	38	1759	Dr. NMM
1757	***Terpsichore***	A. Groignard	Nantes (Pbf)	143'5"	34'0"	17'4"	30x 12		30	1784	AN
1757	***Hébé***	J.-J. Ginoux	Le Havre	144'6"	34'6"	14'11"*	28x 12	2x 18 6x 6	36	1764	AR *d.i.h. gundeck
1758	***Chimère***	J.-M.-B. Coulomb	Toulon	136'0"	35'6"	17'11"	26x 12	4x 6	30	1783	
1764	***Sultane***	N. Poumet	Toulon	130'0"	34'0"	17'4"	26x 12	4x 6	30	1793	AT
1764	***Infidèle***	J.-J. Ginoux	Le Havre	130'0"	34'0"	17'1"	26x 12	6x 6	32	1774	
1765	***Belle-Poule***	L.-M. Guignace	Bordeaux	134'0"	34'6"	17'6"	26x 12	6x 6	32	1780	Dr. NMM - AN
1766	***Dédaigneuse***	L.-M. Guignace	Bordeaux	134'0"	34'6"	17'6"	26x 12	6x 6	32	1784	
1766	***Impérieuse***	L.-M. Guignace	Bordeaux	134'0"	34'6"	17'6"	26x 12	6x 6	32	1791	'67: *Amphitrite*
1766	***Tourterelle***	L.-M. Guignace	Bordeaux	134'0"	34'6"	17'6"	26x 12	6x 6	32	1784	AR
1766	***Indiscrète***	Raffeau	Nantes (Pbf)	130'0"	33'0"	16'6"	28x 12	6x 6	34	1783	AN taken
1766	***Sensible***	Raffeau	Nantes (Pbf)	130'0"	33'0"	16'6"	28x 12	6x 6	34	1781	AT - AN
1766	***Boudeuse***	Raffeau	Nantes (Pbf)	130'0"	33'0"	16'6"	28x 12	6x 6	34	1800	AT - AN
1766	***Enjouée***	J.-J. Ginoux	Le Havre	130'0"	34'0"	17'1"	26x 12		26	1774	
1766	***Inconstante***	J.-J. Ginoux	Le Havre	130'0"	34'0"	17'1"	26x 12		26	1781	AN
1766	***Infidèle***	J.-J. Ginoux	Le Havre	130'0"	34'0"	17'1"	26x 12		26	1778	AN
1766	***Légère***	J.-J. Ginoux	Le Havre	130'0"	34'0"	17'1"	26x 12		26	1779	AN
1766	***Sincère***	J.-J. Ginoux	Le Havre	130'0"	34'0"	17'1"	26x 12		26	1777	AN sold
1766	***Blanche***	J.-J. Ginoux	Le Havre	130'0"	34'0"	17'1"	26x 12		26	1779	AN taken
1767	***Engageante***	J.-F. Estienne	Toulon	134'0"	35'4"	17'10"	26x 12		26	1794	Dr. AT taken
1767	***Atalante***	J.-L. Coulomb	Toulon	136'0"	36'7"	17'10"	26x 12	10x 6	36	1794	Dr. DNA taken
1767	***Renommée***	A. Groignard	Brest	145'9"	34'6"	17'6"	30x 12		30	1784	Dr. DNA - MM
1768	***Aurore***	J.-D. Chevillard jr.	Rochefort	136'0"	34'6"	17'6"	26x 12	8x 6	34	1784	'67: *Envieuse* - AR - taken
1777	***Andromaque***	P.-A. Lamothe sr.	Brest	136'6"	34'6"	17'6"	26x 12	6x 6	32	1796	burned
1777	***Concorde***	H. Chevillard sr.	Rochefort	136'9"	34'6"	17'8"	28x 12	6x 6	34	1783	Dr. NMM - AR - SHM
1777	***Charmante***	J.-D. Chevillard jr.	Rochefort	136'0"	34'6"	17'6"	26x 12	6x 6	32	1784	SHM-MM
1777	***Junon***	J.-D. Chevillard jr.	Rochefort	136'0"	34'6"	17'6"	26x 12	6x 6	32	1780	SHM-MM
1777	***Fortunée***	P.-A. Forfait	Brest	136'3"	34'8"	17'7"	26x 12	6x 6	32	1793	SHM
1777	***Iphigénie***	L.-M. Guignace	Lorient	134'0"	34'6"	17'6"	26x 12	6x 6	32	1795	
1777	***Pallas***	L.-M. Guignace	St-Malo	134'0"	34'6"	17'6"	26x 12	6x 6	32	1778	taken
1777	***Chimère***	J.-M.-B. Coulomb	Toulon	136'0"	35'6"	17'11"	26x 12	6x 6	32	1800	AR
1777	***Sibylle***	J.-N. Sané	Brest	135'2"	34'6"	17'6"	26x 12	6x 6	32	1783	taken
1777	***Railleuse***	R.-A. Haran	Rochefort	136'0"	34'6"	17'6"	26x 12	6x 6	32	1797	
1777	***Nymphe***	R.-A. Haran	Brest	134'0"	35'6"	18'3"	26x 12	14x 6	40	1780	*Dr. NMM
1777	***Magicienne***	J.-M.-B. Coulomb	Toulon	136'0"	35'6"	17'11"	26x 12	6x 6	32	1781	Dr. NMM
1778	***Amazone***	L.-M. Guignace	St-Malo	132'2"	32'10"	16'10"	26x 12	6x 6	32	1782	taken
1778	***Bellone***	L.-M. Guignace	St-Malo	132'2"	32'10"	16'10"	26x 12	6x 6	32	1798	AR - taken
1778	***Gentille***	L.-M. Guignace	St-Malo	132'2"	32'10"	16'10"	26x 12	6x 6	32	1795	taken
1778	***Gloire***	L.-M. Guignace	St-Malo	132'2"	32'10"	16'10"	26x 12	6x 6	32	1795	taken
1778	***Médée***	L.-M. Guignace	St-Malo	132'2"	32'10"	16'10"	26x 12	6x 6	32	1800	AR - taken
1778	***Résolue***	L.-M. Guignace	St-Malo	132'2"	32'10"	16'10"	26x 12	6x 6	32	1798	taken
1778	***Prudente***	L.-M. Guignace	St-Malo	132'2"	32'10"	16'10"	26x 12	6x 6	32	1779	taken
1778	***Surveillante***	L.-M. Guignace	Lorient	132'2"	32'10"	16'10"	26x 12	6x 6	32	1797	wrecked
1778	***Courageuse***	H. Chevillard sr.	Rochefort	136'0"	34'6"	17'6"	26x 12	6x 6	32	1787	taken
1778	***Minerve***	J.-J. Maistral-Sané	St-Malo	135'2"	34'6"	17'6"	26x 12	6x 6	32	1780	SHM - AR - '78: *Diane* - wrecked
1778	***Fine***	J.-N. Sané	St-Malo	135'2"	34'6"	17'6"	26x 12	6x 6	32	1794	wrecked
1779	***Aigle***	J.-N. Sané?	St-Malo	138'10"	35'10"	17'10"	26x 12	6x 6	32	1782	*Dr. NMM
1779	***Capricieuse***	C.-J. Segondat	Lorient	136'0"	34'6"	17'6"	28x 12	6x 6	34	1780	'73: *Charente* - burnt
1779	***Friponne***	C.-J. Segondat	Lorient	136'0"	34'6"	17'6"	28x 12	6x 6	34	1796	AT
1779	***Cérès***	B^{on} Bombelle	Rochefort	136'0"	34'6"	17'6"	26x 12	6x 6	32	1787	AR
1779	***Émeraude***	J.-N. Sané	St-Malo	137'0"	34'6"	17'6"	26x 12	6x 6	32	1797	AR
1779	***Néréïde***	J.-N. Sané	St-Malo	137'0"	34'6"	17'6"	26x 12	6x 6	32	1797	AR - Dr. NMM
1779	***Vénus***	J.-N. Sané	St-Malo	137'0"	34'6"	17'6"	26x 12	6x 6	32	1781	SHM wrecked
1779	***Fée***	H. Chevillard sr.	Rochefort	136'9"	34'6"	17'6"	26x 12	6x 6	32	1783	AR
1779	***Hermione***	H. Chevillard sr.	Rochefort	136'9"	34'6"	17'6"	26x 12	6x 6	32	1793	wrecked
1779	***Galathée***	R.-A. Haran	Rochefort	137'0"	34'6"	17'6"	28x 12	12x 8	40	1795	AR - wrecked
1779	***Lutine***	J.-M.-B. Coulomb	Toulon	136'0"	35'6"	17'11"	26x 12	6x 6	32	1781	Dr. NMM

Laid down	Name when launched	Builder	Place of building	Length	Breadth	Depth in hold	Upper deck	Fo'csle/ Q'deck	Total	Struck from lists	Notes
1779	***Sérieuse***	J.-M.-B. Coulomb	Toulon	136'0"	35'6"	17'11"	26x 12	6x 6	32	1778	AT - sunk
1780	***Vestale***	J.-M.-B. Coulomb	Toulon	136'0"	35'6"	17'11"	26x 12	6x 6	32	1799	taken
1780	***Alceste***	J.-M.-B. Coulomb	Toulon	136'0"	35'6"	17'11"	26x 12	6x 6	32	1799	taken
1780	***Astrée***	P.-A. Lamothe	Brest	155'0"	34'6"	17'6"	28x 12	8x 6	36	1794	SHM
1780	***Isis***	R.-A. Haran	Rochefort	137'0"	34'6"	17'6"	26x 12	6x 6	32	?	
1781	***Iris***	J.-M.-B. Coulomb	Toulon	136'0"	35'6"	17'11"	26x 12	6x 6	32	1793	burnt
1781	***Cléopâtre***	J.-N. Sané	St-Malo	137'0"	34'6"	17'6"	26x 12	6x 6	32	1792	DR. NMM - SHM
1782	***Danaé***	C.-J. Segondat	Lorient	136'0"	34'6"	17'6"	28x 12	6x 6	34	1796	AT
1782	***Fleur de Lys***	R.-A. Haran	Rochefort	137'0"	34'6"	17'6"	26x 12	6x 6	32	1795	*Pique* - Dr. NMM
1785	***Gracieuse***	J.-D. Chevillard jr.	Rochefort	136'0"	34'6"	17'6"	26x 12	6x 6	32	1796	*Unité* - Dr. NMM
1785	***Prosélyte***	?	Le Havre	138'0"	36'0"	15'9"*	26x 12	6x 6	32	1793	SHM - taken - *d.i.h. gundeck
1785	***Calypso***	P.-A. Forfait	Brest	135'0"	34'6"	17'9"	26x 12	8x 6	34	1793	SHM
1785	***Félicité***	P.-A. Forfait	Brest	135'0"	34'6"	17'9"	26x 12	6x 6	32	1809	taken
1785	***Modeste***	J.-M.-B. Coulomb	Toulon	136'0"	35'6"	17'11"	26x 12	6x 6	32	1793	Dr. NMM
1785	***Réunion***	J.-M.-B. Coulomb	Toulon	136'0"	35'6"	17'11"	26x 12	6x 6	32	1793	Dr. NMM
1786	***Capricieuse***	C.-J. Segondat	Lorient	136'0"	34'6"	17'6"	26x 12	6x 6	32	1799	*Charente* wrecked
1788	***Aglaé***	P. Duhamel	Rochefort	136'0"	34'6"	17'6"	26x 12	8x 6	34	1802	MM - *Fraternité* - wrecked
1789	***Inconstante***	J.-D. Chevillard jr.	Rochefort	136'0"	34'6"	17'6"	26x 12	8x 6	34	1793	AN - taken
1789	***Hélène***	J.-D. Chevillard jr.	Rochefort	136'0"	34'6"	17'6"	26x 12	8x 6	34	1793	taken
1789	***Embuscade***	H.-S. Vial du Clairbois	Rochefort	135'6"	34'7"	17'8"	26x 12	10x 6	36	1803	DR. NMM
1789	***Topaze***	J.-M.-B. Coulomb	Toulon	136'0"	35'6"	17'11	26x 12	6x 6	32	1793	Dr. NMM
1789	***Fidèle***	P.-A. Forfait	Le Havre	135'0"	34'6"	17'9"	26x 12	6x 6	32	1802	Dr. NMM
1789	***Prudente***	C.-J. Segondat	Lorient	139'9"	34'6"	17'6"	26x 12	6x 6	32	1798	Dr. NMM
1790	***Fortunée***	P.-A. Forfait	Le Havre	135'0"	34'6"	17'9"	26x 12	6x 6	32	1795	SHM destroyed
1790	***Sémillante***	P.-J. Pénétreau	Lorient	?	?	?	26x 12	6x 6	32	1810	sold
1793	***Bravoure***	?	St-Malo	?	?	?	28x 12	12x 8	40	1801	wrecked
1793	***Cocarde***	?	St-Malo	?	?	?	28x 12	12x 6	40	1803	wrecked
1793	***Insurgente***	P.-J. Pénétreau	Lorient	?	?	?	26x 12	6x 6	32	1799	taken
1793	***Régénérée***	?	Rochefort	136'6"	34'8"	17'4"	28x 12	14x 6	42	1801	Dr. NMM
1793	***République Française***	?	?	?	?	?	?	?	?	?	*Renommée* taken
1794	***Artémise***	?	Toulon	?	?	?	?	?	?	1798	destroyed
1794	***Courageuse***	?	Toulon	?	?	?	26x 12	6x 6	32	1799	taken
1794	***Charente Inférieure***	R.-A. Haran	Rochefort	?	?	?	26x 12	16x 6	42	1796	*Tribune* - Dr. NMM
1794	***Patriote***	R.-A. Haran	Bayonne	137'0"	34'6"	17'6"	28x 12	16x 6	44	1798	*Coquille* - taken
1794	***Décade***	?	Bordeaux	?	?	?	28x 12	10x 6	38	1798	ex-*Macreuse* - taken
1793	***Immortalité***	?	?	?	?	?	?	?	?	1798	Dr. NMM
1795	***Loire***	?	Nantes	?	?	?	28x 12	10x 6	38	1798	taken
1795	***Panthère***	?	?	?	?	?	?	?	?	1795	*Républicaine*
1795	***Chiffonne***	?	Nantes	?	?	?	26x 12	12x 6	38	1802	Dr. NMM
1795	***Fidèle***	R.-A. Haran	Bayonne	138'3"	34'8"	17'7"	28x 12	6x 6	34	1809	'95: *Sirène*
1797	***Dédaigneuse***	R.-A. Haran	Bayonne	138'3"	34'8"	17'7"	28x 12	6x 6	34	1801	Dr. NMM - AR - SHM
1798	***Franchise***	R.-A. Haran	Bayonne	138'3"	34'8"	17'7"	28x 12	6x 6	34	1798	Dr. NMM
1798	***Thémis***	R.-A. Haran	Bayonne	138'3"	34'8"	17'7"	28x 12	6x 6	34	1814	Dr. NMM
1798	***Psyché***	P. Degay	Nantes	133'10"	33'6"	16'0"	24x 12	18x 6	42	1809	Dr. NMM (sp. case)

See overleaf for notes

Notes

The dimensions given in these lists are in accordance with French practice during the period of the Ancien Régime: *length from stem to post (head to head) – breadth to outside of plank – depth in hold at the horizontal line of the midship beam.*

In the ***Notes*** column are a number of initials indicating the various archives or museums where relevant manuscripts or draughts of the vessel in question may be found:

DNA: Danish National Archives, Copenhagen
AR: Rochefort Dockyard Archives, Rochefort
AT: Toulon Dockyard Archives, Toulon
SHM: Service Historique de la Marine, Vincennes
MM: Musée de la Marine, Paris
AN: Archives Nationales, Paris
NMM: National Maritime Museum, London

(A small asterisk indicates draughts as converted for the Royal Navy, as opposed to draughts "as taken".

Dr. Draught; 21 draughts are preserved at the National Maritime Museum, 3 at Rochefort Dockyard Archives, 2 at Toulon. In addition to these, there are also a number of drawings of carved-work (see Chapter XII).

Where no draught is indicated, the documents in question are for the most part either numerical tables, Sailing Reports, or Fitting-out Reports.

As can be seen in the List, the three frigates built by Raffeau*, the *Indiscrète*, the *Sensible*, and the *Boudeuse*, were only 130 feet long, like those built at Le Havre and Nantes (Paimbœuf) but pierced for 26 guns on the upper deck. Since the Regulations of 1762 called for a bowchase port as well, and a distance between ports of 8 feet 10 inches, Raffeau's frigates must have been extremely cramped with their 28 guns.

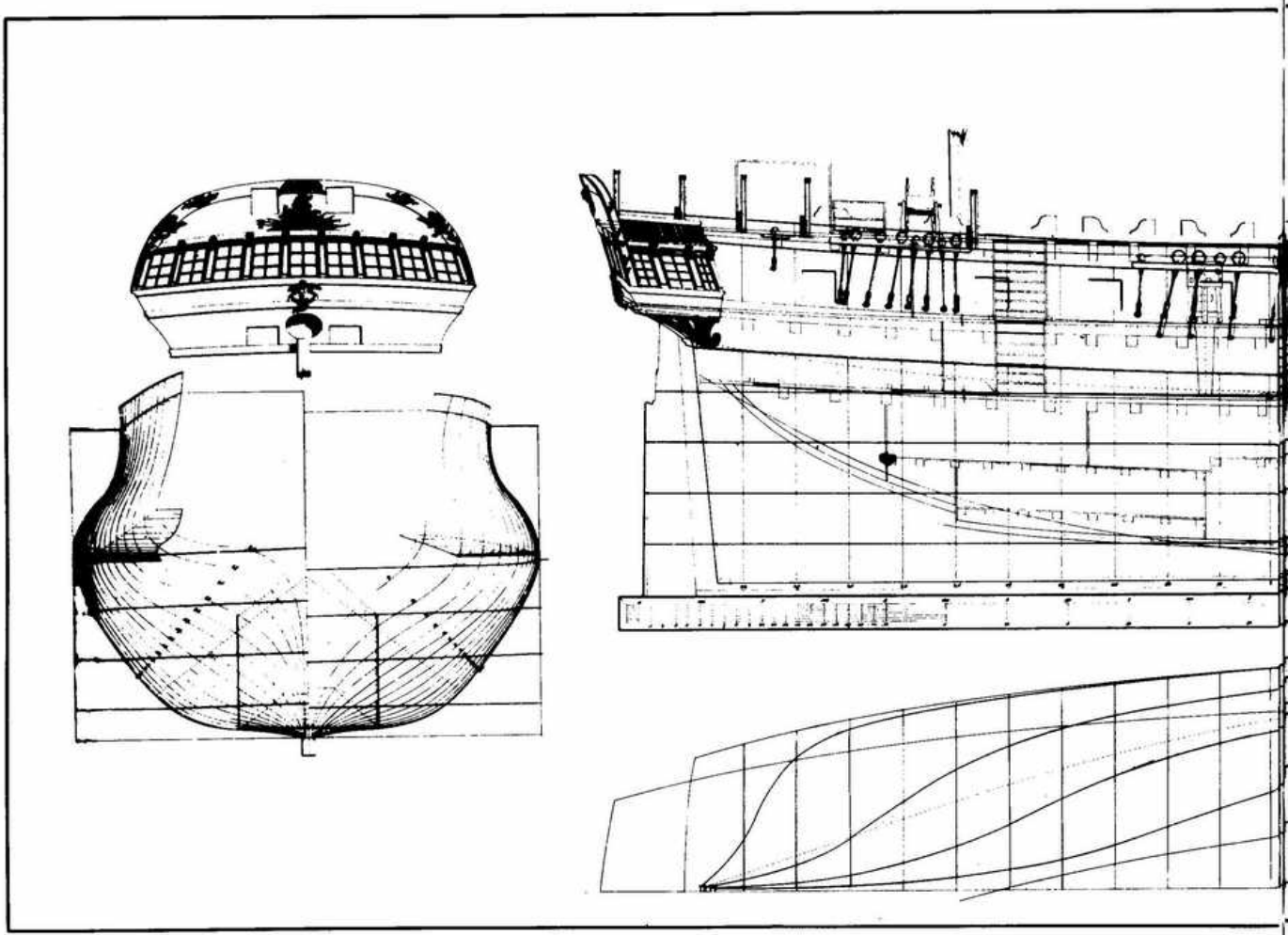
All the other frigates of this armament vary in length between 136 feet and 138 feet 4 inches, adequate for this number of gunports on the upper deck, but very little larger than the 135 to 136 feet average for frigates armed with twenty-six 12-pdrs. The length to breadth ratio is similar in both cases, at slightly less than 4.0.

Note the absence of secondary armament in the frigates built by Groignard, and the opposite tendency during the Revolutionary period to multiply the number of guns on the forecastle and quarterdeck, partly due to the adoption of 4 brass sea-howitzers as stipulated in the Regulations of May 1786; the same text recommended the fitting of 8-pdrs in place of the 6-pdrs, but it seems that this was only rarely adopted.

*Raffeau was a student surveyor in 1752, Assistant in 1759, Master Shipwright in 1767; called to Versailles in 1766 by Choiseul-Praslin (the Minister), he was charged with the supervision of shipbuilding in the Office of Police at the Dockyards, where his functions gave him considerable influence.

Chapter VI
THE 12-Pdr FRIGATE *LA BELLE-POULE*

Courtesy: National Maritime Museum, Greenwich



LA BELLE-POULE 1765-1780

Having examined in the previous chapter the development and historical background of the 12-pdr frigate, this chapter is devoted to one of the best-known examples of the class, the *Belle-Poule**. The plans reproduced here are at a scale of 1:108, but for model-makers interested in making a model of the vessel, a complete set of plans is available separately, at the more usual scale of 1:48 (1⅄″ = 1 foot).

Illustrated below is a draught which dates from the end of her career in the French Navy, preserved at the National Maritime Museum: there is a tendency to forget (at least in France) that the victor of the action against the *Arethusa* in 1778 was in fact herself captured two years later by the much more powerful *Nonsuch* (72). And if her fate is to be regretted, we can be grateful that her draughts have survived, if not in the country of her "birth", at least in her country of "adoption" in England (for she was to serve her new owners for more than 20 years, being finally sold in September 1801).

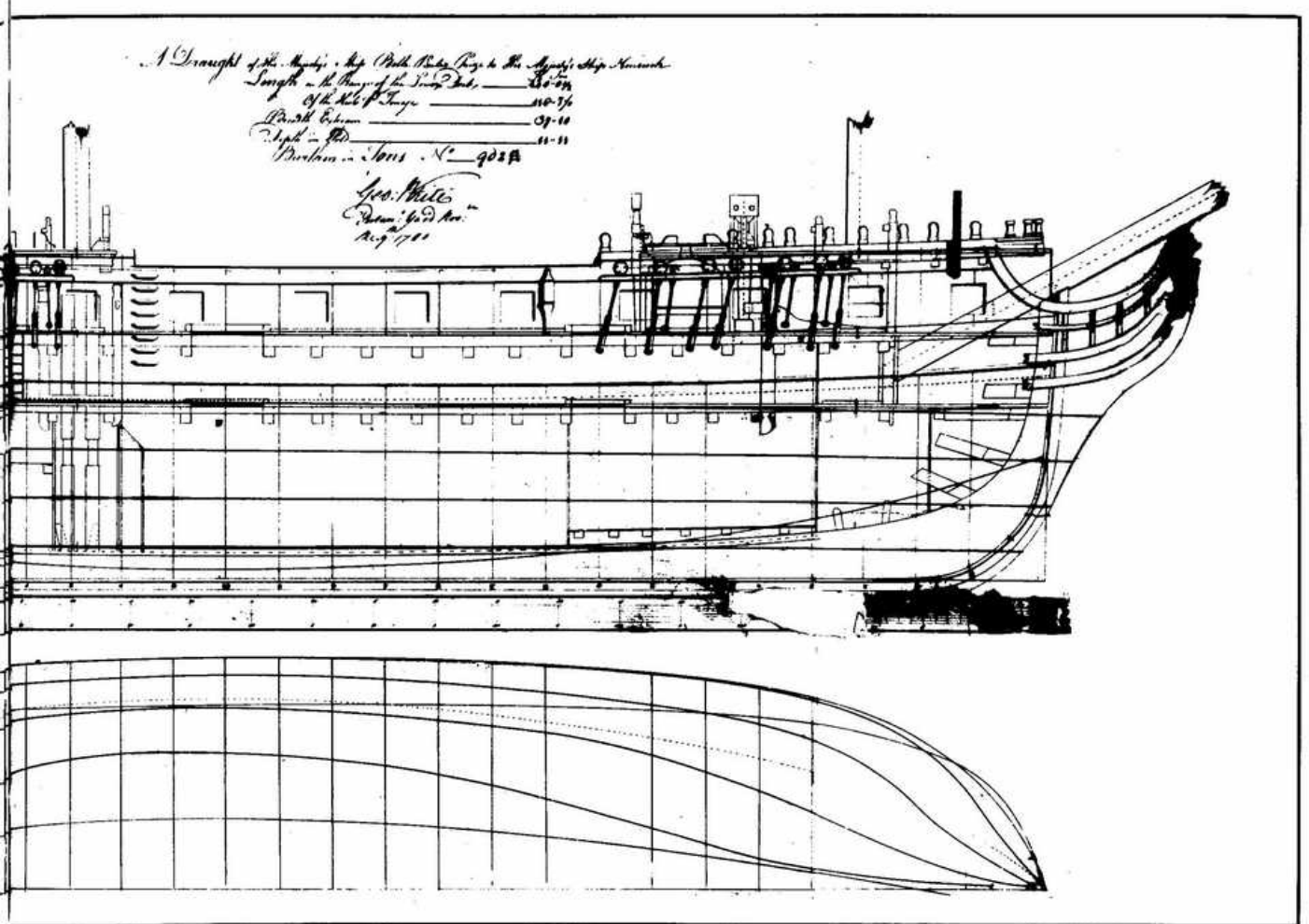
As we have seen, *Belle-Poule* was one of a series of four frigates built between 1764 and 1767 to the same draughts, by Léon Guignace. She was docked for a great repair in 1772 to get her ready for a lengthy commission on the Ile de France station, and we may presume that her condition thereafter is as shown in her 1780 draughts.

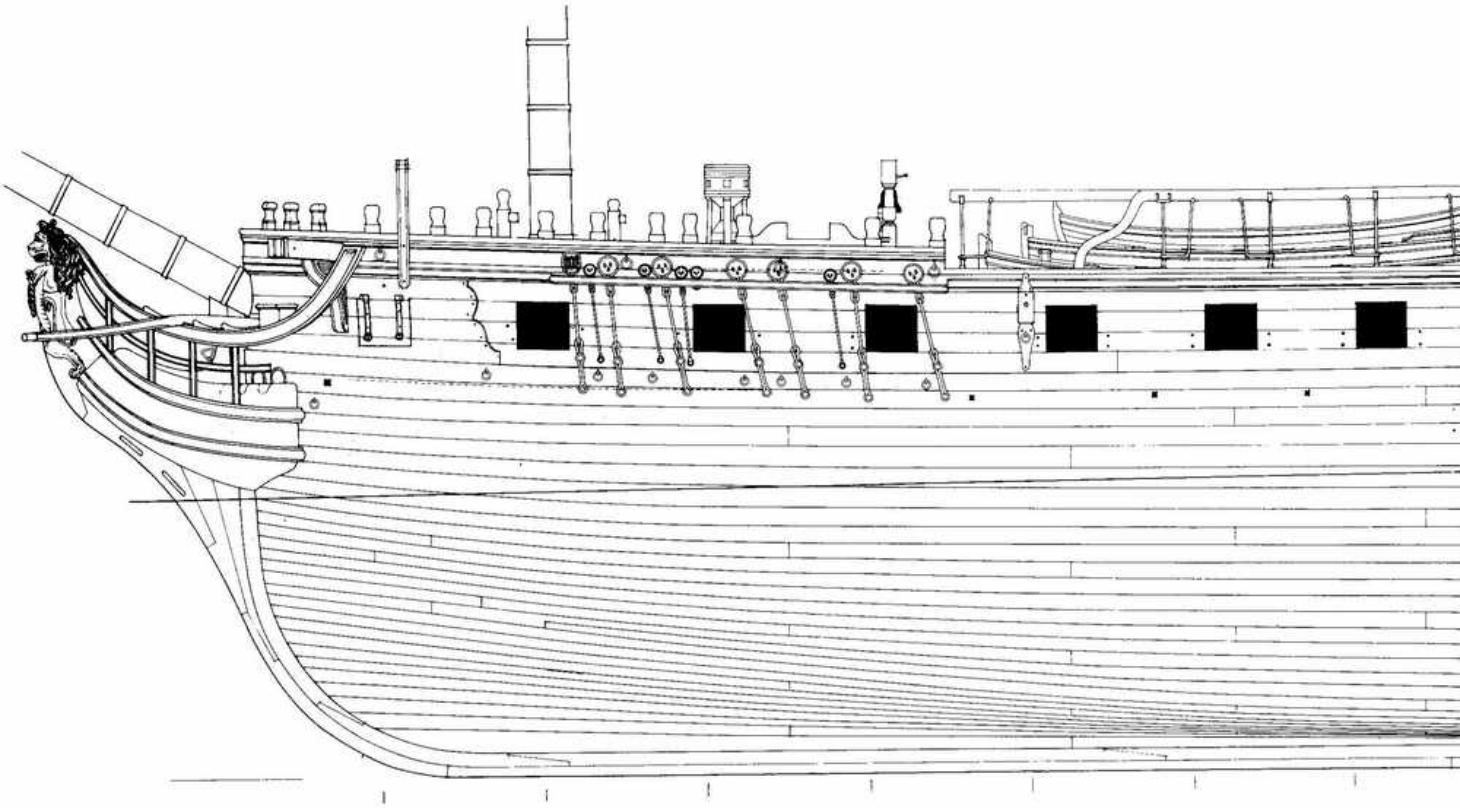
It was with this same mission in the Indian Ocean in mind that the *Belle-Poule* was coppered, the first vessel in the French Navy of any significant size to be so treated (although, curiously, the coppering had been removed by the time of her action against the *Arethusa* in 1778). Prior to this, in 1769, her poop had been removed, which may explain the somewhat "haphazard" appearance of her stern-chase ports.

By 1780 she had been fitted with a deck-cabin on the quarterdeck for the Captain, and a skylight forward of it provides illumination for the 1st Lieutenant's cabin situated in the middle of the wardroom.

The draughts at the National Maritime Museum give no suggestion of any changes made by her captors, which is unsurprising when we see that they were drawn up within two months of her capture. No doubt later in her career several things would have been changed, in accordance with English practices, as we have seen in the case of the *Concorde*.

*The origin of the name remains obscure, although it is attributed to an uncomplimentary nickname given to a lady at Court, the word *poule* having the connotation of "mistress", or something still less respectable!





Outboard Profile

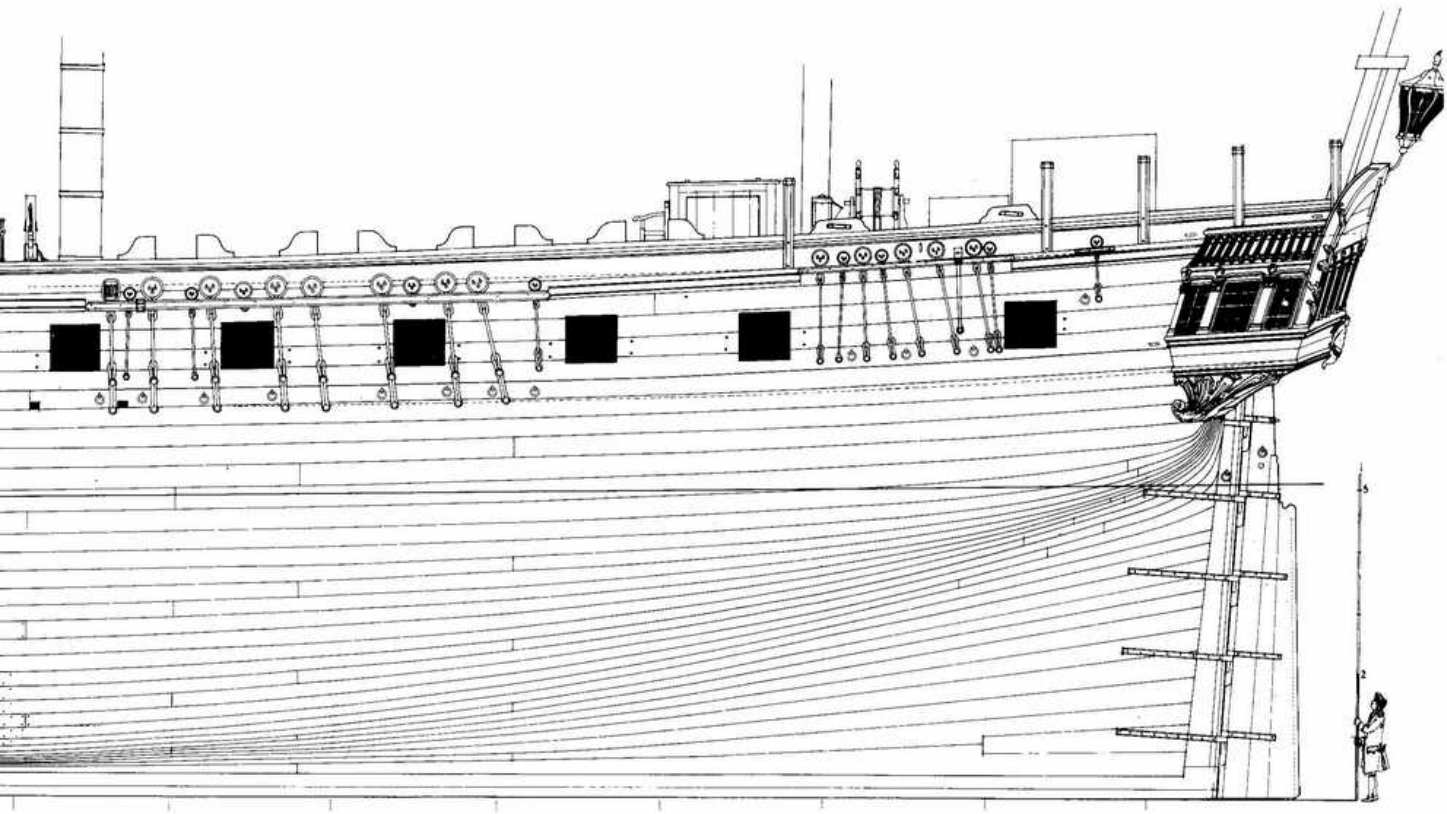
The frigate has fourteen ports on the upper deck, but the foremost gunport is a bowchase port, only armed in case of need, by moving up the gun from the second gunport. Note that this chase-port has a full port-lid.

It was not until 1787 that the provision of a chase-port became mandatory on all ships of the line and frigates in the French Navy. The practice had been common in the 17th century, but was abandoned in the 1690s because the ports were felt to be prejudicial to the integrity of the fastenings at the head. It is worth noting, while on the subject, the comments of Blaise Ollivier: *We used to have in all our ships a bowchase port on the gundeck, as the English do in their ships of 40 and 50 guns, but we did away with it about 45 years ago because we believed that it prejudiced the strength of the ship. Yet we should perhaps have done better to have left it there, and to have found some means for avoiding any weakness to the structure occasioned thereby. For it is almost always from the bow that an attack is launched; a ship must receive several shots fired from the enemy's stern, and is unable to return the fire equally. In order to fight, it is necessary to luff or fall off, hastily fire a few ill-aimed shots, and while this time is lost the enemy shoots ahead. There are sufficient examples of this happening. If therefore we had bowchase ports on the gundeck forward we could bring our heavy guns to bear without deviating from our proper course to overhaul him, and we should be sooner able to take him. It is not impossible to fashion these gunports without affecting the strength of the structure**. The other gunports are fitted with half lids (see *74-G.S.*, vol. II), and they are not exactly evenly spaced, especially the aftermost port.

The frigate has a round head, a practice which was only rarely adopted on ships of the line of the period.

The secondary armament is supplemented by petreros or swivels mounted on stocks; there are twelve in all, two of which are on the forecastle. All of the forecastle and quarterdeck armament is in the form of an open battery, thus to all intents and purposes completely exposed, leaving the guncrews in real danger. On the other hand, the upper works are kept as flush as possible, and this lightness adds to the elegance of the lines; the poop has also been removed, and replaced by a simple deck-cabin, which I have marked in outline.

On the subject of the poop in frigates, I will add to what I have



already said previously by quoting from Maitz de Goimpy (*Traité sur la construction des vaisseaux*, 1776, pp. 184-5): "*These small poops in frigates, with a cabin for the Captain and for the second in command, have been regarded as extremely prejudicial to the vessel's speed of sailing, and other officers have put forward an alternative idea....*

But since a very large number of shipwrights and experienced officers are against it, it is worth examining what disadvantages may result from it. The rate of sailing before the wind can be in no way affected; close-hauled, the extra tophamper is absolutely imperceptible; there is no more than a surface area of about 30 feet which is exposed to the wind, and even then its action is extremely oblique: furthermore the extra deadweight is very small, for such poops weigh no more than 2 tons with their bulwarks, and if there be any place where musketry may be used to some advantage, it is on this poop. The upper deck is less encumbered, especially for night actions; the Captain is more closely in touch with the handling of the vessel than when he is on the quarterdeck, since he hears everything which happens at the wheel, which is a matter of some consequence. When sailing in company or in convoy, or when fleeing from a chasing squadron, he keeps the other vessels as it were constantly in view; and on the other hand, I can find no possible disadvantage."

We have already talked about these small poops, and I have to say that the deck-cabin provides no better a solution and is furthermore very unæsthetic.

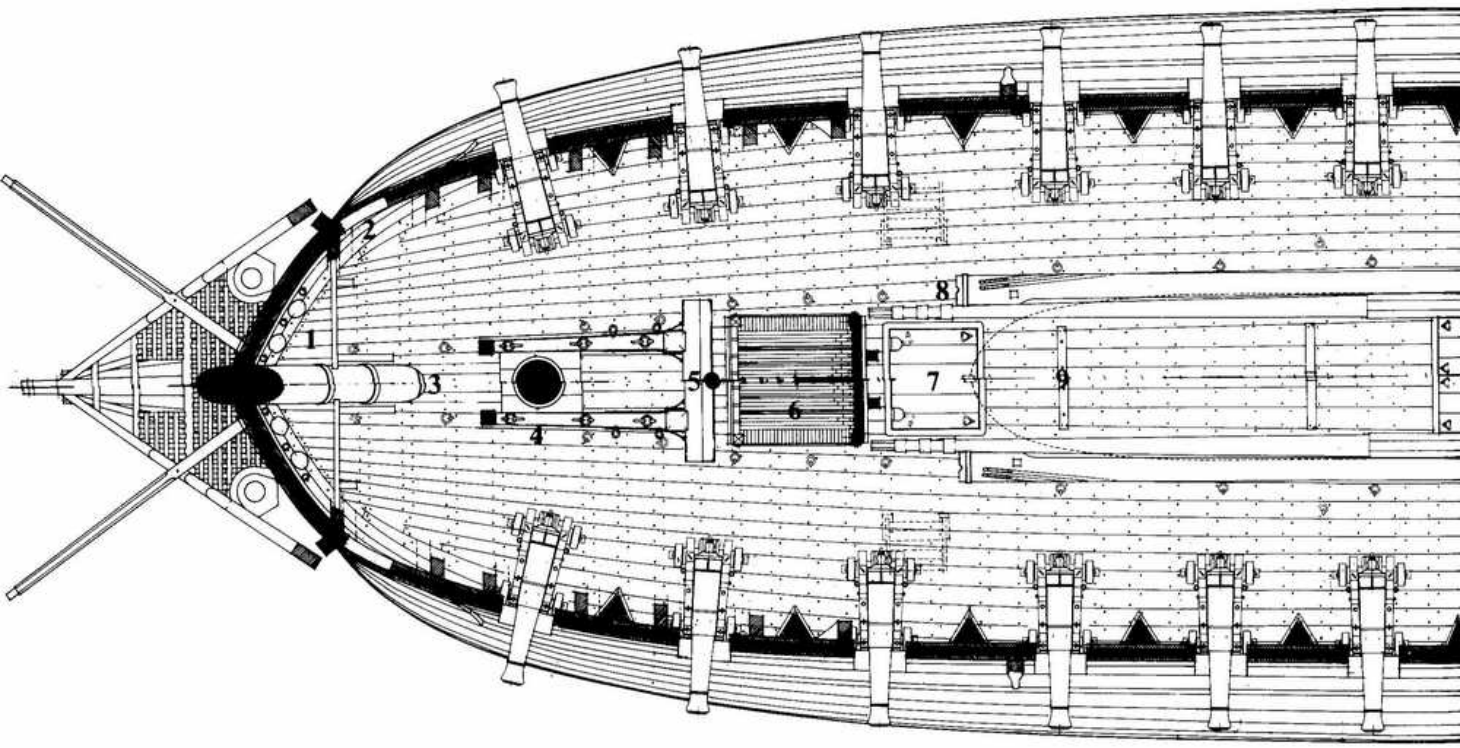
To go back to the drawing, note the position of the boats and the breastrail on the gangway. This is made up of forked iron stanchions, with a swivelling crane, with a plank fixed to the horizontal part. This provides a sort of framework, to which a netting is secured on both the inside and outside. On the outside it is suspended from a line which is threaded through eyes at the head of each of the cranes. Once the nettings are installed they are filled with the crew's hammocks. This arrangement is new, and provides some protection for the men against musket fire and grape. At this period the gangways were only protected in this manner when the vessel went into action.

The breastrail divides at the forward end of the gangway, the main part running down to the plankshеer in a double curve; this is to leave room for the passage of the maintack.

The channels are at the level of the waist rail. Somewhat curiously, the preventer-plate of the chains straddles the edge of the upper wale.

The arrangement of the gunports determines the position of the deadeyes, and note the presence of a separate small stool abaft the mizen-chains for a backstay.

*Blaise Ollivier, "*Remarks on the Navies of the English and the Dutch, 1737*", published by Jean Boudriot Publications as *18th Century Shipbuilding*, edited by David H. Roberts, 1992.)



The Upper Deck

The arrangements are those common to all 8- and 12-pdr frigates of the French Navy at this time, except for the accommodation aft. Note the space taken up by the spare spars, which have to run back quite a long way under the quarterdeck if they are not to cause an obstruction in the galley where they may also be damaged. The heelings of the topmasts are facing forward, but this is not obligatory. If the topmasts and yards are of different lengths, the weight must be evenly distributed, for example by placing the main-topmast and the fore topsail-yard to starboard.

The crew, who berth on the gundeck, have the use of a single ladderway (**15**) to the upper deck, situated forward of the after-hatch. The officers use the main ladderway forward of the mizen-mast. The bread oven is situated on the gundeck between the main-hatch (**10**) and the mainmast, and this explains the presence of scuttles (**11**) to allow the smoke to escape.

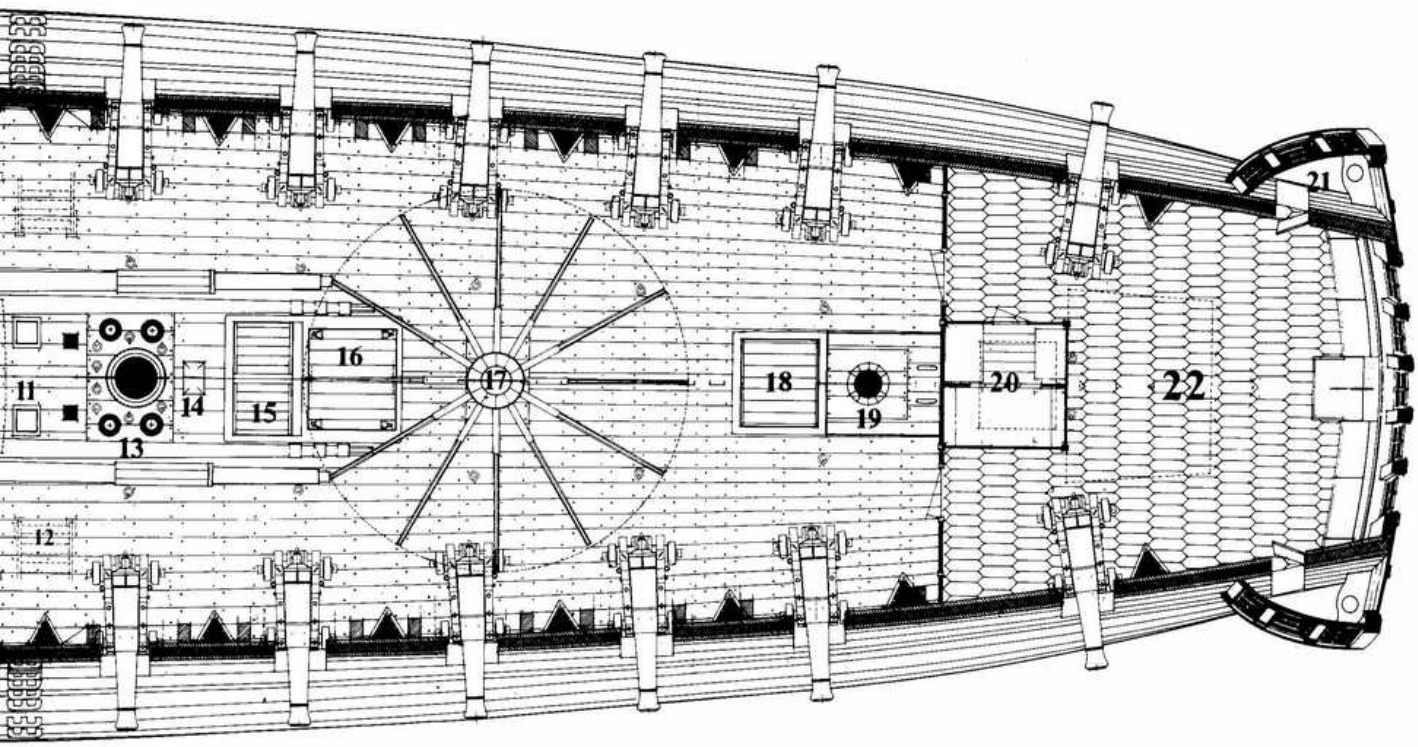
The main capstan has only one barrel, so that it must be placed on the upper deck where the riding-bitts are; it is equipped with twelve bars, with the bar-holes cut chequerboard-fashion in two rows of six round the drumhead.

The bulkhead of the wardroom is set up just aft of the tiller-ropes of the steering wheel; a light structure of joiner's work surrounds the mizen-mast and the tiller-ropes, forming at the same time a meat-room, which is a sort of larder (see *74-G.S.*, vol. II).

The bulkhead which divides off the wardroom from the upper deck can be struck down when the vessel is cleared for action. Access to the wardroom is by way of two doorways, and between them is a bunk (**20**) for the second in command, illumination being provided by means of a skylight in the deckhead above. In this position the bunk impedes the service of the aftermost gun, and no doubt it too would be struck down before going into action.

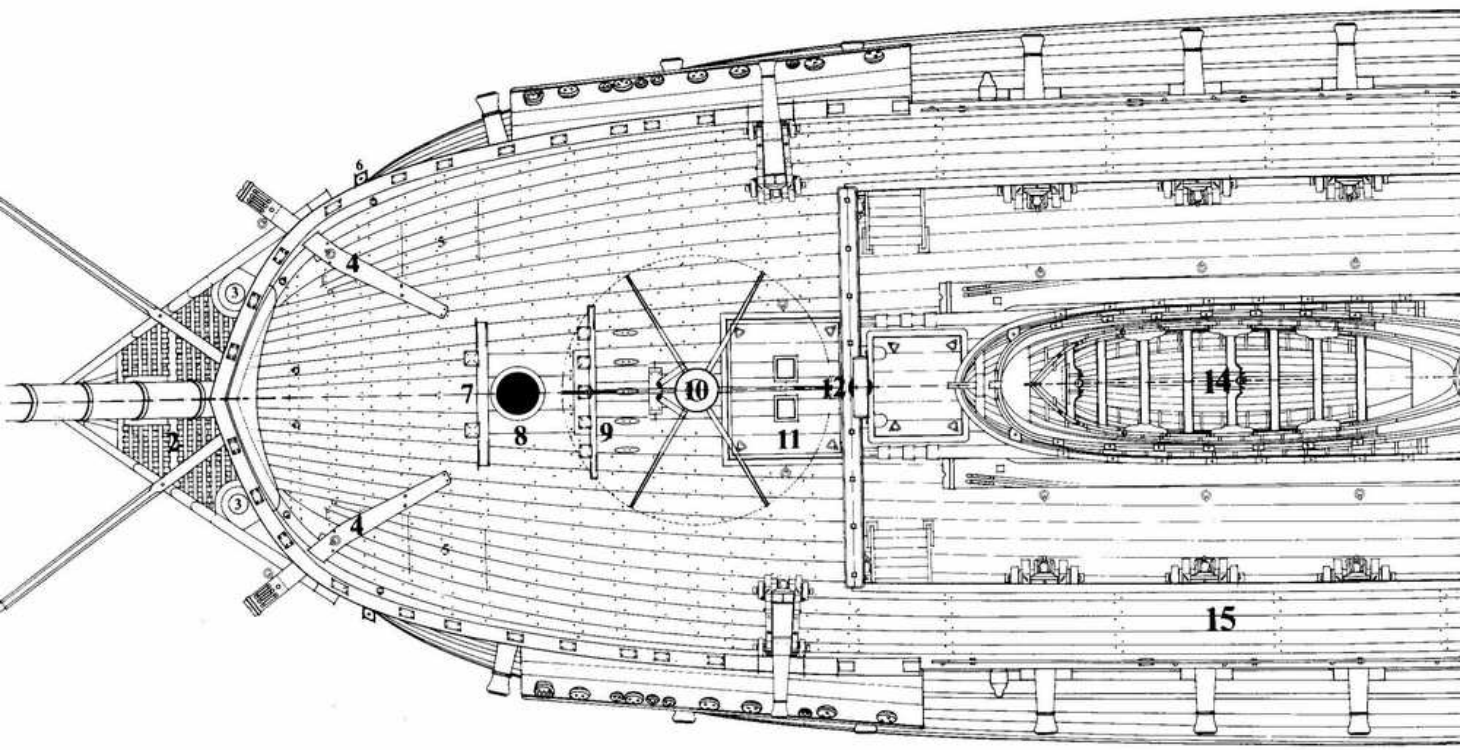
The wardroom is extremely large, and is panelled; the deck-planking is covered by parquet laid over the top. The furniture has not been shown, except for the lockers forming seats under the stern-lights. The wardroom also serves as the stateroom, but it is improbable that it would be reserved for the sole use of the Captain who has been "evicted" to the deck-cabin above. Moreover, the quarter-galleries (**21**) and their privies lead off the wardroom, so that the officers are obliged to have free access to this cabin.

In short, the officers continue to enjoy the use of the wardroom as always, and the removal of the poop or the adoption of the much-diminished half-poop deprives the Captain of his great cabin. It is thus at the Captain's expense that the new arrangements are introduced, which goes some way towards explaining



the objections of many officers to them.
We should note however before concluding this subject that the Captain was eventually to win back his traditional privileges: in 1807 new Regulations gave him exclusive use of the wardroom, and the officers were banished to the gundeck, forward of the gunroom, their cabins opening onto a small mess area.

Key:
1. Manger. Separated off to allow the cables to drain.
2. Bowchase port. The sides of this port and the next one are perpendicular to the side of the vessel.
3. Bowsprit. The step is on the gundeck.
4. Bitt-standards. The arangement is entirely typical of French ships; note the way they abutt the pins of the fore topsail-sheet bitts.
5. Crosspiece. Shortage of space means that the spindle of the fore jeer capstan cuts into the crosspiece of the riding bitts.
6. Galley. The arrangement is the usual one on French ships (see *74-G.S.*, vol. II).
7. Cable-hatch. In its usual place abaft the galley, directly below the forecastle breastwork.
8. Spare spars. Two topmasts and their yards, supplemented by a number of smaller spars.
9. Boat-chocks. These support the keel of the longboat, into which are nested the barge and cutter. The thwarts of the first two are removable to make this possible.
10. Main-hatch. As its name implies, this is the largest hatchway on board the frigate and is closed by a hatch formed of two panels.
11. Scuttles. These allow the smoke from the oven on the berth-deck to escape.
12. Gangway ladders. Four ladders provide access to the gangways from the upper deck; they can be struck down, and are used by the crew.
13. Mainmast and pumps. Note the wedges of the mainmast; there is a similar arrangement on the gundeck for the foremast.
14. Jeer-bitts. From about the middle of the century the fore jeer-bitts were abandoned, but the main jeer-bitts remain, used primarily for the main-topmast.
15. Forward ladderway. Used by the crew to gain access to the upper deck from below.
16. After-hatch. In its usual position, forward of the main capstan.
17. Main capstan. Has 12 bars in two rows, allowing it to be worked by up to 60 men.
18. After ladderway. Reserved for the officers, it provides access from the gundeck to the upper deck and from the latter to the quarterdeck.
19. Meat-room. This is a light structure surrounding the mizen-mast and the tiller-ropes.
20. Cabin. Belonging to the second in command.
21. Quarter-galleries. Contain the privies reserved for the use of the officers.
22. Wardroom. Serves as drawing-room and dining-room for the officers, and as a great cabin when required.



Forecastle and Quarterdeck

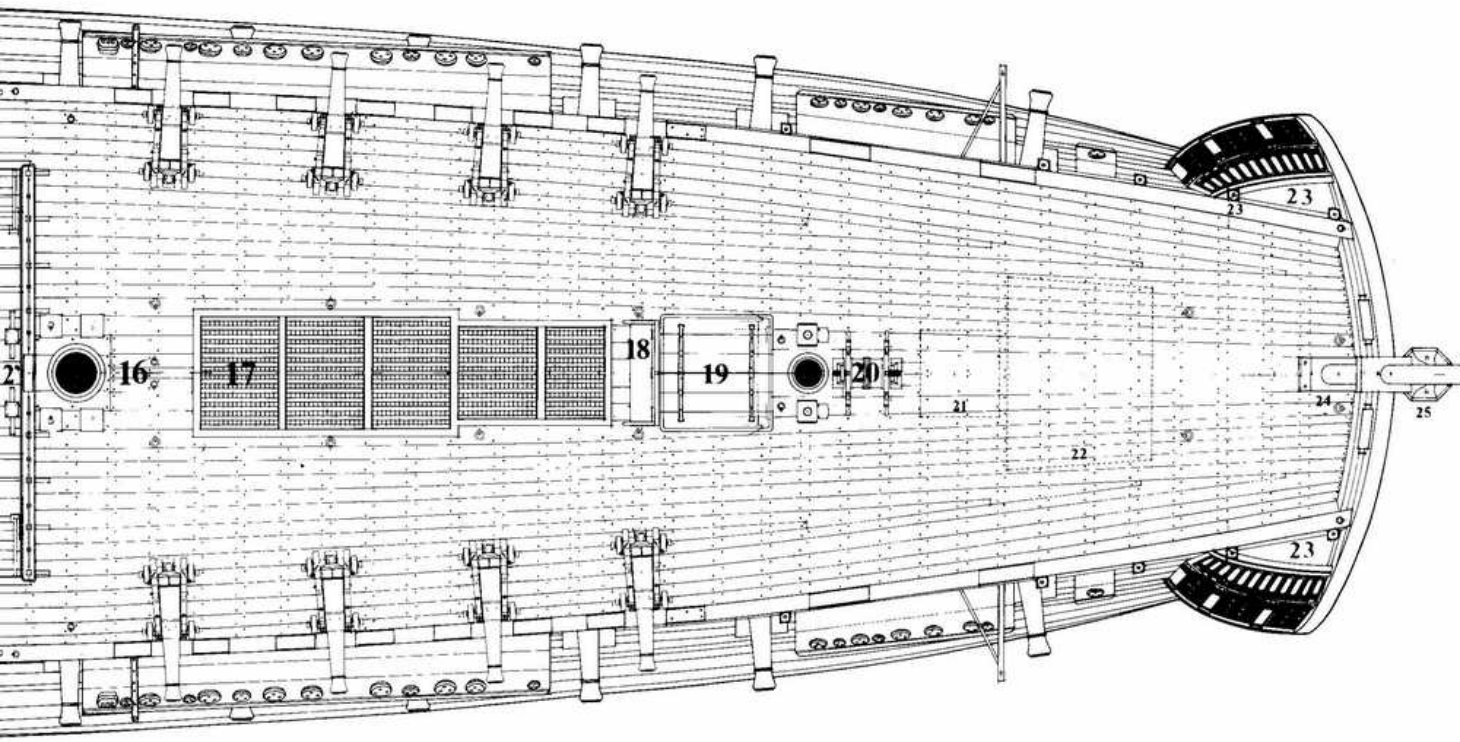
This deck-plan shows the frigate's considerable tumblehome and the respective lengths of the forecastle and quarterdeck, linked by the gangways which are on the same level. The quarterdeck finishes one beam forward of the mainmast.

In a sense both these elements are characteristic features of 12-pdr frigates, differentiating them from the smaller 8-pdr class: the latter have their quarterdeck breastwork abaft the mainmast, and their gangways (or more strictly, *gangboards*) are about a foot lower than the quarterdeck and the forecastle which they link.

On the *Belle-Poule*, the forecastle is armed only with two 6-pdrs (although there is in fact room for four), with eight more of the same calibre on the quarterdeck. This secondary armament is more powerful than that originally intended for the class, but the tendency towards increasing it is understandable. Note the bitts abaft the foremast: they are a development replacing the earlier lead-blocks, and are composed of a series of pins with sheaves, with belaying cleats nailed to the deck. This is the forerunner of the ninepin bitts adopted later.

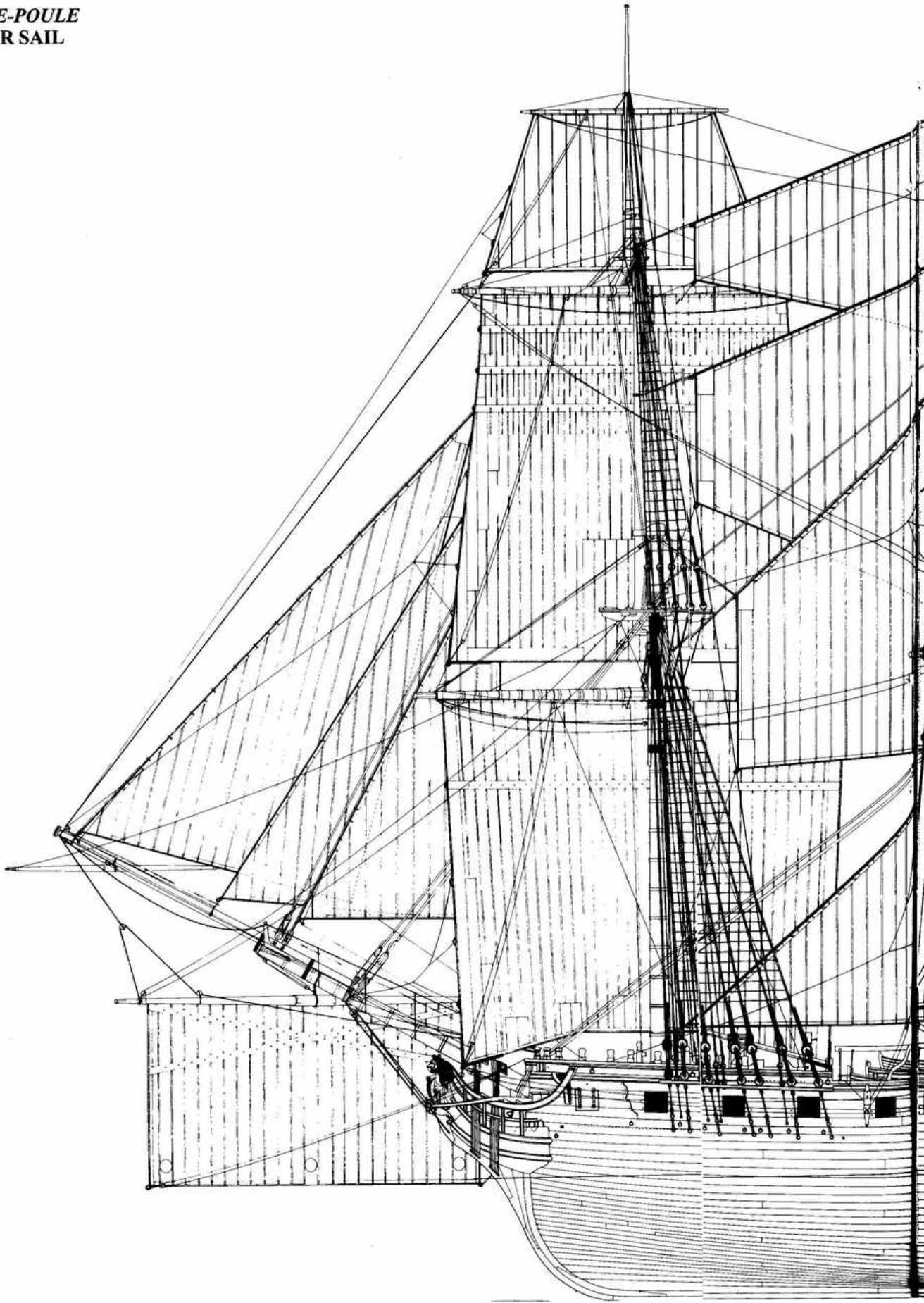
Around the mainmast can be seen the four small scuttles which are removed when the pump spears are inserted. Abaft the mainmast can be seen a series of gratings, and the watch bench backing onto the berthing of the after ladderway. Next, the mizen-mast with the two binnacles, one on either side, and the double wheel. The after part of the quarterdeck is clear, but a dotted line shows the position of the deck-cabin and of the skylight forward of it. Note the iron brackets abaft the mizen-channels: their purpose is to provide a better lead for the mainsheets.

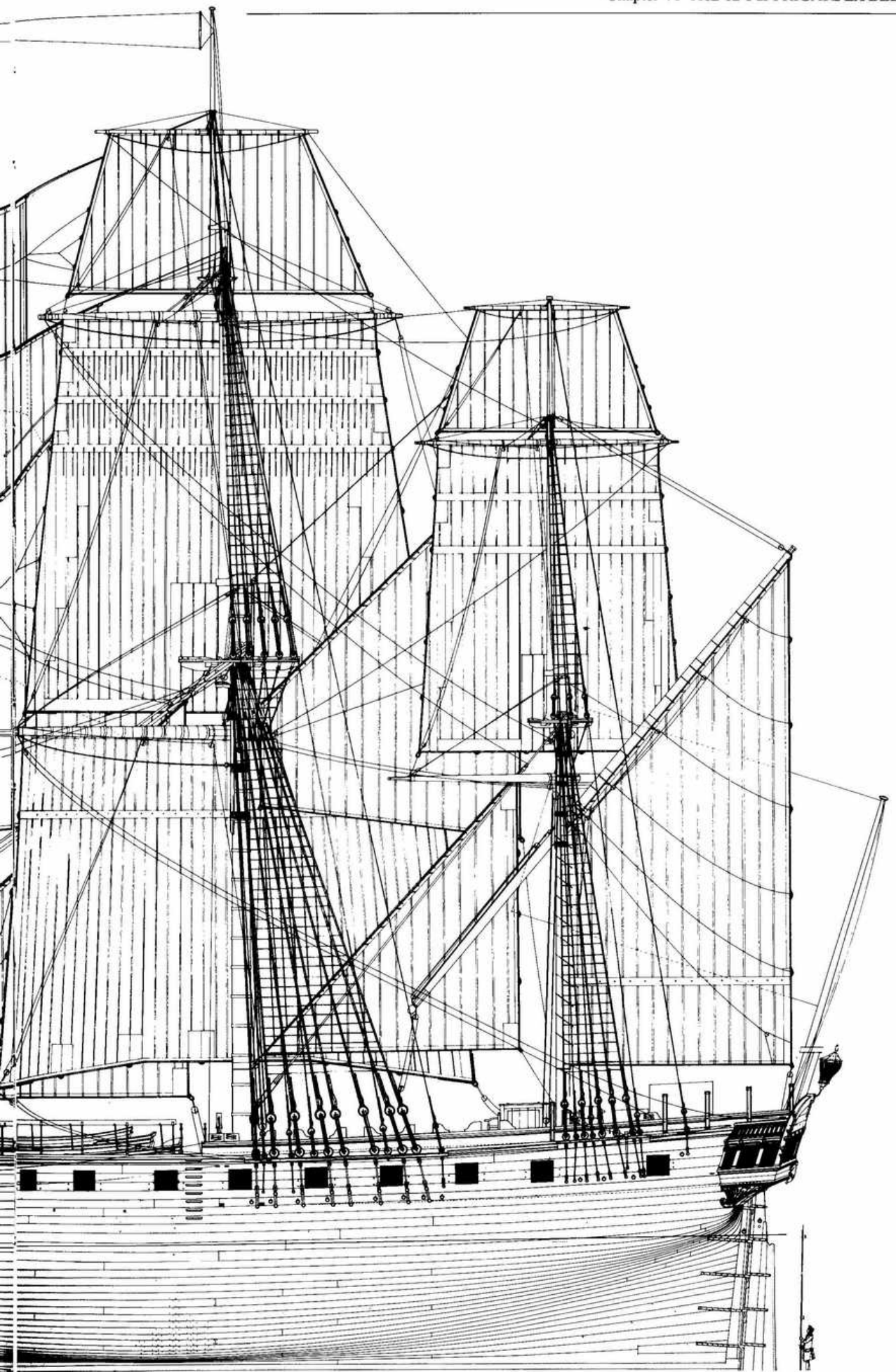
1. Bumpkins. These extend the foretack outboard, and have been part of the rigging of the head since the 1730s.
2. Head. The frigate has a round bow, so that the platform is correspondingly smaller; access to the head is from the forecastle.
3. Seats of ease. Tucked away in the corners of the platform, these are for the crew.
4. Catheads. Bolted to the beams of the forecastle.
5. Spar-shore scuttles. These are made up from short lengths of plank so that they lie flush with the deck, and they are caulked.
6. Swivel gun stocks. There are two on the forecastle, and a further ten on the quarterdeck.
7. Fore topsail-sheet bitts. The cross-piece is shown here abaft the pins, but sometimes it is fastened to their fore side.
8. Foremast partners. A hoop secures the mast-coat where the lower masts pass through the partners in the decks.
9. Bitts. For the rigging of the foremast. The earlier lead-blocks have given way to a series of pins with sheaves and belaying-cleats on the deck.
10. Fore jeer capstan. Fitted with six bars. For its use, see *74-G.S.*, vol. IV.

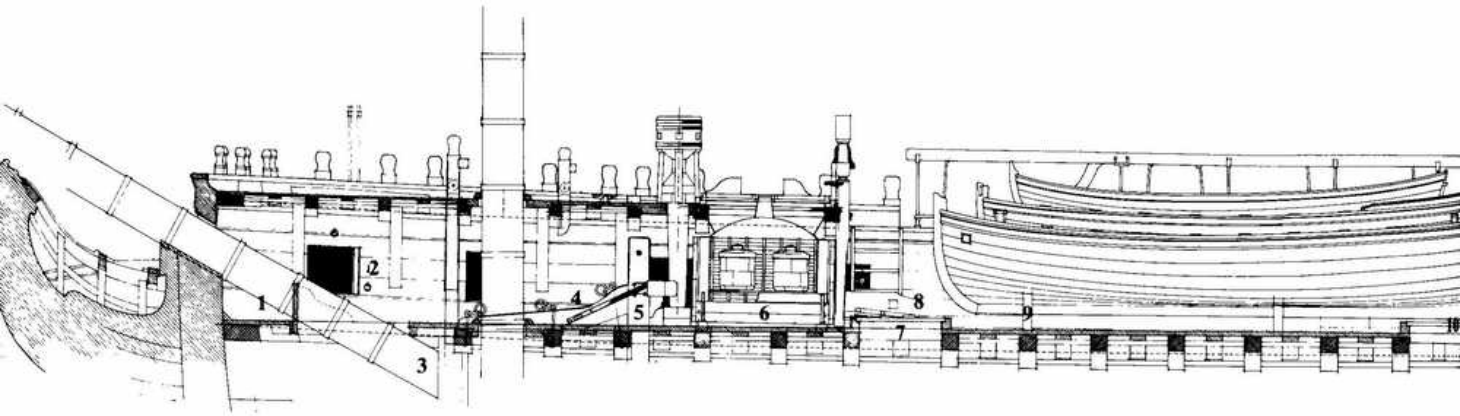


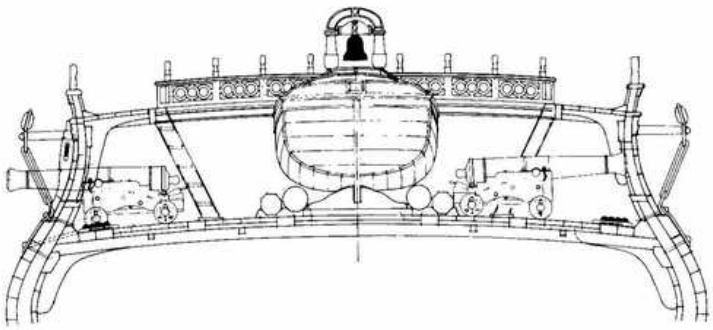
11. Hatch over the galley. The small scuttles are often fitted with hoods or chimneys of sheet iron.
12. Breastworks. The forecastle breastwork incorporates the belfry of the ship's bell, while the quarterdeck breastwork houses the smaller watch-bell.
13. Entering ladders. The starboard one is reserved for the officers.
14. Boats. Of the three boats, only the cutter has its thwarts fitted and its oars and rigging placed inside, so that it can be hoisted out quickly should the need arise.
15. Gangways. There is sometimes a series of stanchions with a handrail on the inboard side of the gangway.
16. Mainmast and pumps. To be strictly accurate, what we can see are the small scuttles sealing off the barrels of the pumps.
17. After-hatch. This is the foremost of the hatches formed of gratings, and is immediately overhead the hatch in the upper deck.
18. Watch bench. In theory this was abolished in 1786.
19. Berthing or hood of the after ladderway. It opens to starboard.
20. Steering wheel. It is situated immediately abaft the mizen-mast, and on either side of the mast can be seen the binnacles.
21. Skylight. I have merely indicated its position.
22. Deck-cabin. The same comment applies.
23. Bell-top of the quarter-galleries. The life float is stowed in the bell-top or upper finishing of the galleries. Later, with the adoption of the driver boom, the float or *buoy of safety* was suspended from the after end of the boom.
24. Step of the ensign staff. The heel of the staff seats in a hollow chock and the staff itself is secured to the central timber of the taffarel by means of a small cap.
25. Stern-lantern. Frigates are entitled to a single stern-lantern only. It was placed lower down when the driver-boom was adopted, and finally disappeared, as did the ensign staff.

BELLE-POULE
UNDER SAIL







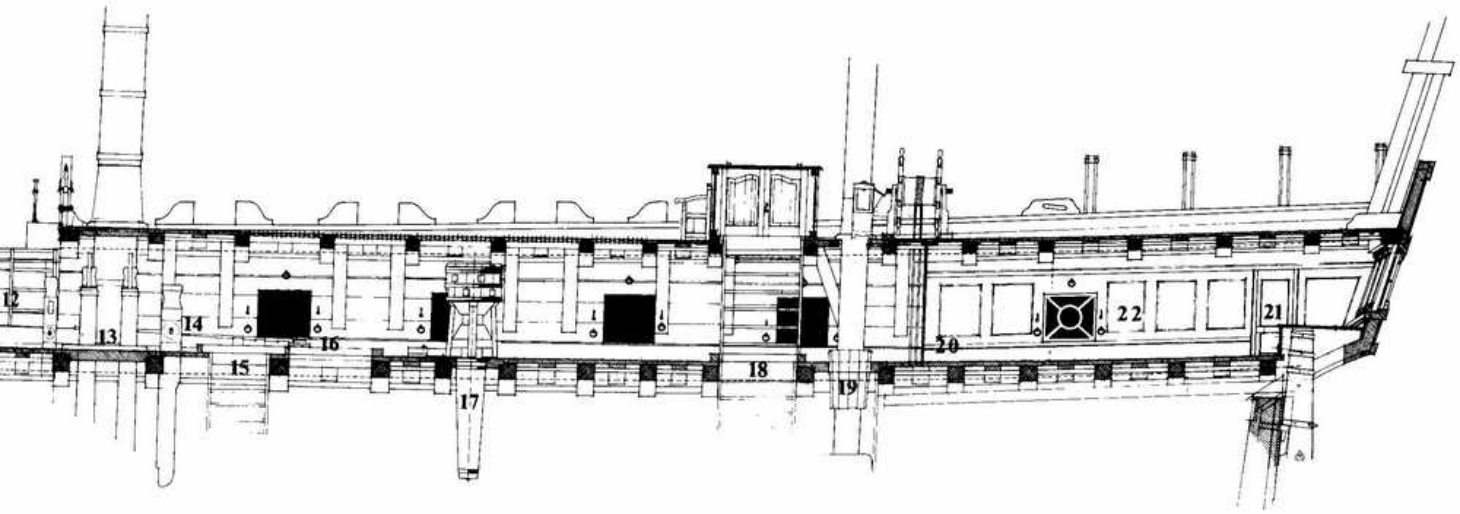


Longitudinal Section

This is only a partial section, since I have not shown anything below the upper deck.
In the key I have used the same numbers as for the plan of the upper deck. Note the boats in the waist: a transverse section shows the amount of space they occupy, together with the spare spars. The room left for the guns to recoil is necessarily restricted, especially for those beneath the gangways.
Since part of the vessel's side is hidden by the boats I have added another small drawing where the boats have been removed. Note in particular the two kevels.

1. Manger
2. Bowchase port
3. Bowsprit
4. Bitt standards
5. Bitt pins
6. Galley fire
7. Cable-hatch
8. Spare spars
9. Boat chocks
10. Main hatch
12. Ladders to gangways
13. Mainmast and pumps
14. Jeer bitts
15. Forward ladder
16. After hatch
17. Main capstan
18. After ladder
19. Mizen-mast
20. 1st Lieutenant's cabin
21. Doorway to quarter-gallery
22. Wardroom

Number **11** designates the scuttles over the oven, not shown in this drawing. The bulkheads of the second officer's cabin have also been omitted, for the sake of greater clarity.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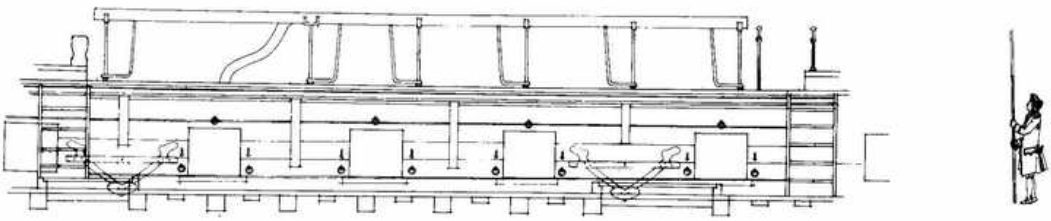
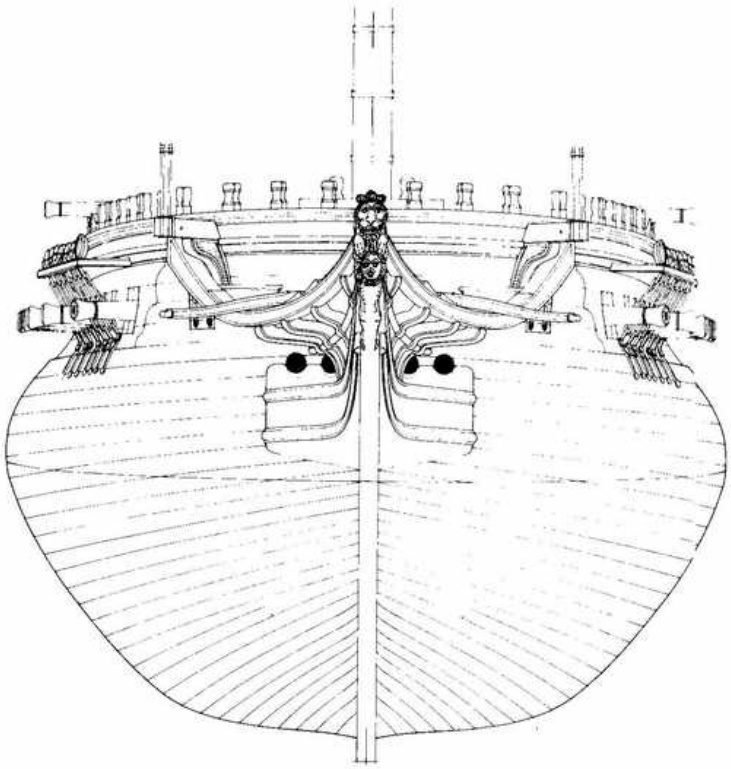
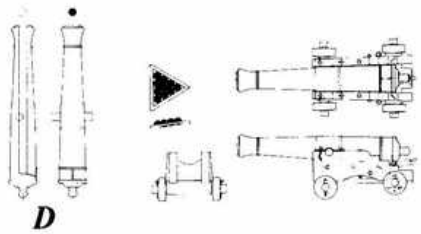
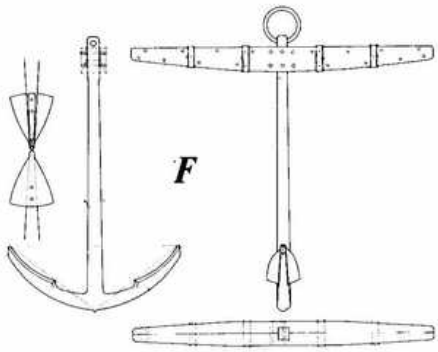
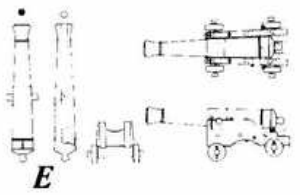
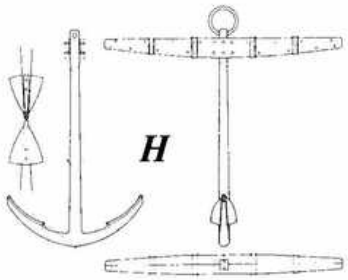


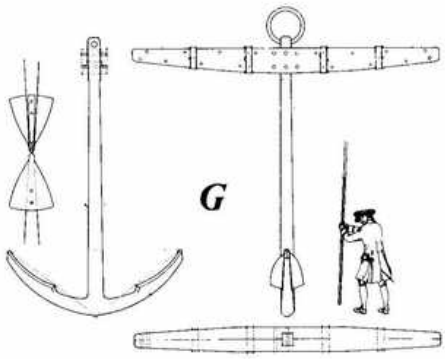


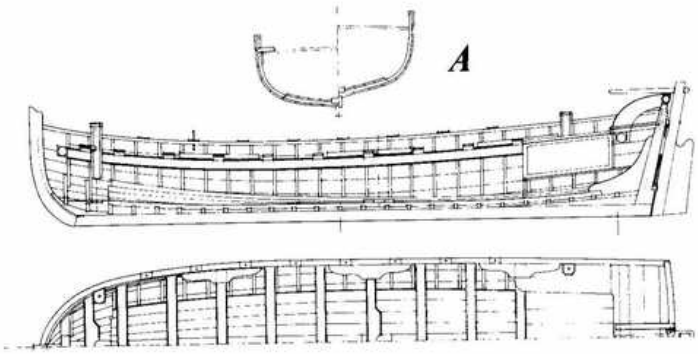


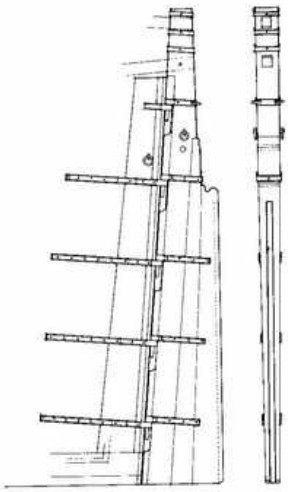


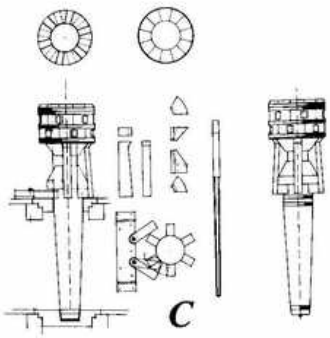


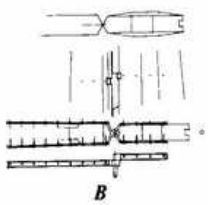












Various Items of Equipment

I have reproduced on this page at a scale of 1:108 a number of fittings and items of equipment. This is not the place for a detailed commentary, which is given in the text which accompanies the set of plans of the *Belle-Poule* available separately.

Chapter VII
EIGHTEEN-POUNDER FRIGATES

18-Pdr FRIGATES

About twenty years prior to the building, in 1782, of the first frigate of this class, a proposal was put forward by an Assistant Shipwright, Pierre-Augustin Lamothe, for a frigate armed with thirty 18-pdrs on her upper deck and twenty 8-pdrs on her forecastle and quarterdeck. His memorandum makes reference to the earlier powerful frigates of 40 to 46 guns, which we have already examined, whose major defect was their low height of gundeck sill, so that in anything like a seaway the lower deck guns were useless, making them poor rivals for vessels with a greater height and reasonable stability. Lamothe does not go into all their other defects, but the vessel which he proposes is designed to have no less than 7 feet 6 inches of height of sill and be perfectly stable. Its superiority over all other frigates and 50- and 56-gun ships is guaranteed, and even 64-gun ships would be outclassed in heavy weather[1], as he explains. The length from stem to post was set at 145 feet, breadth 37 feet with little tumblehome, depth in hold 19 feet, displacement 1,450 tons which corresponds to an average draught of 15½ feet.

This memorandum, of which the above is a synopsis, is dated November 22nd 1762, and is addressed to the Court; however, nothing was to come of it.

This does not appear to have discouraged Lamothe, for he went on to prepare the draughts of his frigate, in a document dated January 1769 which is reproduced overleaf. It is apparent that the principal dimensions had by then been reduced, since the vessel measures 142 feet in length, breadth 36 feet, and with a depth in hold of 18½ feet. The length to breadth ratio is 4.11. These details might usefully be compared with those of frigates built towards the end of the 18th century. The limited rake of the stem, the perpendicular sternpost and the considerable length to breadth ratio all confer a decidedly "modern" elegance to this frigate. However, the draught apparently attracted no more support at Court than the earlier memorandum.

A further proposal was made in 1775 by the Master Shipwright at Toulon Dockyard, Joseph-Marie-Blaise Coulomb. His memorandum entitled "*On the usefulness of a new class of frigate armed with 18- and 8-pdrs*" is dated November 15th 1775, and it also is reproduced overleaf in full. In this case, the new class is no more than an extrapolation of the 12-pdr class, with the 12-pdr guns replaced by 18-pdrs and the 6-pdr secondary armament upgraded to 8-pdrs; there is no increase in the number of gunports, although the increase in calibre makes it necessary to lengthen the vessel, and thus to increase its breadth and depth in hold. The greater length in turn makes it possible to increase the secondary armament from six to ten pieces. An original note is struck by Coulomb's proposal to replace the 18-pdrs by 12-pdrs in peacetime in order not to strain the vessels' sides and weaken their fastenings. Their stability is presumed to be greater than for the 12-pdr class in a ratio of 4 to 3, and they should carry their sail better, with easier and slower pitching and rolling motions; being more often close to the horizontal, their natural waterline should be better preserved and thus their leeway reduced.

The scantlings of the timbers was similar if not identical to that of the 12-pdr class, apart from the deck-beams which of course had to be reinforced, and thus the cost of building was scarcely any greater. We will examine these factors more closely in Chapter XI.

Despite Coulomb's authority, his memorandum was ignored. It has to be recognised however, that throughout this period preceding the American War, not a single frigate was laid down.

During the period from 1777 to 1779 inclusive, no less than thirty-six 12-pdr frigates were built, but it was not until 1781 that the first 18-pdr in the French Navy was laid down, this being the *Vénus*, the subject of the next chapter. The decision was somewhat tardy, and no doubt inspired by the decision of the Royal Navy to order two 18-pdr frigates in 1778, both of which were operational by 1780.

In 1782, seven frigates were laid down to the draughts of several different designers, no doubt with the intention of carrying out comparative trials, and, as was done with designs for ships of the line, to settle on an optimum design for the 18-pdr frigate or at the very least their ideal dimensions. Eight frigates were thus available by the closing years of a conflict which was to highlight the very important service which frigates could perform.

The 1786 Programme envisaged a total of 60 frigates for the French Navy, of which 20 should be armed with 18-pdrs. At this date the Navy already had seven, one having been lost during the American War of Independence. By 1790, the programme was well-advanced, since there were fifteen frigates in service and a further three on the stocks. However, there is no evidence that a class design had been adopted at this stage, since nine of the frigates built or building represented different designs from different shipwrights; nevertheless, the general characteristics had at least been established, and the main armament, which had fluctuated between twenty-six and twenty-eight 18-pdrs was finally set at 28 in 1789; the secondary armament was reinforced at the same time, particularly with the adoption of the sea howitzer. During the first few years following the Revolution nothing more was done than to complete the vessels already building.

Between 1793 and 1795, twenty-two frigates were built. It would not be until 1810-1815 that such an important building programme would be undertaken again, with the building then of no less than thirty-six frigates. In the intervening period the numbers laid down were more modest. From 1798 onwards, as we have already seen, no further 12-pdr frigates were built, so that, with the exception of a very small number of 24-pdr frigates, the French Navy at the fall of the Empire was entirely equipped with 18-pdr vessels, epitomising frigate design of the period.

From 1807 onwards the armament was significantly increased with the adoption of iron carronades, replacing the mediocre brass sea howitzers.

In theory at least, from 1810 onwards, all new frigates built had to conform to a single class design[2].

The last 18-pdr frigates were laid down in the years 1813 to 1814. Some of them were not launched until the Restoration. The French Navy of the post-Napoleonic era still had nearly forty 18-pdr frigates, half of which were still in service in 1830, the last being finally struck from the lists in the middle of the 19th century. The existence of such a large number of these vessels gave rise to a number of modifications to their armament, internal arrangements, upper works, etc., so that even under Louis-Philippe they were not too seriously outclassed.

Nearly one hundred and fifty 18-pdr frigates figure in the Navy Lists between 1782 and 1850, a remarkable testimony to the success and longevity of the design, which scarcely altered from the original concept as laid down in 1780-1781.

There was a final resurgence of the class with the adoption, in 1824, of the so-called third rate frigates whose characteristics were very similar to the 18-pdr class, armed however with guns appropriate to the technological developments which had occurred under the Restoration.

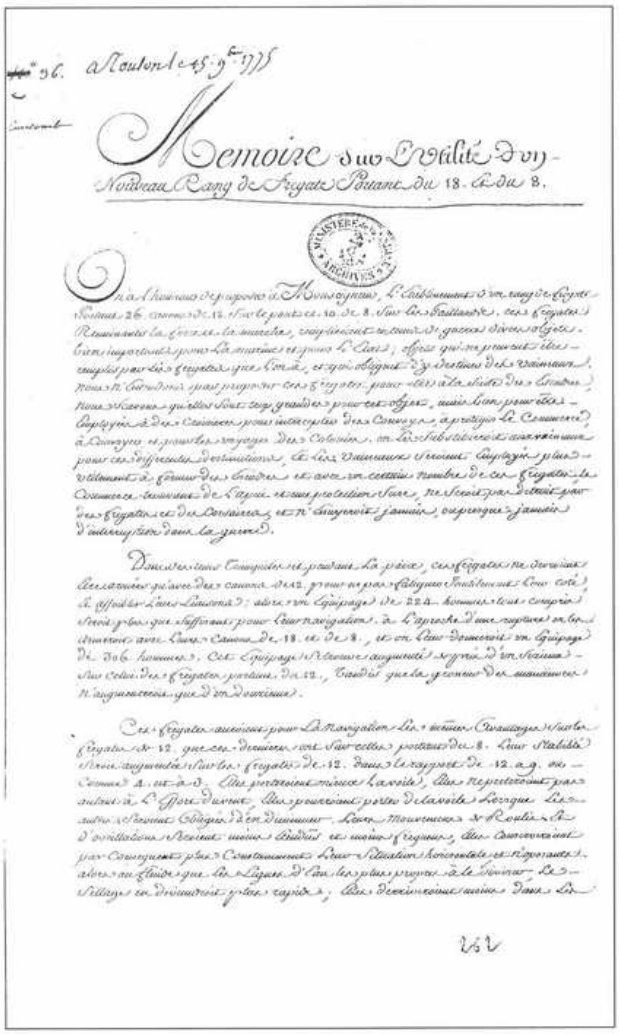
We will examine these third rate frigates in Chapter X, since they were armed with 30-pdrs.

18-pdr Frigates Names & Designers	**Length at the waterline**	**Breadth at h. of b.**	**Depth in hold**	**Average draught**	**Height of gundeck sill**	**Total displacement**	**Block coefficient**	**Distance c. of g. forward of mid-point of length**	**Distance below load waterline**	**Distance of metacentre from c. of g. of underwater hull**
Concorde 1791 – P.-A. Lamothe	144.417	36.667	19.250	15.250	6.000	1423.1820	0.490	5.420	5.583	11.501
Virginie 1793 – J.-N. Sané	144.000*	36.667	19.000	15.000	6.000	1350.7210	0.484	4.416	5.523	11.083
Seine 1793 – P.-A. Forfait	147.000*	37.166	18.000	14.000	6.000	1311.3040	0.483	5.318	5.055	12.257
Valeureuse 1795– C.-H. Tellier	145.000	37.000	18.000	15.360	6.000	1341.1263	0.477	5.032	5.005	11.748
Guerrière 1798 – J.-F. Lafosse	145.000	36.800	19.000	15.000	6.000	1446.6440	0.684	4.742	5.570	10.743

The figures in this table are expressed in French feet and decimals of a foot, and in French tons and decimals of a ton (see p. 10).
Length at the load waterline from rabbet to rabbet including thickness of plank.
Breadth at the height of breadth to inside of plank.
*According to the lines as taken off in the draughts of the NMM, the length on the waterline of the *Virginie* is 142 feet, and that of the *Seine* 146 feet 4 inches.

These examples, taken from the same table as was used in the chapter on the 12-pdr class, demonstrate the very high degree of homogeneity in this class of frigates, except for the *Guerrière*, which has a large displacement and an abnormally high block coefficient, greater even than that of a three-decker(!), unless there is some error in the calculations or typographical mistake? It is worth noting also the displacement of the *Concorde*, which is some 80 tons greater than the average of 1,340 tons for the others, still with a common height of gundeck sill of 6 feet. The three principal dimensions are broadly similar, with block coefficients slightly less than 0.5. The stability would appear to be greater than for the 12-pdr class, but still less than that proposed by Coulomb in the report reproduced overleaf.

1. The height of gundeck sill of 64-gun ships rarely exceeds 5 feet. In a heavy sea, any ship of this strength which is not endowed with exceptional stability will be unable to open its lower deck ports, thus depriving it of its 24-pdr armament. With only 12-pdrs on the upper deck and 6-pdrs on the forecastle and quarterdeck it would be clearly outclassed by the frigate proposed.
2. The class design is that of the *Justice* of 1794, to all intents and purposes identical to Sané's *Vénus* design of 1781.



Mémoire sur l'Utilité d'un Nouveau Rang de Frégate Pesant du 18. et du 8.

Reçu à Versailles le 25 Novembre 1775

Mémoire sur l'Utilité d'un Nouveau Rang de Frégate Pesant du 18. et du 8.

On a l'honneur de représenter à Monseigneur, l'Établissement d'un rang de Frégates pesantes de 26. canons de 8. sur le pont et de 10. de 8. sur les Gaillards, ces Frégates Remplaceroient les Frégates de 24. de 8. et de 12. de 8. et donneroient divers Objets bien importants pour la Marine et pour l'Etat; Objets qui ne peuvent être remplis par les Frégates que l'on a, et qui obligent à des Destinations des Vaisseaux, nous n'en donnons pas proposer ces Frégates pour cet objet, mais bien pour être employées à des Croisières pour intercepter des Convois, à protéger le Commerce à Bord, à pourvoir au voyage des Colonies, en Cas de Substitution et aux retours pour ces Expéditions d'Armements, et Cas Vaisseaux seroient employés plus utilement à former des Escadres, et avec un certain nombre de ces Frégates de Croisières, suivant de l'Appui, ne seroit pas obligé pour des Frégates et des Corvettes, et n'employeroit jamais, ou presque jamais d'interruption dans la guerre.

Dans des mêmes Comptoirs ne pesoient que la pièce, ces Frégates ne devroient avec armées qu'avec des canons de 12. pour ne pas obliger Soubise mettre Son côté à affoiblir Leurs Batteries; alors Son Equipage de 224. hommes, tout compris, seroit plus que suffisant pour leur navigation, à l'approche d'une rupture on leur donneroit avec Leurs Canons de 18. et de 8., et on leur donneroit Son Equipage de 306. hommes. Ces Equipages Nouveau augmenté ne prit d'un Sixième sur celui des Frégates pesantes de 12., tandis que la grosseur des manœuvres n'augmenteroit que d'un dixième.

Ces Frégates auroient pour la Navigation les mêmes Avantages sur les Frégates de 12. que ces dernières ont sur celles portant du 8. Leur Stabilité Seroit augmentée sur les Frégates de 12. dans le rapport de 12. à 9. et — comme A. est à D. Elles pourroient mieux la voiles, elles ne pourroient pas autant à la Mer, mais elles pourroient porter de la voile lorsque les autres seroient obligés d'en diminuer. Leur mouvement de Roulis et d'oscillations seroient moins étendus et moins réguliers, elles Combattroient par Conséquent plus Constamment. Leur Situation horizontale et Respirantes abres au Canon, que les Lignes d'Eau les plus propres à le Soutenir. Le Sillage en deviendroit plus rapide, elles deviendroient moins dures. Les Roulis obligeroient à tendre moins de Vent, parceque elles deviendroient dures. L'Eau plus de résistance sur le côté.

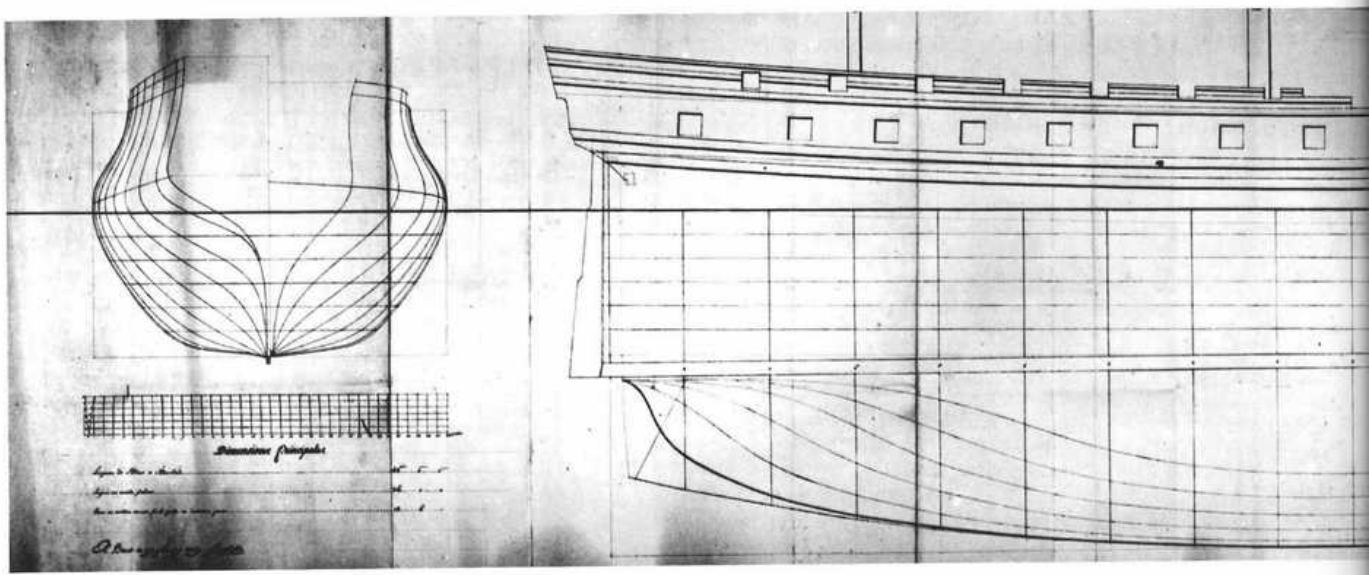
On trouveroit dans ces Bois construit que l'on a dans le port pour les Frégates portant du 12. La Substitution seroit pour ces Frégates proposées en Jauge. Seulement de Cèdre que ces pièces ont tant sur Leur Bord que sur Leur gabarage, et que l'on est obligé d'aller pour les radoubs aux Dimensions qui Frégate. Les Frégates de 12. exigé Reconnaissance aux augmentations de Jauge. Les Bordages des ponts, Gaillards, et Cage deviendroient Calcinés et intérieur Seroient de même épaisseur que Ceux des Frégates de 12., et ne Calcineroit Seulement que sur plus grande quantité. Les Bois seroient quinze pouces sur plus d'équarissage dans les deux Sens, et un pouce plus de longueur seroient pour l'augmentation de Largeur.

Le Gard de la Depense d'une pareille Frégate seroit pour Sa Construction que pour celle de 12. La Différence de la Campagne avec celle d'une Frégate portant du 12., est Si petite qu'elle ne doit pas être mise en parallèle avec les Dépenses que Son Expédition occasionneroit dans un Jour de guerre, puisque celle de 12. est de 207 hommes pour la Coque de 12 à 14 pour la Garniture, deux Layette, et de 9 pour Compris les Canons, Sec Artillerie, et les Vivres de ces diverses matières.

La Dépense en Appointements, Table, Soldes, Gratifications ne diffère de celle d'une Frégate de 12. que de 1676th. 10s. Sept sols pour mois, Cequi fait un objet bien minime, en le Comparant avec les Avantages que ces Bâtiments.

A Toulon le 16. Novembre 1775.

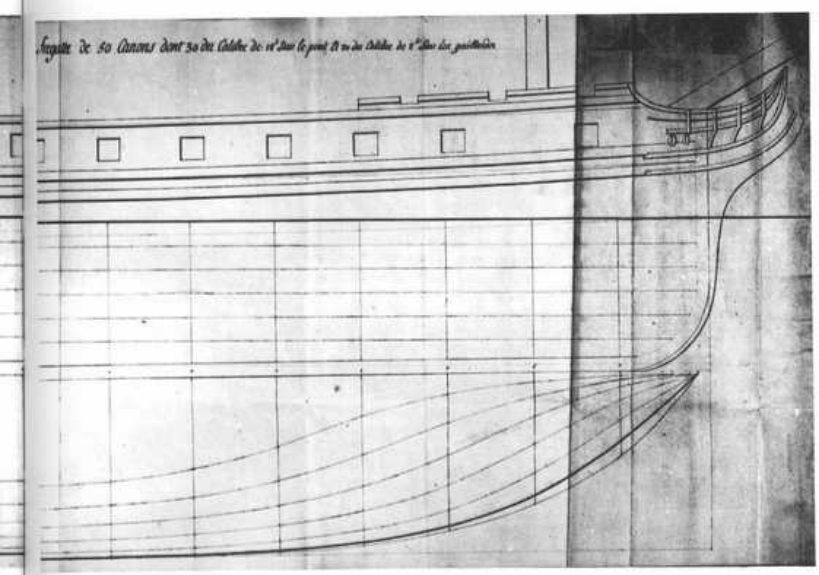
Toulon

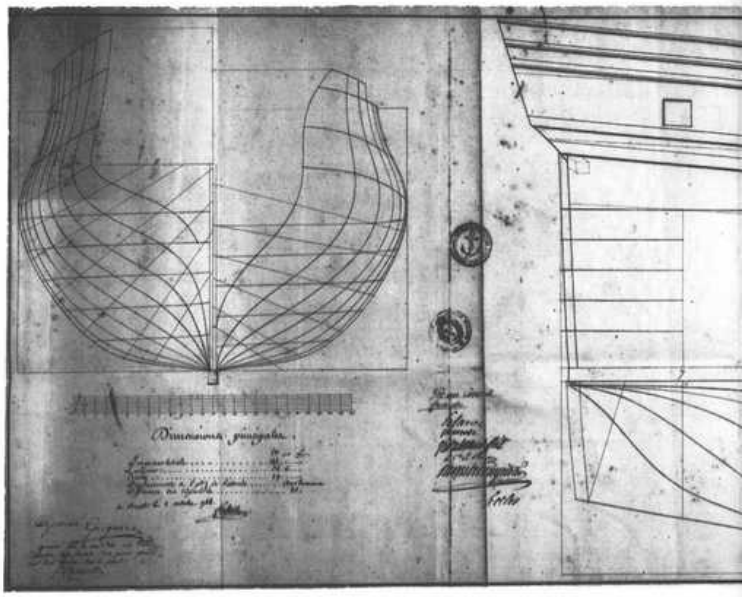


Memorandum drawn up by Joseph-Marie-Blaise Coulomb, nicknamed the Chevalier Coulomb since he was ennobled in 1779. The nephew of Luc Coulomb, Joseph Coulomb was made an *Élève constructeur* in 1745, *Sous-constructeur* in 1757, *Ingénieur-constructeur* in 1765, and *Ingénieur-constructeur en chef* in 1768. He ended his career at Rochefort as *Ingénieur Directeur*. Born in 1728, he died in 1800.

This draught, dated January 19th 1769, bears the signature of the shipwright Pierre-Augustin Lamothe*, and follows on from the report which he had prepared in November 1762.
The length between perpendiculars has been reduced to 142 feet, rather than the 148 originally proposed, thus rather shorter than the 64-gun ships of the period, which carried twenty-six 24-pdrs on the gundeck and were between 151 and 156 feet long.
The length to breadth ratio is 3.944, with a breadth to inside of plank of 36 feet; the depth in hold, at 18½ feet, is slightly greater than the half-breadth.

*P.-A. Lamothe was made an *Élève constructeur* in 1752, *Sous-constructeur* in 1757, *Sous-ingénieur constructeur* in 1765, and retired in 1784. He died on the 16th Brumaire of Year X of the Republic (November 6th 1801).





L'ÉRIGONE

From 1810 onwards all the 18-pdr frigates laid down for the French Navy had to be to the lines of the *Justice* (ex-*Courageuse*), built at Brest in 1794-5 to the draughts of Jacques-Noël Sané at the same time as the *Cornélie*. In March 1810 he drew up the official draughts and tables to which all vessels of this class were thereafter to conform. It is worth noting that there were a number of minor differences between these draughts and those of the *Justice*, the length being greater by some 6 inches, and the depth in hold by 1 inch.

The principal dimensions as laid down in 1810 were thus as follows: length between perpendiculars 144 feet 6 inches, breadth to inside of plank 36 feet 8 inches, depth in hold 19 feet 1 inch. The displacement at a height of gundeck sill of 6 feet was 1,390 tons (1,350 tons according to some sources).

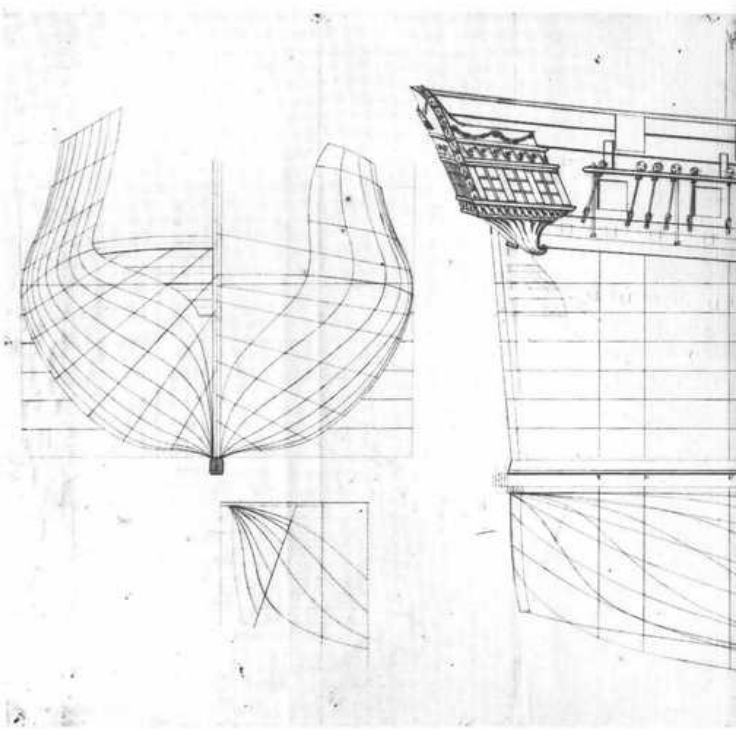
The *Érigone* thus conforms to the dimensions as laid down. Built between 1810 and 1812 at Antwerp, she was struck from the lists of the French Navy in 1825.

The general appearance of her lines is very close to those of the original 18-pdr frigates designed by Sané, save that the sheer of the wales is more pronounced[1]. The upper works are reduced to an absolute minimum on the forecastle, but are rather higher aft; there is, however, no poop.

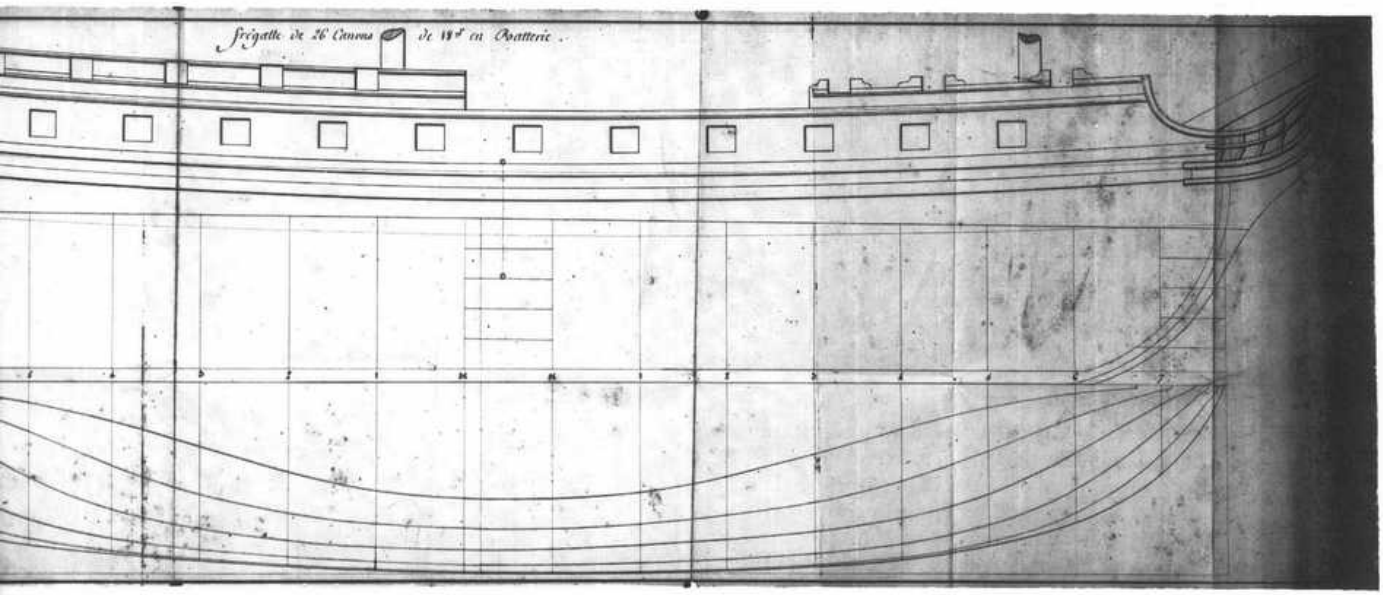
The main armament is unchanged, and there is no bowchase port. The secondary armament does not conform to the 1807 Establishment for guns, since there is only one 8-pdr long gun on the forecastle, flanked by two 24-pdr carronades; the quarterdeck is armed with six 24-pdr carronades, making a total therefore of sixteen 24-pdr carronades and two long 8-pdrs, which, with the twenty-eight 18-pdrs on the upper deck make up a total armament of 46 guns, an absolute maximum. This was in fact only officially sanctioned by the 1827 Establishment.

Between the forecastle and the quarterdeck can be seen the beams supporting the gangways, and these extend across the waist as skid-beams for the spare spars and for three of the ship's boats[2] (3 others are hung from davits). This arrangement is in imitation of Royal Navy practice, and has the advantage of disencumbering the upper deck, but on the other hand, the boats are more exposed to enemy fire and increase the topside weight[3].

Note also that the steeve of the bowsprit has been reduced to 22 degrees, and that the head is attractively curved.

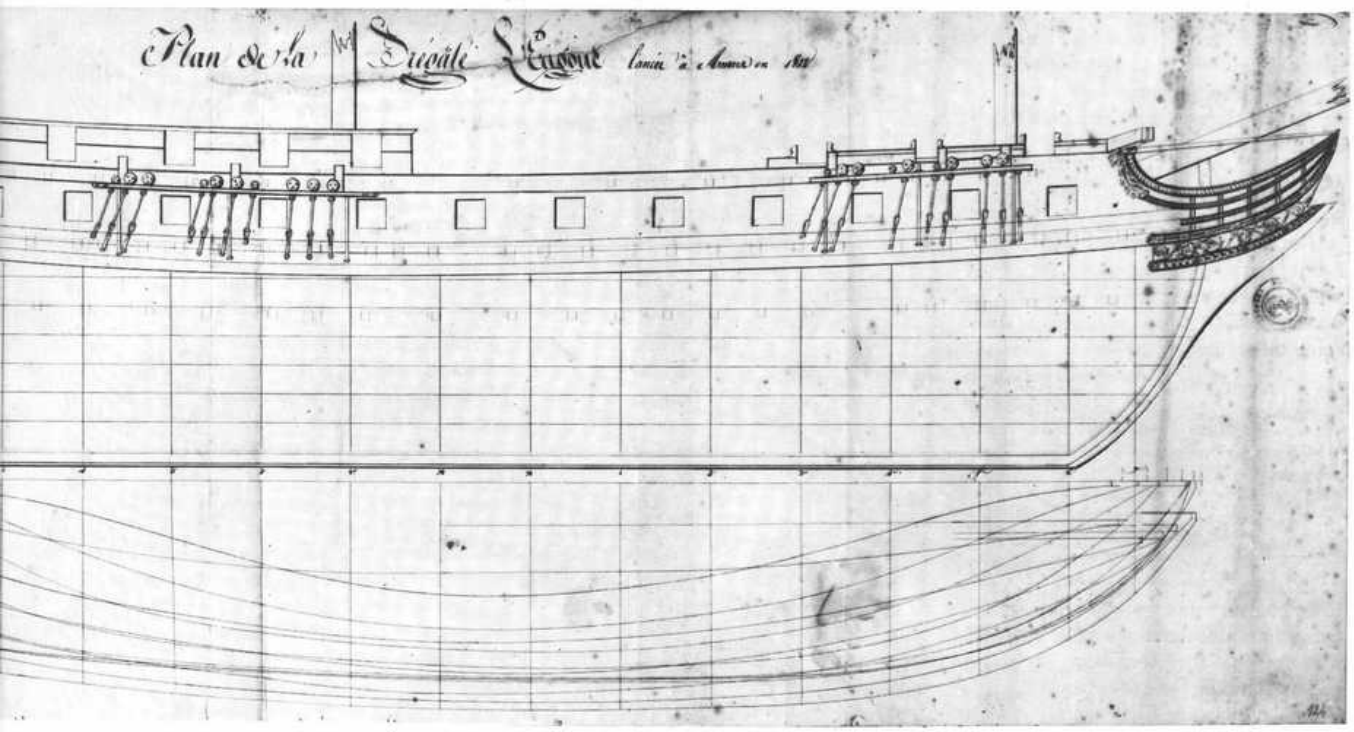


1. The tables drawn up in 1810 and setting out all the dimensions for the class design fixed the following values: depth in hold forward 20 feet 11 inches, amidships 19 feet 1 inch, astern 22 feet 1 inch. The original design called for 2 inches less forward and 1 inch amidships.
2. A good example of this arrangement can be seen on the model of *La Flore* at the Musée de la Marine in Paris.
3. Any increase in the topside weight above the centre of gravity can be prejudicial to the vessel's stability.

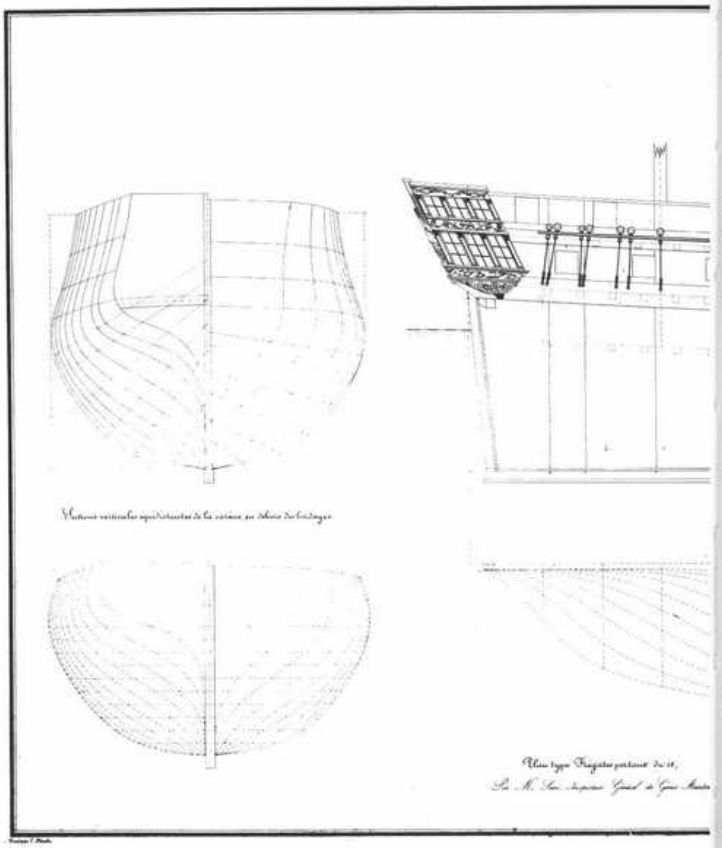


This draught dates from 1785 and should be compared with another draught from the same year of a 12-pdr frigate, which we examined in Chapter V. Both documents bear the signature of Pierre Alexandre Forfait. It would appear that in the case of the 18-pdr above, the vessel was never built. Her principal dimensions are as follows: length 144′0″, breadth 36′6″, depth in hold 19′0″; displacement at 6′6″ height of gundeck sill, 1,390 tons. In the bottom left-hand corner of the draught can be seen the annotation against the approval by the Surveyor that the upper deck should be pierced for 14 rather than 13 gunports.

This draught, like its twin of a 12-pdr vessel, is not typical of Forfait's usual "hand", as exemplified by the *Fortunée* of 1790, or by the even more famous *Seine* shown in the following pages. If we compare the two draughts, both the 12-pdr and the 18-pdr frigate have many points in common. It would appear that the designer applied a coefficient of 1.066 to the three dimensions of the smaller vessel in order to arrive at the lines of the 18-pdr. The displacement is thus increased from 1,140 to 1,390 tons, with a height of gundeck sill of 6′6″ as opposed to 6′4″.



L'ARMIDE



Following the fall of the Empire in 1814, no further 18-pdr frigates were laid down. Building was restricting to finishing the nine vessels which were still on the stocks at this time, the last of which was launched in 1823.

Despite the decision by the King in Council in 1824 that the 18-pdr frigate would henceforth be discontinued, the class design retained for frigates of the third order was that of the *Armide*, a Sané frigate launched at Lorient in 1821 after spending nine years on the stocks. With no new building planned, the class design affected only rebuilds and major repairs, but since there were still some forty 18-pdr frigates in the post-Napoleonic navy, this was still of significance.

The building programmes of 1824-7 called for 16 frigates of the third order in the French Navy, and this figure was confirmed in the 1837 programme. This made it necessary to find replacements for the Sané 18-pdr vessels, and between 1830 and 1850 some fifteen new third order frigates were built, but to new designs, albeit comparable to the earlier 18-pdr frigate designs. The main armament was composed of 30-pdrs, and thus we have elected to discuss these vessels in Chapter X rather than here.

Since the text which accompanies the draughts illustrated here (from the *Atlas du Génie Maritime*, Part I, Pl. 17, 1834) is diffficult to read, the main part is reproduced below (metric measurements):

Principal dimensions

Length on the gundeck from rabbet to rabbet	45.500m
Breadth to inside of plank at the midship beam	11.910m
Depth in hold at the horizontal line of the midship beam	6.172m
Displacement at 1.95 m height of gundeck sill	1,391.605 t.

Stability calculations

Distance from the c. of g. of the underwater hull	to the average load waterline:	1.849m
	forward of the vertical passing through the centre of the load waterline:	1.290m
Height of the lateral metacentre above the c. of g. of the underwater hull		3.396m
Height of the longitudinal metacentre above the c. of g. of the underwater hull		44.765m

Sail plan

Sail area (standing jib, driver, courses, topsails & topgallants)		1,946.757 m^2
Ratio of sail area to block coefficient at the load waterline		3.480
Distance from the centre of effort	to the average load waterline:	20.416m
	forward of the vertical passing through the centre of the same line:	2.405m

Armament

Main:	28 long 18-pdrs
Secondary:	16 24-pdr carronades
	2 short 18-pdrs

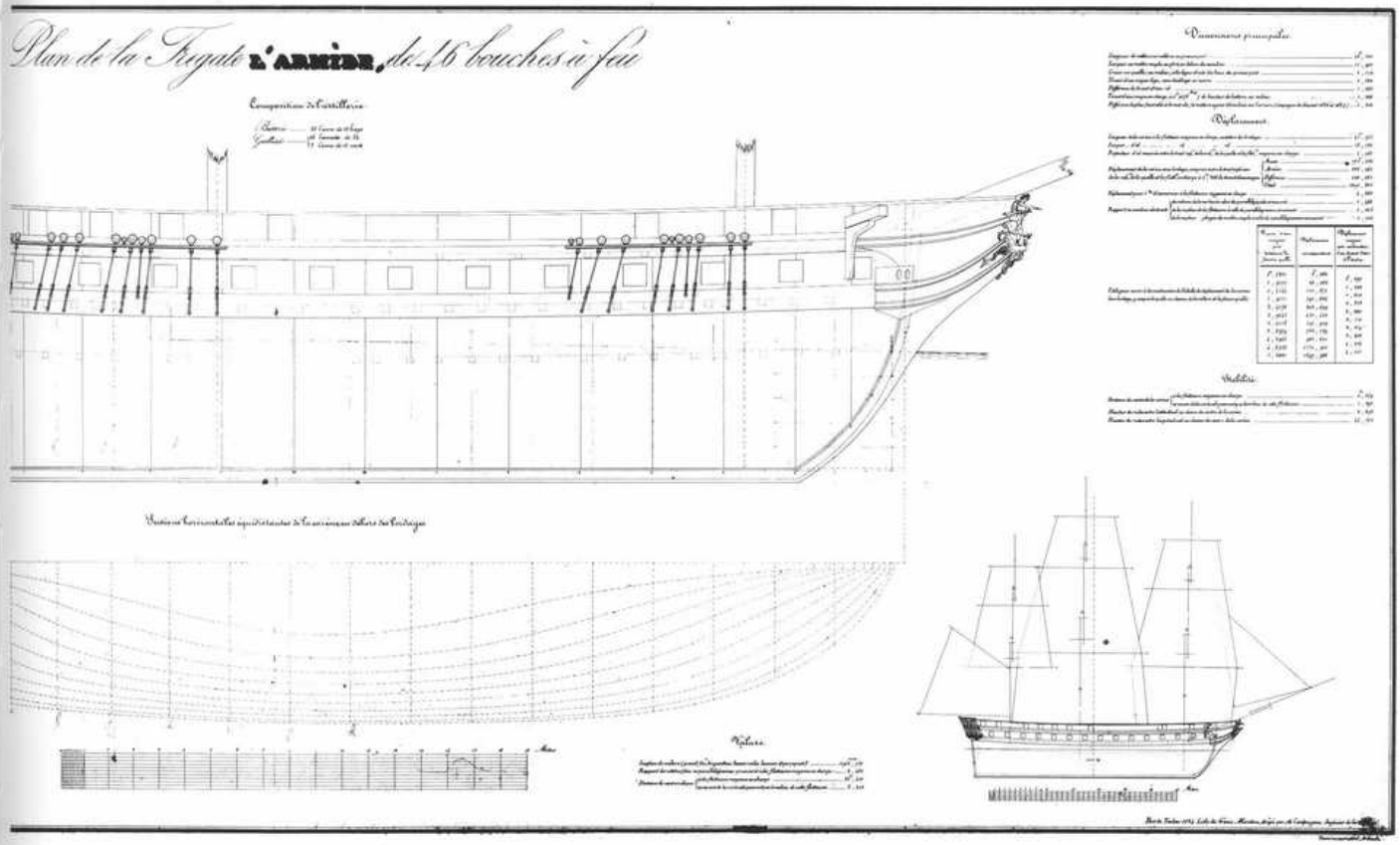
If we compare this draught with that of the *Érigone*, we can see the various modifications made to the last 18-pdr frigates. While it is true that there has been no change to the volume of the underwater hull, the upper works have been considerably altered, not always to æsthetic advantage.

The sheer of the wales follows that of the upper deck, so that they have less hanging, and this results in an impression of stiffness, emphasised further by the fact that the sheer of the various rails follows that of the wales. The waist armour is high, and this is followed throughout the length of the vessel, even to the head!

The visible parts of the head have been reduced to the upper rail only: the lower rails and the head-timbers are berthed up. The cathead and its supporter, placed abaft the bowchase port, appears isolated. The quarter-galleries, on two levels and ill-proportioned, have no upper finishing. Note the way the main-channels merge into the mizen-channels in one continuous line. The over-high bulwarks make the upper works appear too high; in accordance with contemporary practice there are no gunports over the waist despite the fact that the lines run right through, with just a few beams to support the gangways and the spare spars and boats, which are no longer stowed on the upper deck, as we have already seen in the draughts of the *Érigone*; this arrangement is thus too light to support any carronades, which are accordingly limited to two on the forecastle and ten on the quarterdeck, with two long 18-pdrs right up in the bows as bowchase guns.

Finally, note the considerable reduction in the amount of tumble-home: this, together with the reduction in the hanging of the wales and the raising of the upper works, have the effect of destroying the elegance of Sané's original design; fortunately, the sail plan has lost nothing of its grandiose beauty.

In 1837 one final change was made to the main armament, with the replacement of four long guns by four 30-pdr shell guns.


Plan de la Frégate L'ARMIDE, de 46 bouches à feu

Among the Chaumont Papers, acquired by the *Service Historique de la Marine*, there is a series of draughts of 18-pdr frigates. The following six examples are taken from this source.

The body plans enable an interesting comparison to be made between the designs of a number of different shipwrights; on the other hand, the sheer and half-breadth plans are broken in the middle, so that the midship section must be "reconstituted" – not impossible when one knows that all the sections are equidistant one from the other, including the two midship bends. Looking carefully, it is possible to distinguish the positions of the masts. It has to be admitted that this form of presentation, while having the advantage of limiting the size of the draughts, does not make them particularly easy to follow: there is no doubt that it would have been infinitely preferable to have been able to examine the original draughts from which these were drawn up, but in their absence, we must be grateful for whatever we can find, remembering the great paucity of draughts which have survived in the French archives.

Unnamed 18-pdr frigate by J.-N. Sané. Sané made no changes to the original draughts of 1781, when they were adopted as the class design in 1810: a fine example of conservatism from a man who had the reputation of being an innovator thirty years earlier! But it must be admitted that in general, in both maritime and military matters, France remained essentially faithful right up to the Restoration to the traditions established in the final years of the Ancien Régime.

This draught is worth comparing with the numerical data for the *Justice**, a manuscript dating from March 1810 and preserved at the *Service Historique de la Marine* (Cat. N° S.H 321). A number of marginal notes refer to the original estimates for the *Justice*, laid down in 1794 as the *Courageuse*, but re-named by the time she was launched in 1795. She was surrendered to the Royal Navy in 1801 at the capitulation of Alexandria. Such modifications as there are are relatively insignificant: the length at the waterline, originally 144 feet, is increased to 144 feet 6 inches; the breadth remains unchanged at 36 feet 8 inches, while the depth in hold is increased by 1 inch to 19′1″. Other details: the position of bends 7 and 8 of the afterbody has been slightly moved. Note also that on this draught the perpendiculars of the stem and the post are not taken at their head, but rather at the point where they intersect the load waterline.

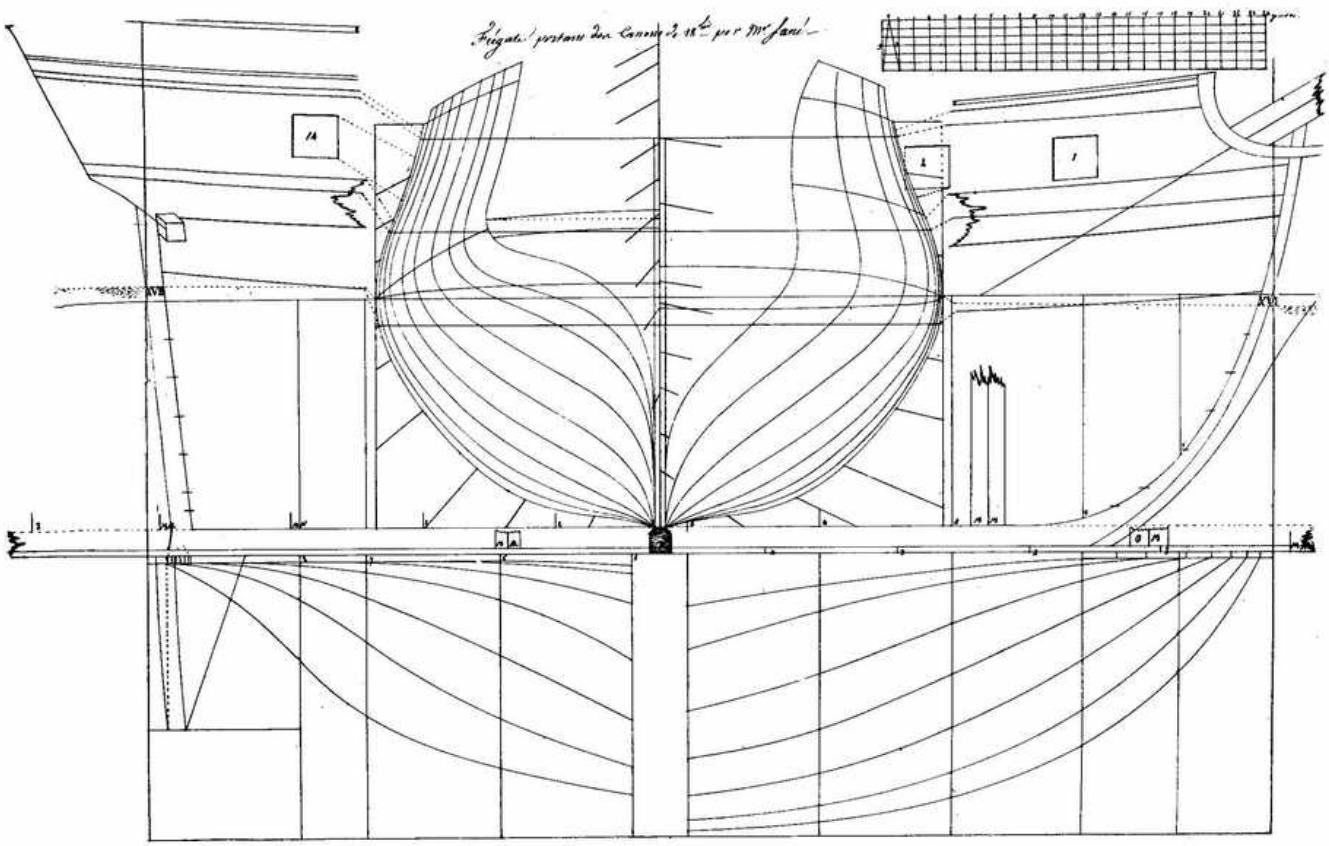
Sané's frigates were designed from the start for 14 gunports on the upper deck, with no additional bowchase port. The distance between ports is 6′6″, and the breadth fore-and-aft 2′9″. The distance from the perpendicular of the stem to the foremost gunport is 11′6″ and from the perpendicular of the post to the aftermost gunport 12′1″. For those frigates armed with only 26 18-pdrs (13 gunports), for example the *Pomone* built at Rochefort between 1782 and 1785, it would appear from the draughts that the distance between ports was as much as 7 feet, while the distance from the stem to the foremost port measured about 17′0″. This was enough to make room for an additional bowchase port in this position.

It is worth noting in this regard that a letter signed by the Minister and dated April 1787 strongly recommended (effectively imposing) the opening of a bowchase port, but only for ships of the line.

The hull lines appear harmonious and elegant: to judge from the position of the floorhead ribband, the length of the midship floor is a little less than half the breadth, and the deadrise above the upper face of the keel is 2 feet. The tumblehome of the upper works is not too pronounced, being 3 feet on either side at the midship bends.

The rake and the curve of the stem and the rake of the sternpost are in accordance with Sané's usual practice.

*The numerical data for the frigates *Vénus*, *Hébé* and *Dryade* are preserved at the *Service Historique de la Marine* under the same reference S.H. 321.

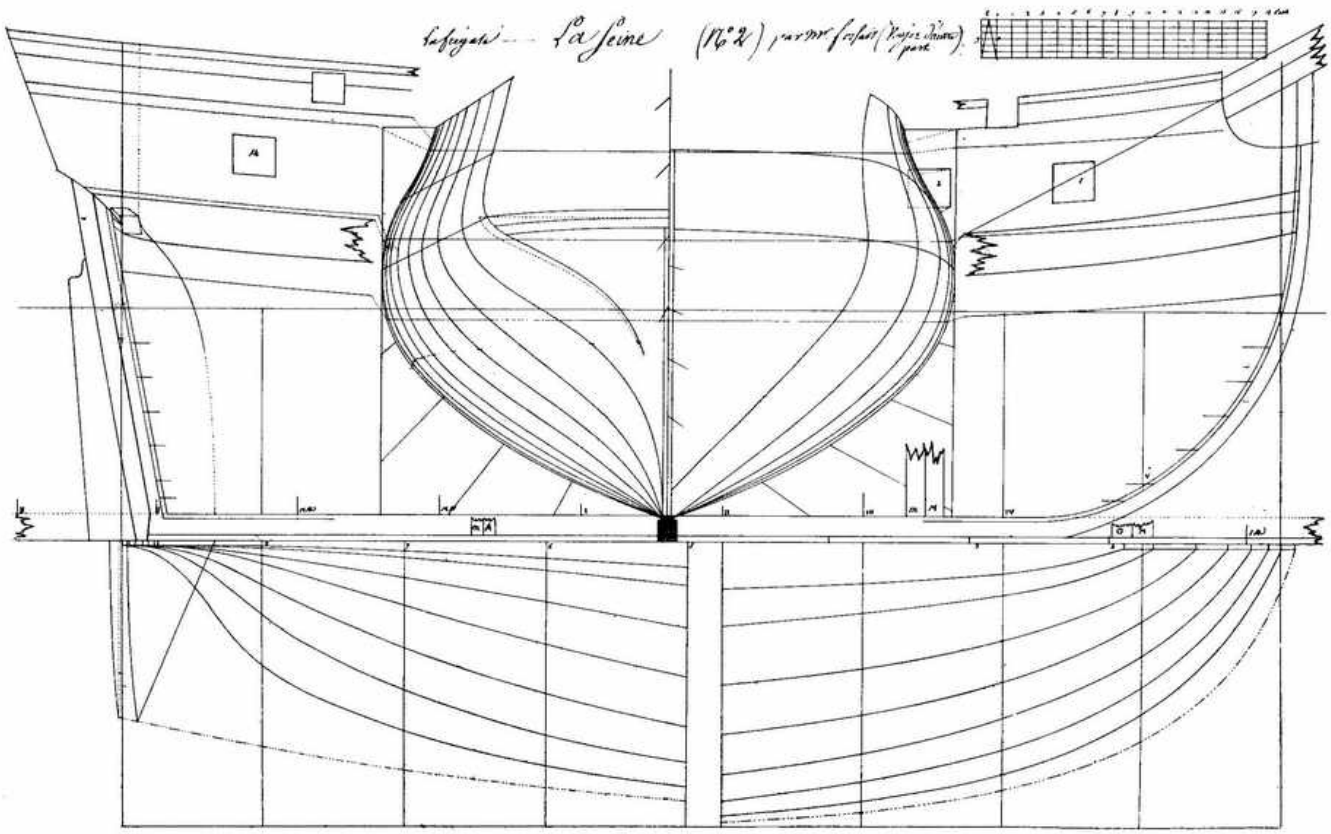


***La Seine:* 18-pdr frigate by Pierre-Alexandre Forfait.** As we have already seen with the draughts of the *Fortune* of 1790*, Forfait's *Seine* of 1793 (shown below) is directly inspired by the former. The contrast with Sané's 18-pdr frigates is thus just as evident here as with the 12-pdrs. The three principal dimensions do not however differ greatly from Sané's, with a length at the waterline of 146′4″ as opposed to 143′0″, a breadth to inside of plank of 37′2″ compared to 36′8″, and a depth in hold of 18 feet compared to 19. The displacement is 1,311 tons 304 pounds, while Sané's measures 1,350 tons 721 pounds. In other words, the differences in the lines of all the 18-pdr frigates are relatively small, which was the objective of the Chevalier de Borda when he drew up the 1786 programme.

It is when we come to examine the body plan and the waterlines that we see how the volumes of the hull have been displaced in Forfait's design towards the two ends of the vessel from amidships. The breadth of the midship floor is only one third of the breadth overall at the midship bend (compared to half in the case of Sané's designs), with a deadrise of 2 feet 3 inches (2 feet for Sané). The underwater body is thus markedly "pinched" in the central part of the hull.

The two designs are thus very different in concept, despite principal dimensions which are almost identical, and yet both were successful (see the section on the sailing qualities of 18-pdr frigates below).

*Not to be confused with the 1777 12-pdr frigate of the same name, also built by Forfait, but to very different lines.



***La Valeureuse*: 18-pdr frigate by C.-H. Tellier.** Charles Tellier was one of Forfait's students, and was responsible in 1795 for the design of the *Valeureuse*, and in 1799 of the *Infatigable*, both vessels being built at Le Havre. Greatly influenced by the design principles of Forfait, Tellier took over from him at Le Havre in 1797 when Forfait departed for Venice. A note in Tellier's own hand accompanied this draught, the main points being as follows:

Principal dimensions: length 145 feet, breadth 37 feet, depth in hold 18 feet. Displacement 1,341 tons 1,263 pounds (the height of gundeck sill is not given, but in principle should be 6 feet). The centre of gravity of the underwater hull is 5 feet 3 inches forward of the mid-point of the length, and 8 feet 11 inches above the upper face of the keel. The metacentre is 11 feet 3 inches above the centre of gravity of the underwater hull.

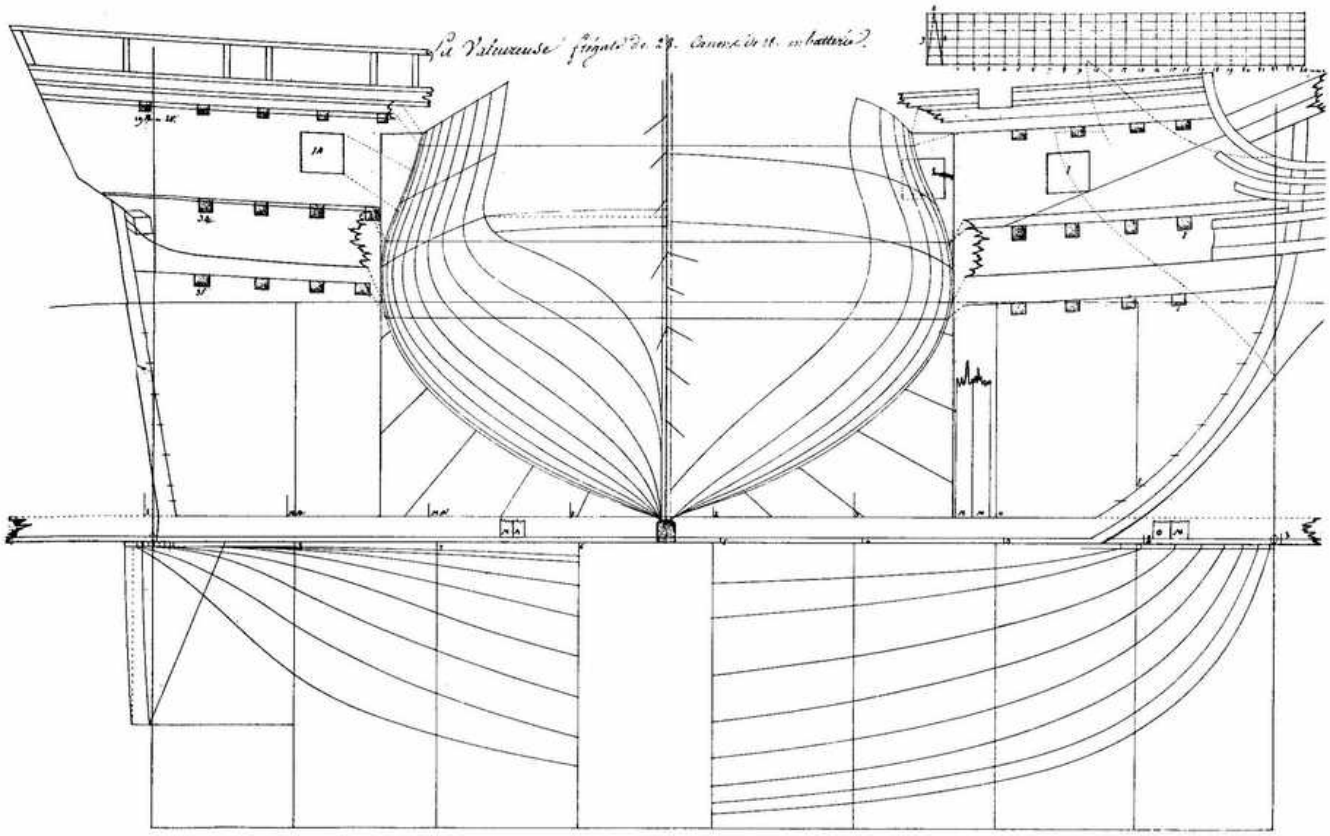
These numbers are very slightly different than those of Forfait's designs, but the lines of the hull show in general a considerable degree of similarity.

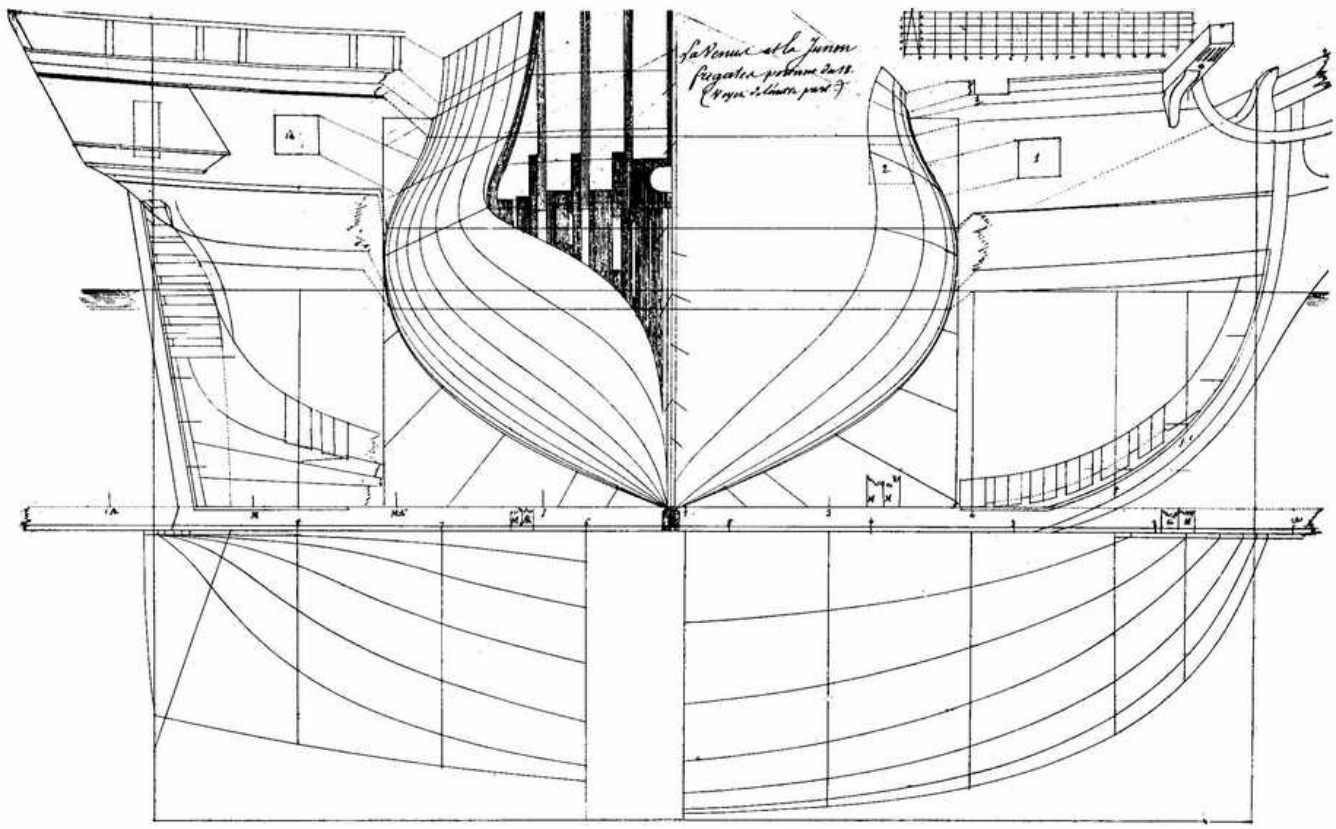
Note the alternative design for the head marked with a dotted line, and also the very slight steeve to the bowsprit, at 22 degrees.

***La Vénus & La Junon*: 18-pdr frigates by P.-A. Forfait.** There is a manuscript note accompanying the draught which reads as follows: "The frigate *Vénus* and *Junon* were built at Le Havre to draughts which differ very little from those of the *Seine*, by Forfait. The draught of the *Amazone* is the same as that of the *Vénus* and the *Junon*, save that the tumblehome has been reduced by straightening the upper futtocks. Length 147 feet – breadth 37 feet 4 inches – depth in hold 18 feet 3 inches. The *Junon* was launched on August 16th 1806, the *Vénus* on April 5th 1806 and the *Amazone* on September 17th 1807.

"The stern-frame of the *Vénus* and the *Junon* were built using vertical timbers, while that of the *Amazone* had horizontal transoms in the usual manner. The first method is shown in the body plan, the second in the sheer plan."

Note the shallow steeve of the bowsprit, at 24 degrees, rather than the usual 30, and the steep angle of the cathead; the room and space of the timbers of the hull are frames sided 1 foot 10 inches, space 6 inches. Note also the shape of the quarter-galleries.





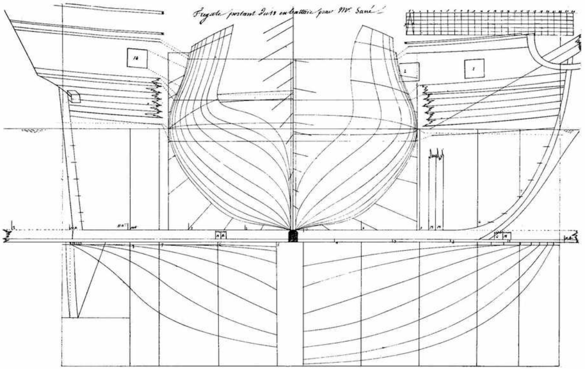
Unnamed 18-pdr frigate by J.-N. Sané. This other Sané design is in the same bundle of documents, and it seemed therefore appropriate to reproduce it here also. Having said that, it should be noted that it is in fact identical to the previous design, except that the wales are arranged differently.

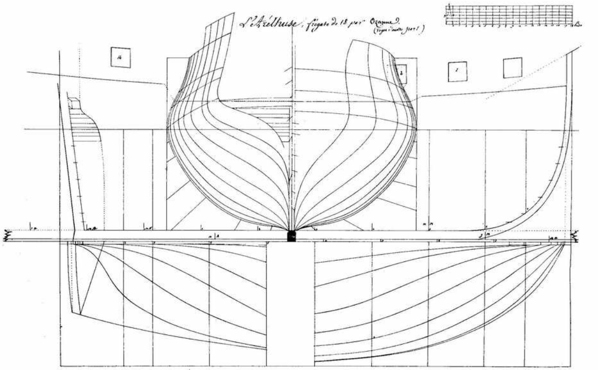
***L'Aréthuse*: 18-pdr frigate by Pierre Ozanne.** Ozanne is better known for his remarkable drawings, of which a considerable number have been reproduced over the years in our books, but he was also a more than competent shipwright. He designed an excellent sloop-of-war, the *Diligente*, and the only frigate which he ever designed, the *Aréthuse*, had all the qualities desired.

The principal dimensions given in a note attached to the draught are as follows: length 144 feet 10 inches, breadth 36 feet 6 inches 6 lines, depth in hold 19 feet. The burthen* at a height of gundeck sill of six feet is 793 tons, of which 139 are ballast (iron 110, shingle 29).

The hull volumes are not dissimilar to Sané's designs, with only slight variations in the principal dimensions, although a bow-chase port has been added. The draught shows the perpendicular of the stem tangential to the vertical part of the timber, while the perpendicular of the post is taken from the point of intersection with the horizontal line of the upper face of the wing transom. Where the stem curves throughout its length, as is the case with the Sané designs, the perpendicular should be measured from the head. It is worth remembering however that designers preferred to measure the length from stem to post on the outside at the load waterline, from rabbet to rabbet, or else from outside to outside. Others however copied English practice by measuring the length on the inside, at the horizontal line of the gundeck and from the inside of the rabbet of the stem to the inside of the rabbet of the post. It is by no means unusual in texts giving the lengths of ships to find no mention of the method by which they are measured, and this must give rise to a certain caution in their treatment. However, I have already written extensively on this subject, and will not bore you with it further!

*The total displacement is not given.


Fregate portant du 18 en batterie par Mr. Sané


L'Aréthuse, frégate de 18 par Ozanne

VARIOUS BODY PLANS OF 18-Pdr FRIGATES

(Scale 1: 120)

No less than fifteen different shipwrights provided designs for the 18-pdr class of frigate, even though in some cases the contribution was extremely limited. Only one vessel was built to the designs of each of the following: Baron Bombelle, Pierre Degay, Pierre Geffroy, Jean-François Lafosse, Pierre Ozanne; the designs of Jean-François Gauthier and Charles Tellier led to only two vessels each.

However, the role played by the other designers is more marked, and I have taken the trouble therefore to assemble here a series of body plans, based on those preserved at the National Maritime Museum in Greenwich.

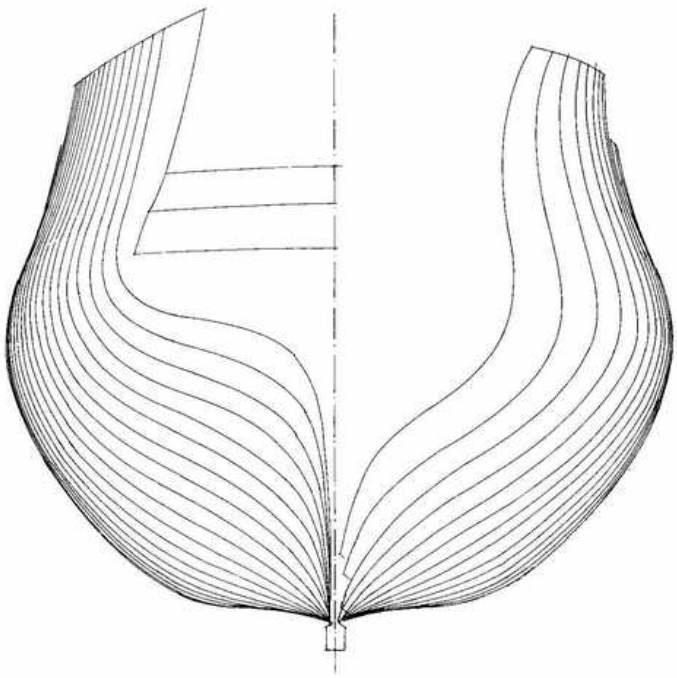
There are two distinct types of body plan: those which are relatively classical and derive broadly from the lines of Jacques-Noël Sané, and those which are less conventional and appear to derive from the designs of Pierre-Alexandre Forfait. It is not impossible that the latter was himself influenced by the 8-pdr designs of Antoine Groignard, which we have already seen, and Groignard in turn may well have been influenced by the designs of Blaise Pangalo[1], since all these designs have one thing in common: a very steep deadrise, of up to three feet for both ships and frigates, Pangalo's great quality being that "he was so skilled in placing in the entry and in the run aft that capacity which he did away with by virtue of the steep deadrise"[2]. However, this is only a hypothesis on my part.

The ten body plans which follow give an overall view of the the design differences for the 18-pdr class, but these differences need to be "weighted" in view of the great preponderance of the role played by Sané, whose design was followed for no less than 73 of the 137 frigates built. By comparison, the number of frigates which might be said to conform to the "Forfait mould" number less than twenty. Of the others, inspired in the main by Sané, one of the most prolific, with 14 vessels, was Rolland, considered to be a close pupil of Sané; this may explain the special favour accorded him in allowing him to build four of the frigates of his design after the adoption, in 1810, of the Sané class design of the *Justice*, which in theory precluded such independent initiatives.

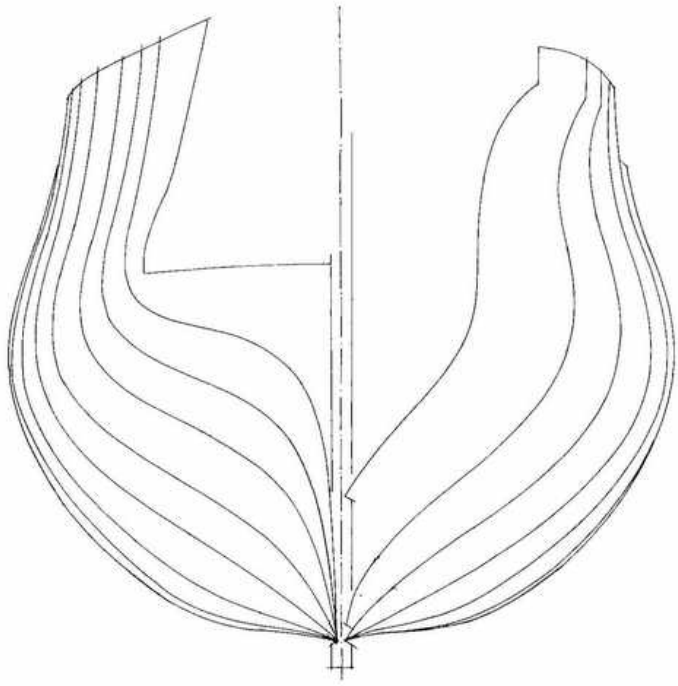
Note that the dimensions which accompany these body plans should be interpreted as follows: length taken at the load water-line from rabbet to rabbet and to outside of plank. The breadth and the depth in hold are measured in the usual manner.

1. Biaggio Pangalo, known by the sobriquet *Maître Blaise*, was a shipwright of Neapolitan origin; a protégé of de Tourville, he came to Brest in 1684, where he was the Master Shipwright until his death in 1722. His designs considerably impressed and influenced Blaise Ollivier; indeed, the connection did not end there, for in 1738 Ollivier bought his house in Brest from Pangalo's daughter!

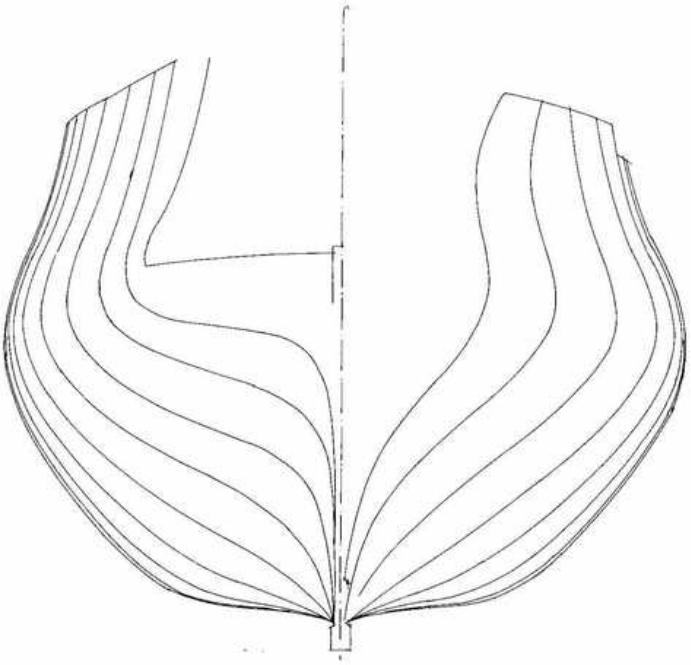
2. The quotation is from Ollivier's *Traité de Construction* in the form of a dictionary, dated about 1736. Published in French for the first time in 1992 by Éditions Oméga, parts of it (including this quotation) were translated in the 20-page Glossary of Shipbuilding Terms at the end of *18th Century Shipbuilding*, ed. D.H. Roberts, Jean Boudriot Publications, 1992.



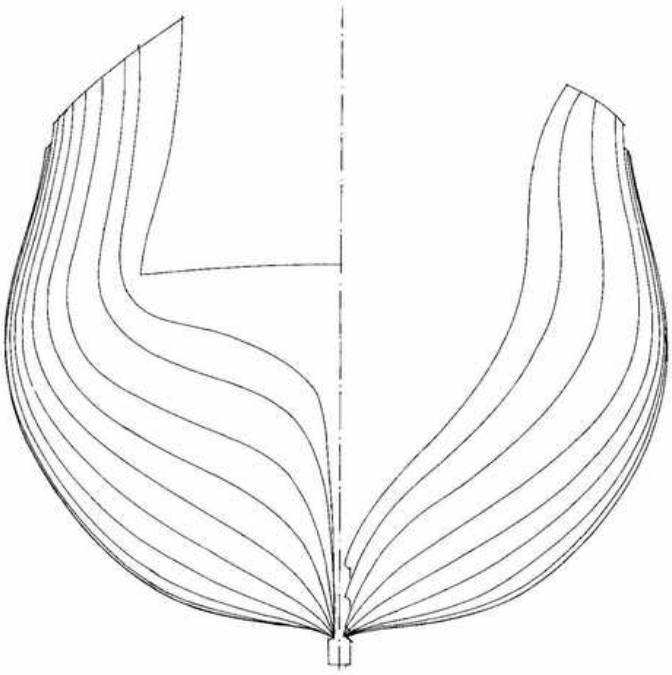
La Sultane 1803. *J.-N. Sané.* The lines are identical to those of the *Vénus* of 1781 (see the next Chapter). Following a tradition already established for the 12-pdr frigates, there is a continuity of style in all Sané's designs, right up to the 120-gun ship. Dimensions: length 142′6″ – breadth 36′8″ – depth in hold 19′0″. In 1810 the length was increased by six inches and the depth in hold by 1 inch.



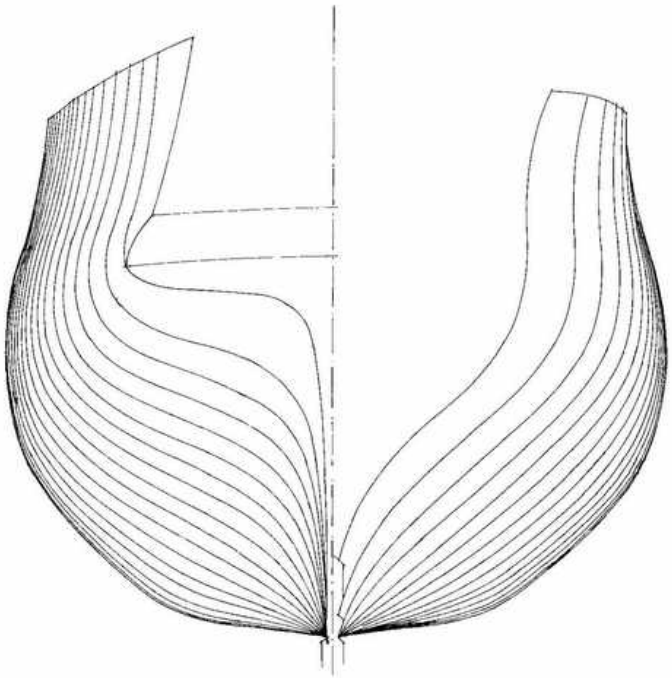
Le Niémen 1808. *Pierre Rolland.* The lines are similar to Sané's. Dimensions: length 141′5″ – breadth 36′11″ – depth in hold 19′0″. Fourteen frigates were built to Rolland's designs.



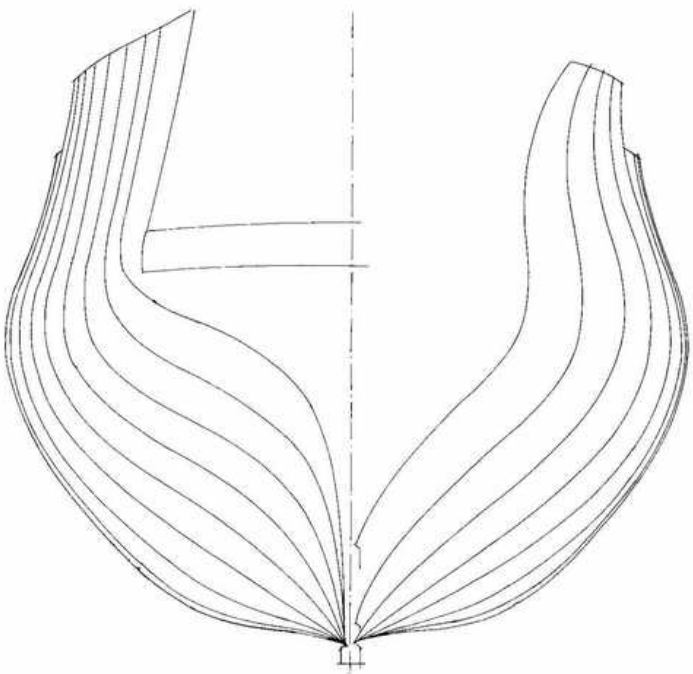
***L'Uranie* 1788.** *Charles Segondat-Duvernet.* Eight frigates were built to these lines. Dimensions: length 143'6" – breadth 37'0" – depth in hold 19'0". The similarity to the two previous draughts is obvious, although the underwater hull is less rounded at the height of breadth.



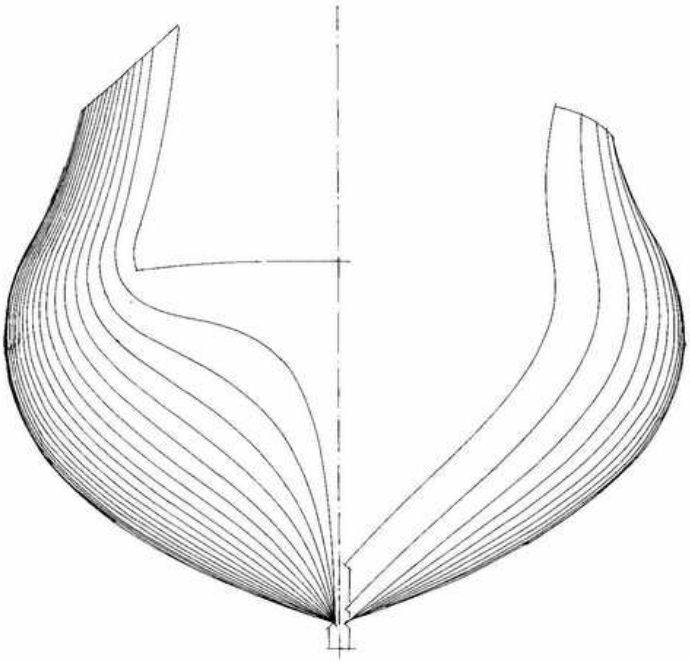
***L'Africaine* 1795.** *Raymond-Antoine Haran.* Dimensions: length 140'6" – breadth 36'6" – depth in hold 19'0". The central part of the vessel is built almost to the same mould over quite a large area; compare for instance with the same stations in the *Uranie*. The tumblehome is limited. Only three frigates were built to the draughts of this shipwright.



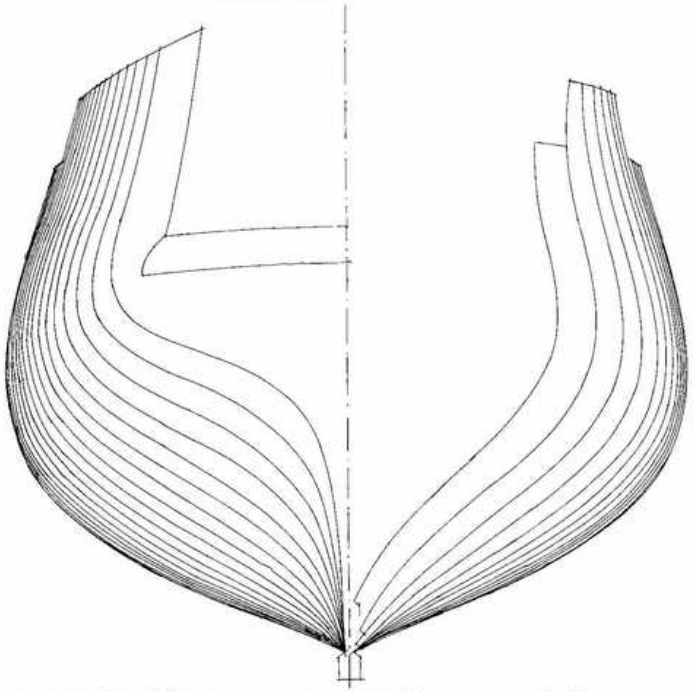
***La Junon* 1782.** *Joseph-Marie-Blaise Coulomb.* This draught seems very similar to that of the *Africaine*, except that it is more pinched at the bow and stern. We have already noted the same phenomenon in the 12-pdr vessels built by J.-M.-B. Coulomb. Six frigates were built to these draughts. Dimensions: length 142'0" – breadth 36'7" – depth in hold 18'9".



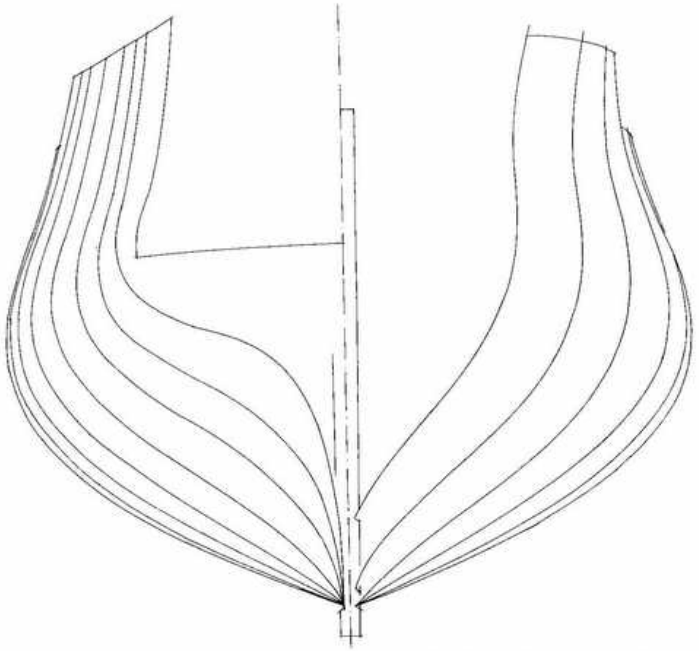
***La Minerve* 1804.** *Pierre Rolland.* A variation taken from the draughts preserved at the National Maritime Museum, and showing a rather greater breadth at the load waterline. This *Minerve* of 1804 should not be confused with the *Minerve* of 1793, built to the draughts of J.-M.-B. Coulomb, nor yet with a third frigate of the same name built in 1801 to the draughts of Sané.



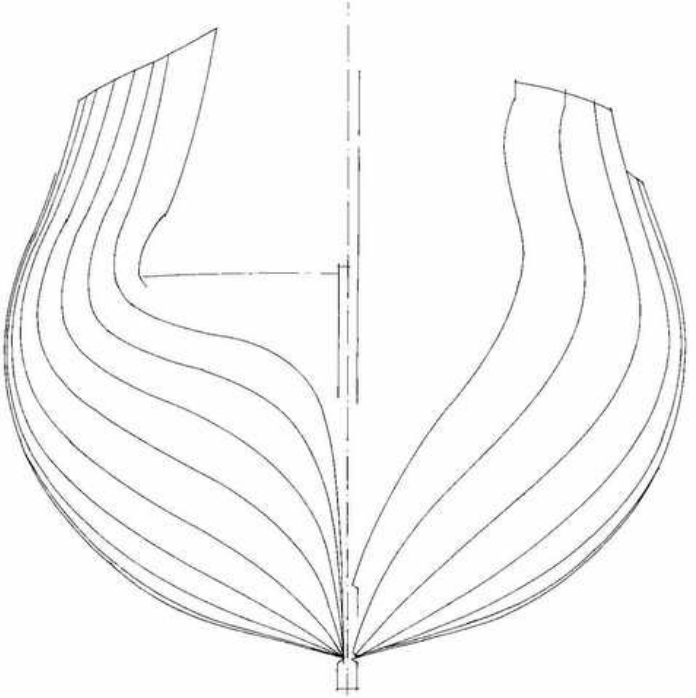
La Seine 1793. *Pierre-Alexandre-Laurent Forfait.* This draught shows a very deliberate break with the style of the previous ones we have examined. The 12-pdr vessels built by the same shipwright presaged a very personal style. Having already commented on the lines of the underwater hull, we will not go over the same ground again. Dimensions: length 146′4″ – breadth 37′2″ – depth in hold 18′0″. The length is thus considerably greater than that of the other frigates of the same class, and this was even increased by a further foot with the *Furieuse*. Eleven frigates were built to these draughts.



***La Néréïde* 1808.** *François Pestel.* The lines are very similar to Forfait's lines in the *Seine*, although there is a very slight inflexion at the keel, and the toptimbers are almost straight in the central part of the vessel, with only limited tumblehome. Dimensions: length 143′5″ – breadth 37′0″ – depth in hold 19′0″. Eight frigates were built to this draught.



***La Clorinde* 1807.** *Jean-François Gauthier.* Once again the lines are very similar to those of the *Seine*, and Gauthier had probably already done much the same in 1796 with his *Uranie*. Dimensions: length 145′6″ – breadth 37′6″ – depth in hold 18′0″. These were the only two frigates built to this draught.



***La Loire* 1795.** *Pierre Degay.* This draught is some ways a compromise between the style of Forfait and that of Sané; this was the only frigate to be built to this draught. Dimensions: length 142′6″ – breadth 37′0″ – depth in hold 19′2″.

SAILING QUALITIES OF 18-Pdr FRIGATES

A large number of so-called "decommissioning reports" (Sailing Reports) have survived for 18-pdr frigates; the majority naturally concern Sané-class frigates, which is scarcely surprising in view of the preponderance of this design. The comments already made when examining the sailing qualities of the 12-pdr class apply here also, especially with regard to the particular qualities which are sought after for frigates.

We have noted that some fifteen shipwrights were responsible for draughts of 18-pdr frigates. Among these it is natural to single out *Sané*, whose draught for the *Vénus*, built at Brest in 1781-2, was the origin of a design to which, from the Revolution onwards, a very large number of frigates were built, not just in French dockyards, but also, under the Empire, in all the ports of Europe under French domination. From 1810 onwards, Sané's design was effectively the only one authorised for all new building. *Forfait*, at Le Havre, and his student *Tellier* built a number of frigates to the draughts of the the *Seine*, including the *Révolutionnaire*, the *Pensée*, the *Indienne*, and the *Spartiate*; the last-named, captured practically as she was leaving Le Havre, was much admired in the Royal Navy. *Pestel* was to build his frigates at Saint-Servan, from his draughts of the *Didon*, while Rochefort was where *Rolland*'s frigates were built; *Segondat-Duvernet* was active at Dunkirk, with the draughts of the *Méduse*. Mention should also be made of the *Loire* by *Degay*, the *Aréthuse* by *Ozanne*, etc.

However, of a total of 137 frigates, no less than 73 were built to the draughts of Jacques-Noël Sané. Next most prolific were Forfait and Tellier with fifteen vessels, followed by Rolland (fourteen), Segondat-Duvernet with half a dozen, and Pestel with perhaps a couple more.

As we have already noted, from 1810[1] onwards Sané's *Justice* was adopted as the class design, and from that date until 1813, 37 frigates were laid down to this single draught. It would thus be no exaggeration to say that the 18-pdr frigate is above all the Sané frigate, and there are no shortage of Sailing Reports for vessels of this type for which the original design goes back to 1780-81, with effectively no modifications being made over an exceptionally long period, the last Sané frigate being launched in 1823. The last to be laid down date from 1813, and at the fall of the Empire there were twenty still building at dockyards in France and abroad.

Almost all the Sailing Reports concur in recognising the following qualities in Sané's frigates.

Responsiveness to the helm. All answer the helm exceptionally well in a good breeze, with a tendency to gripe in stiffer winds.

Ability to carry their sail. To perfection[2]: the criticisms of too high masts and insufficient stiffness made of the 12-pdr vessels are entirely absent.

Pitching motions. Very gentle, causing no strain to the spars and no shocks to the rudder.

Rolling motions. Also very gentle, without shocks, slow and regular.

Sailing close-hauled. Generally reported as superior, as long as they are correctly trimmed with regard both to load waterline and difference in draught fore and aft[3]. As a general rule they make little leeway, and "hold their wind".

On a reach. Advantageous, with better speeds attained than close-hauled, but at the expense of bracing the yards rather too fully, and great care in trimming all the sails.

Running. Less good than the other two points of sailing, but if trimmed a little more by the stern than for sailing close-hauled, performance with the wind astern may still be advantageous.

Trying. In the majority of cases they handle well hove-to under forecourse and main-topsail, less well under the forecourse alone. On the whole they handle very satisfactorily hove-to and make little leeway.

Tendency to gripe. Most tend to gripe, with weather lurches as soon as the wind freshens.

Slackness. Not in the least, even in light airs.

In stays. With the wind ahead, they are very quick in stays, even under topsails alone[4], with no hesitation and speed of sailing maintained. With the wind astern and veering they are slower in stays and tend to lose ground, but they come up quickly as soon as they have put about.

It is obvious that Sané's frigates possess all the qualities which might be demanded of them, with the rare quality of being fast sailers close-hauled and yet still excellent sailing large, and even respectable with the wind astern. The frigates designed by other shipwrights were also in the main successful, but to a less marked degree. The choice adopted in 1810 was without doubt justified, in the light of the need for uniformity, although it might be said that by then the 18-pdr frigate was already obsolescent, if not obsolete.

Sailing reports only rarely give figures for speed, but for the Sané vessels and the better of their rivals, the following may be taken as representative: close-hauled, 9½ to 10 knots – reaching, 13 knots – running, somewhere between the two. By comparison, a Sané 74 under all plain sail might reach 8 knots. The figures quoted represent, it should be remembered, speeds achieved under optimum conditions, whether of sea or the state of repair of the vessel in question, and there are wide differences even in the performance of the same vessel, depending on stowage, the trim of spars or sails, the trim fore and aft or the load waterline, deformations to the hull lines and its condition, all parameters which were more or less well understood by commanding officers.

Let us now examine a number of frigates designed by other shipwrights. First of all, *Forfait*, considered with more or less justification as a sort of "competitor" to Sané: he made his reputation with a series of frigates built to the draughts of *La Seine*. All answered their helm well in a stiff breeze, carried their sail well, had gentle pitching motions but very lively rolling motions tending to strain their spars. They sailed well close-hauled without distinguishing themselves, but were exceptional sailing large, and still excellent with the wind astern. They tried well under forecourse alone, better under staysails. With very little tendency to gripe, they tended to be slack in light winds and especially when close-hauled. As a result, they were not very handy in stays except in a good wind, although they veered perfectly.

The draughts of the *Armide*, by *Pierre Rolland*, were used for the frigates built at Rochefort, Bordeaux, Bayonne and Cherbourg[5] between 1802 and 1813. The *Armide* answered her helm well, was a little tender, and not the most stable of vessels. Her pitching motions were very gentle, but she rolled considerably, albeit gently. She sailed well close-hauled, was very fast on a reach, moderately fast before the wind. She tried well under all types of sail. There was no tendency to gripe, being rather slack, but she handled reasonably well in stays.

At Lorient and Dunkirk, between 1782 and 1808, it was the draughts of the *Méduse* by *C.-A. Segondat-Duvernet* which were employed. The vessels built to this design answered their helm

"marvellously", carried their sail very well; their pitching motions were lively and easily provoked, but with little danger to the spars, but they rolled excessively. Close-hauled was not their best point of sailing[6], but on a reach they were excellent; with the wind astern they were mediocre. In a fresh gale they tended to gripe, but they were never slack and were easy in stays both tacking and veering.

The draughts of the *Minerve* by *J.-M.-B. Coulomb* were followed in Toulon between 1782 and 1789. These frigates were responsive to their helm, carried their sail excellently, but in anything like a seaway they pitched and lost speed; for all that, both their pitching and rolling motions were easy. They were indifferent sailers close-hauled, much better on a reach, and below average with the wind astern. They steered well, tending neither to gripe nor to be slack, and they were quick in stays both tacking and veering.

The shipwright *J.-A. Lamothe* was responsible for the design of the *Nymphe* in 1782, and five further frigates were built to the same draughts at Brest and Nantes. They answered the helm well in a good breeze, but tended to be slack in light airs. They carried their sail excellently. Their pitching motions were very gentle, but at the same time considerable, to the point that the figure might be buried; they rolled a lot, but with motions which were gentle. Close-hauled they performed well, were excellent on a reach, indifferent with the wind astern. They carried a weather helm in anything like a wind, but were slack in light airs. They were reasonable in stays, but very slow to come up when veering and tending to make a sternboard when tacking.

Two frigates were built at Le Havre to the draughts of the *Valeureuse*, by *Charles Tellier*. They were judged to be slack in anything but a stiff gale, but carried their sail well; they pitched very gently, but were lively rollers; no risks to spars were reported, despite rolling from rail to rail. Close-hauled their performance was no more than ordinary, but sailing large they were excellent, reaching 9 to 10 knots in a good gale; in a following wind they were average. They did not gripe, but tended rather to carry a slack helm in light airs; they tacked with difficulty, but veered very well.

The draughts of the *Africaine*, attributed to the shipwright *R.-A. Haran*, were probably those followed for three frigates built during the Revolution at Bayonne, Bordeaux and Rochefort. The *Africaine* steered very well, remained very stiff under a press of sail, pitched easily and rolled with a slow and regular motion. Close-hauled she was a fair sailer, but very weatherly; her best point of sailing was large, especially at four points off the wind, while running before the wind she was merely average. She tended to neither a weather nor a slack helm and was quick in stays both tacking and veering.

Pierre Ozanne was responsible for only one frigate, the *Aréthuse*, built at Brest in 1789; we have already seen her body plan. The same document was accompanied by some short lines indicating that she had all the qualities requisite of a frigate.

Since no Sailing Reports have survived for any of the frigates built by *Degay*, *Gauthier*, *Geffroy* or *Pestel*, we cannot comment on their qualities as we have done for those built by their colleagues. This absence of documentation is regrettable, especially for Pestel, who built eight frigates to the draughts of the *Didon* at Saint-Malo and Genoa.

To conclude this section on the sailing qualities of the various types of 18-pdr frigates, it seemed appropriate to quote the Baron Tupinier. In a text appended to his observations on the dimensions of frigates and ships of the line published in 1822 (*Annales Maritimes*), Tupinier, who was Director of Naval Construction at the time, makes the following remarks:

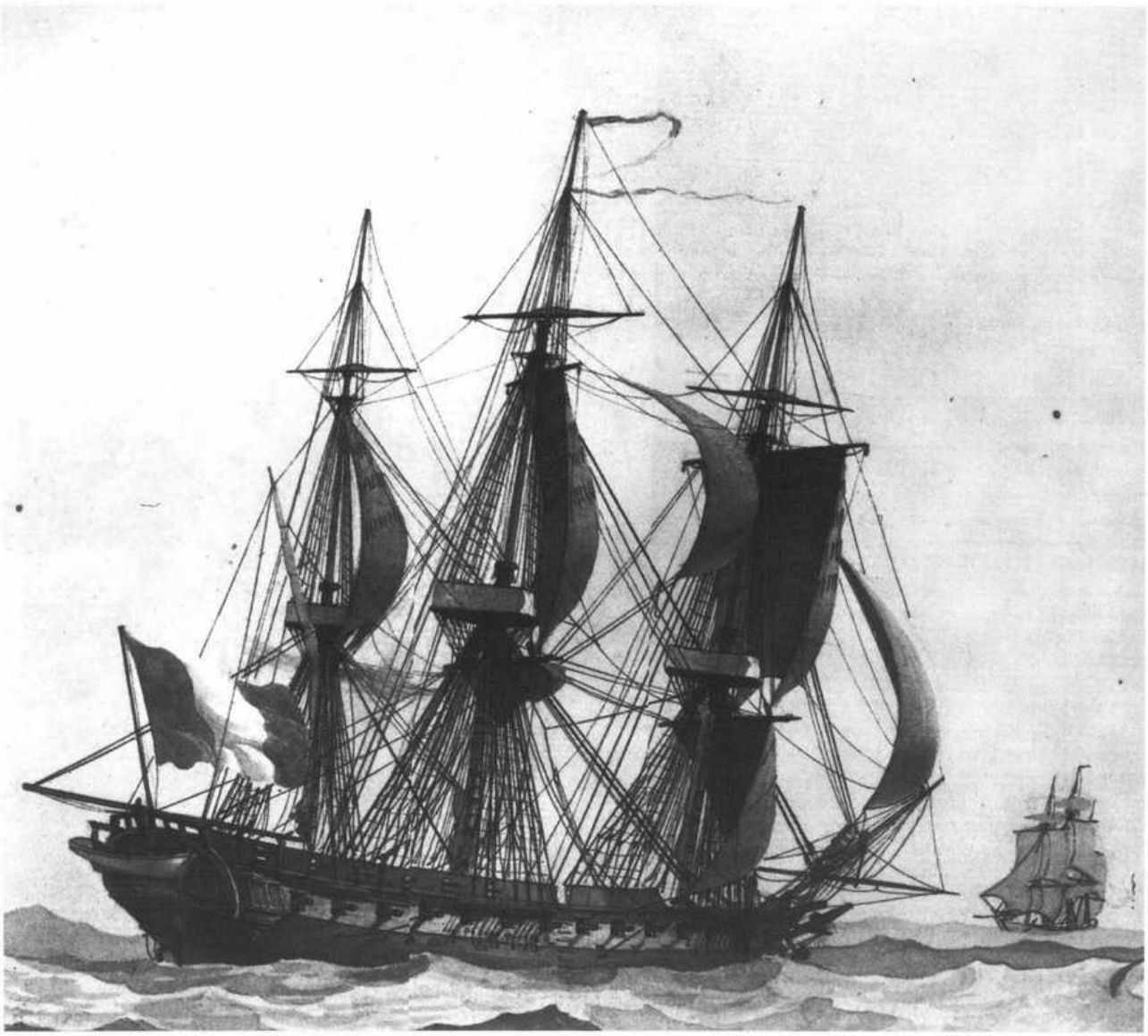
"I am forced to agree on this fact, that our 18-pdr frigates have no more stability than the strict minimum to avoid their being compromised, in heavy weather, by the action of the wind on their sails; they consistently lose a great part of their advantage in a steep sea, because of the degree of rolling to which they are subject, with the wind astern, or else by their excessive heel when sailing close-hauled."

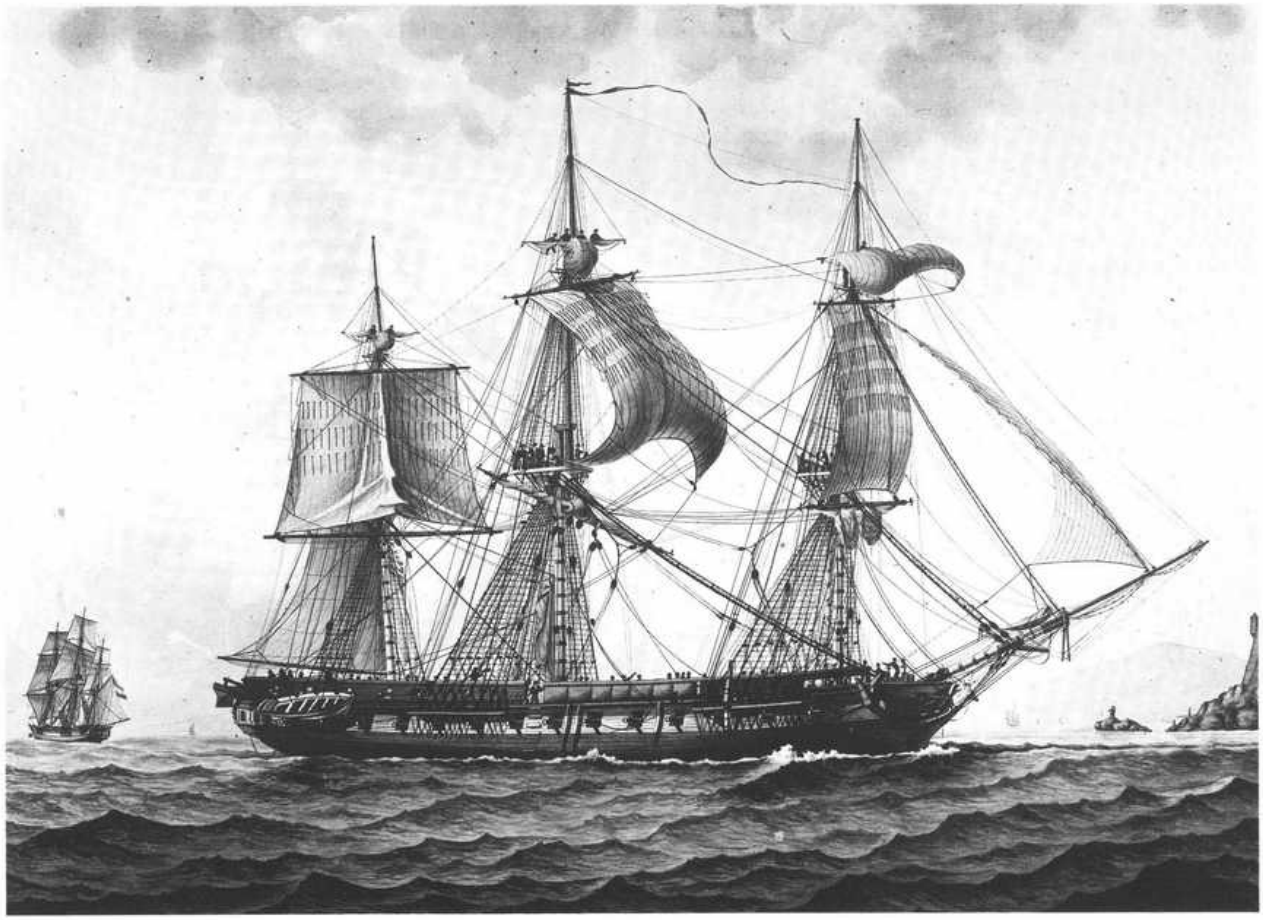
These criticisms are similar to those expressed by officers of the Royal Navy in their reports on our 8- and 12-pdr frigates (see above). Yet a very large number of Sailing Reports for 18-pdr frigates make no mention of these failings, which leads one to conclude that they restricted their comments to the vessels' behaviour in favourable wind and sea conditions.

We should add that Tupinier went on to state: "apart from the 44-gun frigates by Mr Sané, the Marine Royale has a number built by Mr Rolland, *Inspecteur Général du Génie Maritime*, and by Mr Pestel, *Sous-directeur des Constructions Navales*. Both designs are remarkable for their excellent qualities."

1. Note however an exception made in the case of Baron Rolland, named *Inspecteur Général du Génie Maritime* in 1804, whose draughts continued to be followed in Rochefort and Bordeaux.
2. A few Sailing Reports suggest that they carried their sail no better than moderately well, that they were somewhat tender, and in general mediocre. However, this can probably be attributed to faulty stowage.
3. The difference in draught may be as much as 26 to 27 inches.
4. In a seaway, it is often necessary to haul over head sails before hauling the bowlines on the after sails, to prevent the frigate coming up into the wind again too quickly.
5. Nevertheless, two 18-pdr frigates were built in Cherbourg to Sané's draughts, in 1804 and 1810.
6. They made however very little leeway, and moreover registered 12 knots sailing large, and that not in a storm of wind.

18-pdr frigate by Antoine Roux (1765-1835)





This watercolour bears the signature of Antoine Roux (1765-1835), but it is undated, and the frigate is unnamed. She possesses however all the characteristics of an 18-pdr frigate from the closing years of the Empire. The style is somewhat naïve, and is marked by a certain hardness and sparseness in its execution. However, these criticisms are only minor, and it must be recognised that Antoine Roux painted *from nature* and with considerable attention to detail.

As was customary, the wales are painted black, and this band runs right through to the head, where some of the timbers are highlighted in pale colours. The figure is painted white. The upper deck battery is yellow ochre for part of its height, but the upper part of the quickworks are painted black, above a line placed a little way below the upper sills of the gunports. The yellow ochre of the topsides stretches round through the quarter-galleries and finishes at the bow at the fore side of the catheads. There are fourteen gunports on the upper deck, and no chase-port. Note the presence of fenders[1], by now generally abandoned. The stock of the sheet anchor can be clearly seen at the after end of the fore-channels. The forecastle and quarterdeck bulwarks are topped by a low barricade of hammock nettings[2]. Larger barricades run along the waist, over the gangways, and take both hammocks and the crew's sea-bags. They are formed of iron stanchions with a swinging crane supporting a wooden bottom and nettings on either side; painted canvas is used to cover up the contents on both the inside and the outside. There is a break between these barricades and those of the forecastle to allow the passage of the maintack. The break at the after end is larger, for the entering ladder.

The forecastle bulwarks are open at the fore end to leave clear three timberheads used for handling the anchors. According to Regulations, the forecastle should be armed with one 8-pdr long gun and one 24-pdr carronade on either side (Establishment for guns of 1807). These guns are not shown in the painting, but there are six gunports for long guns and carronades on the quarterdeck[3], so that the total armament is 40 guns.

The frigate ought to be provided with six boats (see below), including three so-called yawls on davits at the stern. The longboat, barge and cutter should be resting on boat-chocks on the upper deck.

The frigate is coming to anchor with the wind astern, the wind appearing to be a fresh gale, since some sails have been taken in. The action of the rudder being put hard over from one side to the other, together with the mizen-topsail braced over until it is pressed against the mast, are sufficient for the frigate to lose way while still balancing the vessel with the driver and the standing jib. The maincourse is furled, the forecourse brailed up, and the topgallants are about to be furled.

The rigging is shown in minute detail (the blocks are perhaps a little over-emphasised). I would like to make one comment concerning the bowsprit: the cap is placed vertically and symmetrically, so that the jibboom and its pole cannot be correctly manœuvred, since the rings forming the straps of the forestay and fore preventer-stay hearts are closed off at that angle. The dol-

phin-striker is double (A-shaped), in order to provide better support on the weather side. The bobstays of the jibboom and its pole are clearly visible. The spritsail-yard serves presumably only to spread the jibboom shrouds[4] (only just visible). The horses with their knots are represented, and note also the twin bobstays of the bowsprit and the preventer-bobstay designed to resist the strain imposed by the fore-topmast stays.

The forestay and fore preventer-stay are snaked, as are the corresponding mainstays passing down on the starboard side. There are a series of shroud-trucks in the lower shrouds. The mizen-topmast staysail can be seen furled against the mizen-mast, the mizen-staysail against the mainmast, and the main-staysail against the foremast; another sail (the middle staysail) can just be seen gathered up in the top. Among the numerous items of rigging depicted are the masthead tackles and a stay-tackle. The run of all the lines can be followed, evidence enough of the knowledge and rigour of execution employed by Antoine Roux in this painting.

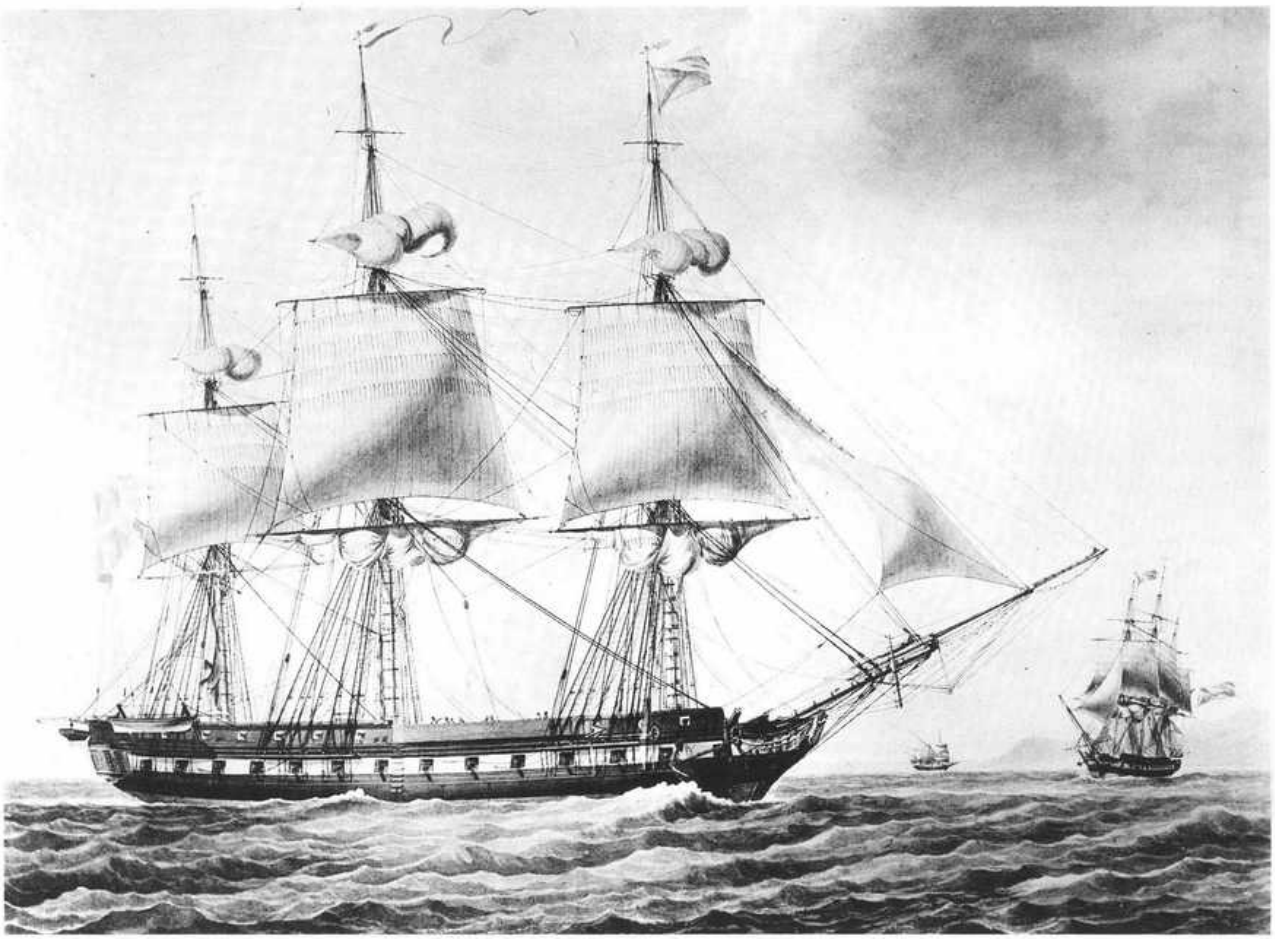
1. In general, fenders went out of use sometime in the second half of the 18th century.
2. The nettings are strung on lines stretched through eyes in the stanchions.
3. The Establishment for guns of March 1807 set the secondary armament of 18-pdr frigates at two 8-pdr long guns and two 24-pdr carronades on the forecastle and six long guns and six carronades on the quarterdeck.
4. The presence of a capshore would make it impossible to rig a spritsail.

This is another watercolour by Antoine Roux, also undated, and depicting an anonymous 18-pdr frigate; its characteristics are however similar to those of the other vessel which we have just described. In this commentary therefore I shall restrict myself to noting any significant variations.

The jibboom is extended by a flying jibboom, and this can be hauled out thanks to the arrangement of the straps of the hearts placed above the spar. The whole of the upper deck battery is painted in yellow ochre, without the upper band of black cutting into the ports, and this stripe is continued right forward as far as the figure. The stock of the sheet anchor can be seen at the fore end of the channels rather than at the after end, and it is partly painted in yellow ochre. The bulwarks of the forecastle are intersected by three openings, one for a timberhead and the two others for an 8-pdr long gun and a 24-pdr carronade. There are six gunports on the quarterdeck, armed appropriately.

The frigate is sailing close-hauled under reduced sail: the courses are brailed up as is the driver, the royals are furled and the topgallants bagged, and only the outer jib is set. This arrangement, confirmed by the smaller drawing in the background, implies that the wind is blowing a fresh gale.

The rigging details are not as clear as in the previous painting, the hand being less "disciplined", as is perhaps more typical of Antoine Roux' more usual style.



This watercolour bears the signature of François Roux (1811-1882), the youngest of Antoine Roux' three sons. It purports to represent the *Pomone* (1804-11), but it is impossible to confirm this attribution, all the more so since the painting bears the date 1877. Nevertheless, one is forced to recognise its artistic merit, and the expertise of the painter.

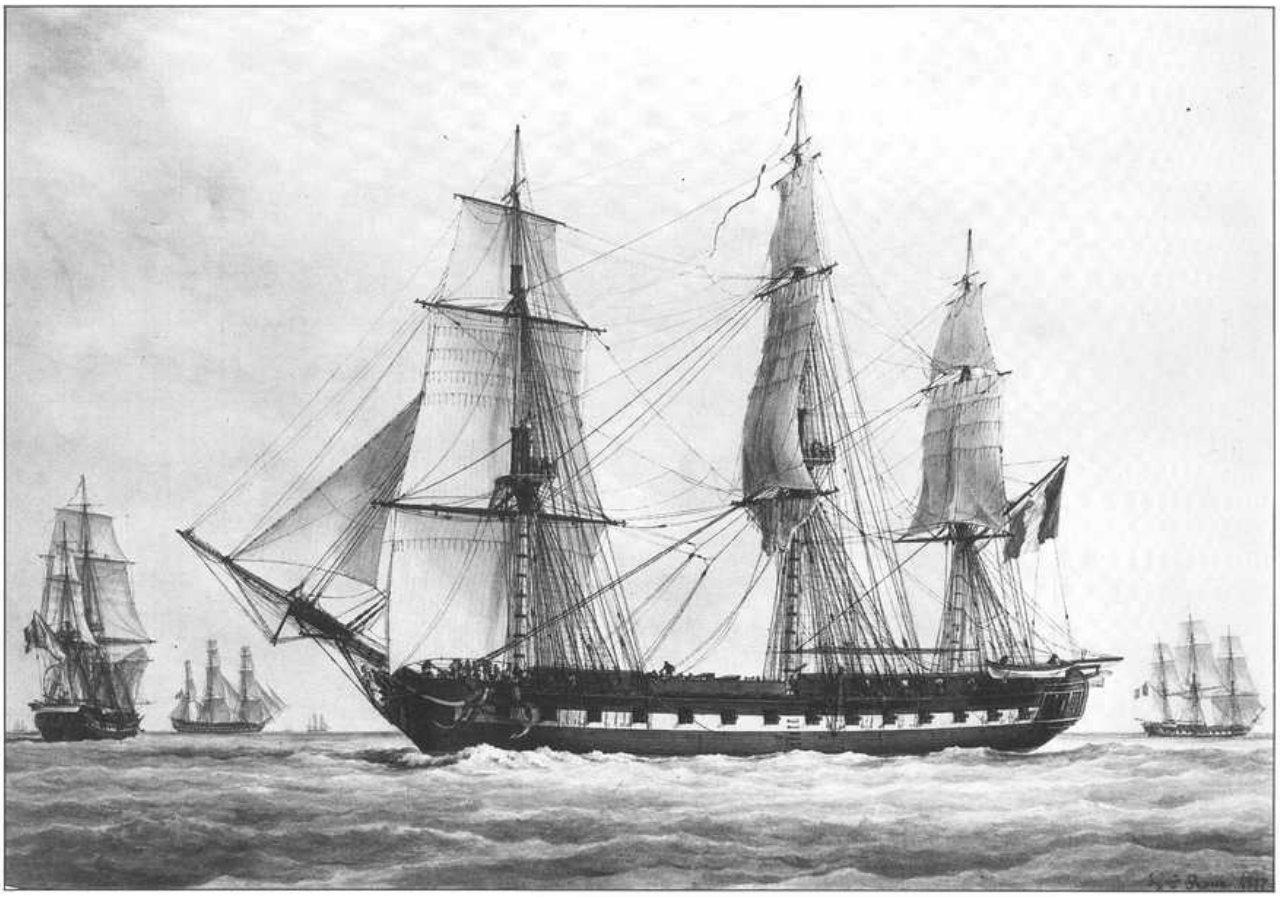
The frigate is sailing before the wind, and the state of the sea and the strength of the wind correspond to what was called a "fresh gale". The topgallants are furled, and the wind is too strong for studdingsails. The maincourse is brailed up and the driver is furled, allowing the forecourse to draw well. The mizen-topsail is set, without apparently masking the main-topsail, which however seems to be keeping the wind from the fore-topsail and the standing jib. As a rule, with the wind as strong as this, it passes under the foot of the main-topsail and exerts some pressure on the lower part of the fore-topsail and the jib, which is set to correct any lee-lurches which may occur with a following wind.

The rigging is minutely and exactly represented: note the sprit-sail-yard which is bare, serving only to spread the jibboom shrouds at a better angle, and those of its pole. The dolphin-striker is double, essential for the bobstays or martingale of the jibboom and its pole. Abaft the bowsprit cap, which is set asymmetrically, the inner jib can be seen furled. I will not comment on all the items of rigging which are so carefully depicted, but would draw your attention to the reef-bands, the reef-points on all the sails including the forecourse, and the robands.

As far as the hull is concerned, note the way the cables of the best bower anchor (on the starboard side) and the small bower pass in through the inner hawseholes. The sheet anchor is stowed in the main-channels, and there is a boat on davits; these details are in accordance with the arrangements as laid down in the 1807 Establishment. Note also the presence of a bowchase port.

This representation, showing the frigate from an unusual angle difficult to portray, is ample evidence of the talent of François Roux.

*



This painting, which is also by François Roux, was made in 1877. It depicts the *Pénélope* (1802-1816), built to the draughts of Rolland. If there is a criticism to be made of the watercolours by both Antoine and François Roux, it is that the sheer is less pronounced than was actually the case under the First Empire (see for example the draughts of the *Érigone*). As time went by, and repairs or rebuilds were carried out, this sheer was progressively reduced, as can be seen in the draughts of the *Armide*. However, apart from this slight qualification, the painting shown here is entirely in accordance with the Regulations of 1807.

The wales are painted black, as is the whole of the head, with only the figure standing out against it. The band above the wales is painted either white or yellow ochre, and covers only the lower two thirds of the gunports, with the remainder of the upper works painted black. The quarter-gallery is black, apart from a few mouldings highlighted in a pale colour. The quarterdeck and forecastle have high bulwarks, topped by enclosed hammock racks. In the waist, the gangways are protected by waist-cloths of black-painted canvas stretched between hammock-cranes where further hammocks can be stowed.

The armament appears to be in accordance with the 1807 Regulations, with a main battery of twenty-eight 18-pdrs and eight 8-pdrs and the same number of 24-pdr carronades as secondary armament.

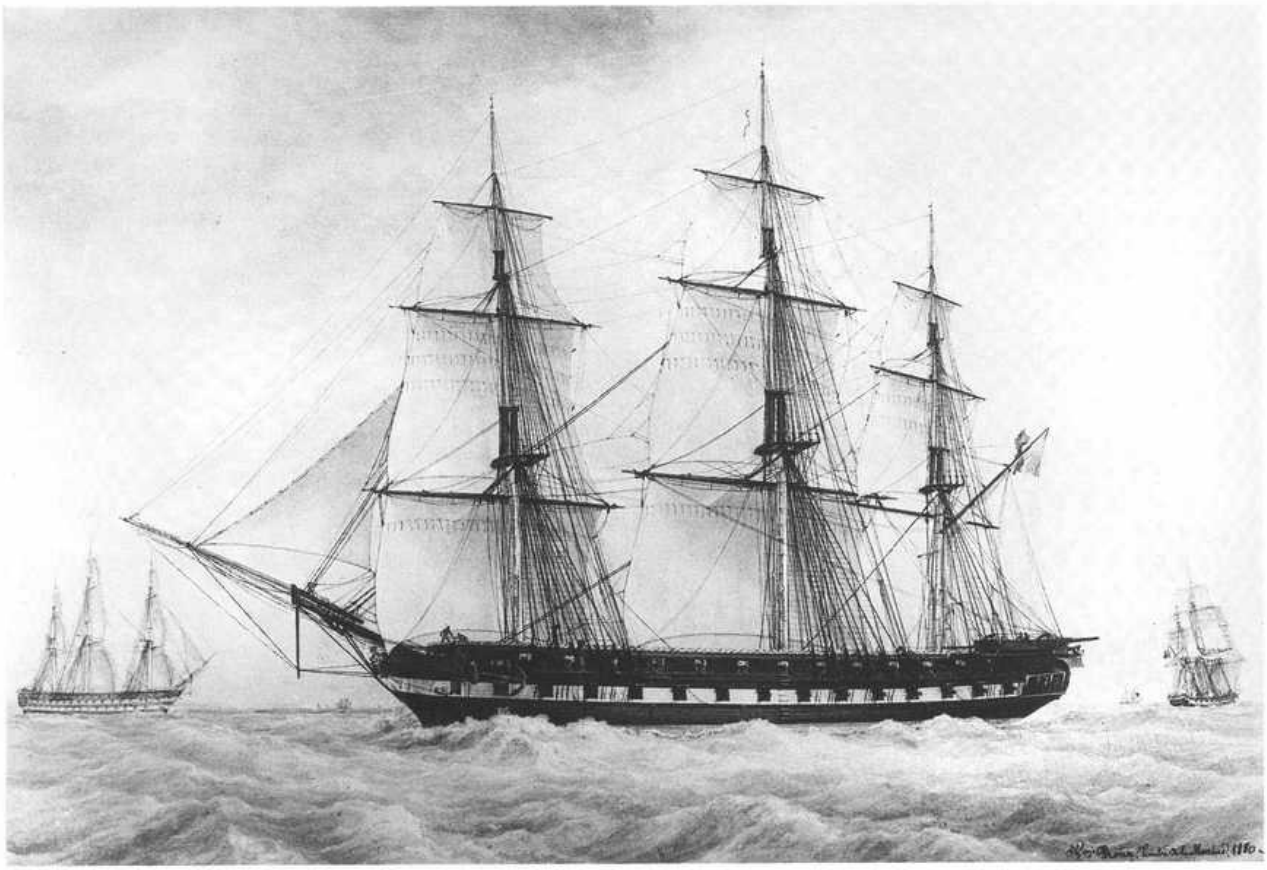
It is possible to make out two boats, presumably the longboat and the launch*, stowed together with the spare spars on skid-beams resting on the carlings of the gangways. There is a swivel-gun mounted next to the entering ladder. Note the best bower anchor at the port cathead and the sheet anchor stowed in the port main-channels, rather than to starboard as was more usual.

An overhead netting has been stretched between the mainmast and the mizen, and further aft, in the way of the mizen-channels, there is a small boat on davits, with another at the stern.

The *Pénélope* is evidently putting about with the wind astern (veering), in a fresh breeze. Only the sails of the foremast and the standing jib are filling. The sails of the main- and mizen-masts have been braced over or brailed up, and the frigate is coming up.

I will not repeat the comments already made concerning the rigging, except to point out: the flying jibsail furled round the flying jibboom, the inner jib also being furled; the mainstay passes to starboard of the foremast, with the preventer-stay to port; the two stay-tackles; the royals furled and brought down onto the caps; the mizen braces; the boom topping-lift with its stirrup; the vangs.

*As a rule, frigates are supplied with five boats: longboat, barge, cutter, gig; the barge is sometimes also called the Captain's barge. The two others are often called yawls or jolly-boats. These are stowed on davits. There is frequently a sixth boat, hung from davits at the stern, intended for the use of the Captain or the Second Captain, and it has the merit of being able to be launched very quickly in the event of a man falling overboard.



In 1880, shortly before his death, François Roux painted this watercolour of the *Galathée* (1811-1838), built at Genoa to the draughts of Pestel. This depiction illustrates perfectly the ultimate development of the 18-pdr frigate, and an interesting comparison can be made between this painting and the draught of the *Armide* taken from the *Atlas du Génie Maritime* and illustrated on pp. 174-5.

The gunports of the upper deck battery are underlined with a white band stretching from the quarter-galleries to the head, the timbers of which are entirely berthed-up with thin boards. The figure is limited to a simple bust. The frigate has a round bow, the quarterdeck and forecastle are entirely linked forming a complete spar-deck. This allows the installation of a second battery of guns, with one short-pattern 18-pdr and twelve 24-pdr carronades on either side. This armament is significantly more powerful than that laid down in 1827 (2 long guns and 16 carronades), and the total number of guns carried by the *Galathée* in this watercolour is actually 54, although the plate from the *Atlas* shows a complement of guns which conforms with the 1827 Establishment.

The bulwarks of the frigate extend uninterrupted from bow to stern. Note that the entering ladder leads up to a gunport. This second tier of guns means that port-lids can be employed on what is now the gundeck, and the guns can be lashed up against the side*.

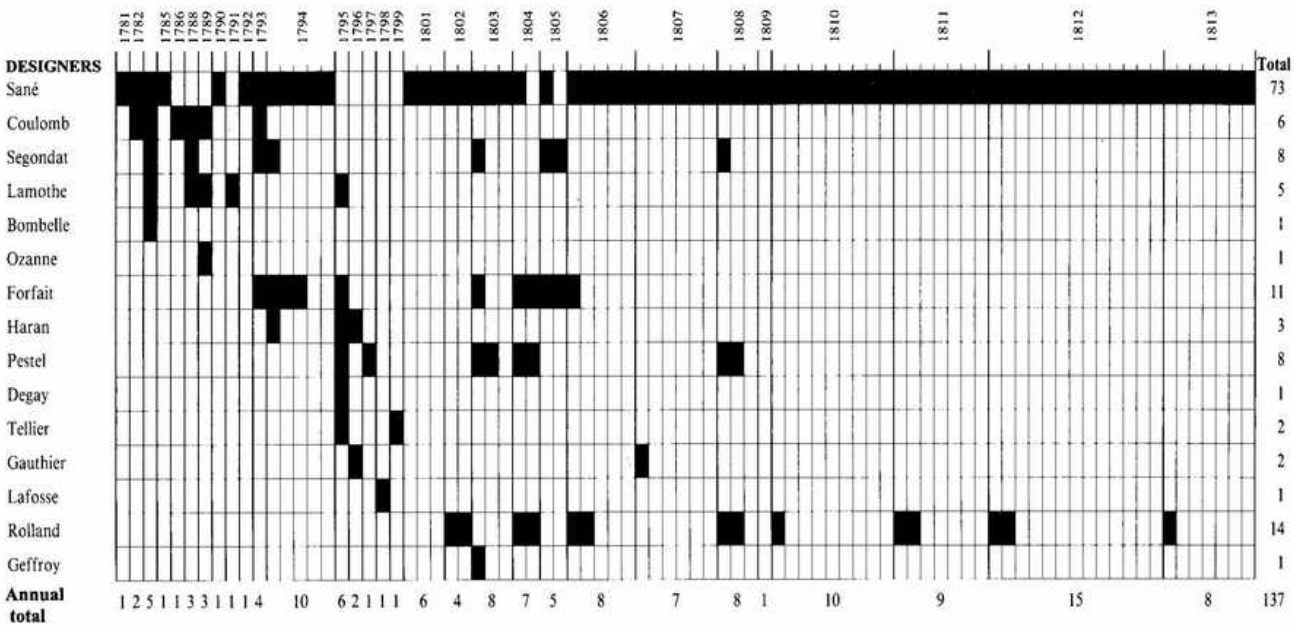
The bulwarks finish in a solid structure enclosing the hammocks; the three boats are stowed on the spar-deck, with the barge or cutter stowed in the longboat , and the yawls hung on davits.

The *Galathée* is shown sailing close-hauled under reduced sail, so that the wind must be blowing a fresh gale. The driver is not set, since the frigate tends to gripe as soon as the wind freshens. Rather curiously, the topsails have three reef-bands, apart from the mizen-topsail which has two, which is an arrangement more reminiscent of the previous century. A large single dolphin-striker replaces the more usual double spar, and the bowsprit cap is placed vertically in the axis of the bowsprit which by now is usual. The spritsail-yard, which tended to strain the bowsprit, has disappeared, being replaced by iron "whiskers" running out from the catheads and providing support for the jibboom shrouds and those of the pole. Looking carefully, it is possible to make out the fact that the shroud-trucks have disappeared, in favour of simple splices turning in rings; the mainstay passes down to starboard of the foremast, and the main preventer-stay to port.

The lower masts are painted white; the topmasts are left unpainted from the cap to the crosstrees, as are the topgallants above their cap. All the other parts of the masts are painted black, including the tops, trestletrees and crosstrees. The jibboom and its pole are left unpainted for the part forward of the bowsprit cap. The frigate has no royal-masts rigged, but the topgallant poles are long enough to set royals if required.

*As a precaution against surprise attack at sea, Regulations stipulated that the upper deck guns of frigates should be kept loaded, and this justified the fitting of half-lids. With a powerful secondary armament on the spar-deck, kept constantly in readiness, half-lids were felt to be unnecessary for the "upper deck" guns.
[Translator's note]: No such considerations persuaded the English Royal Navy to abandon full lids for all gunports, apparently without serious disadvantage!

18-pdr Frigates.
Numbers Built and their Designers, 1781-1813



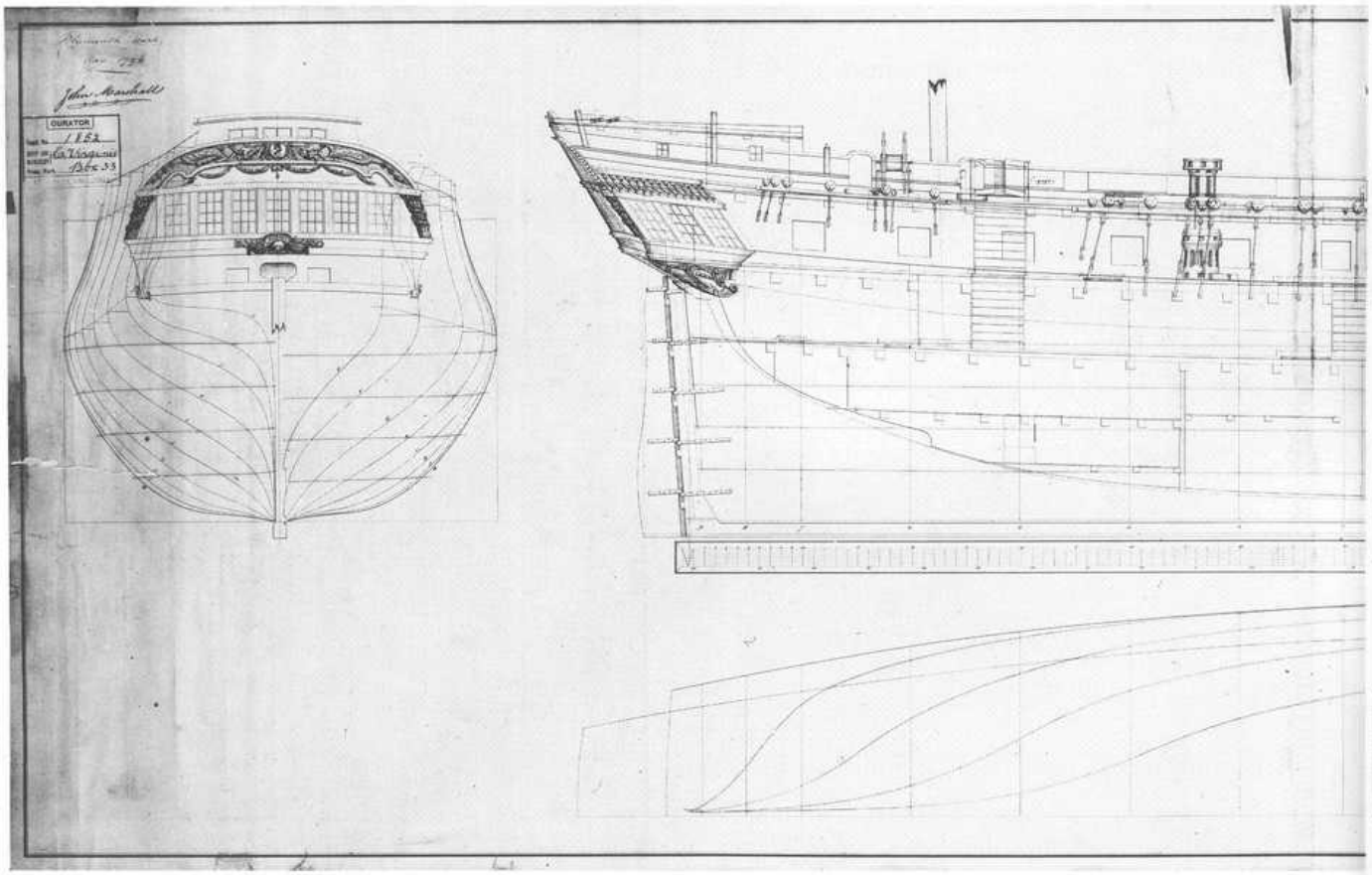
The left-hand column indicates the names of the fifteen shipwrights responsible for the designs of all the frigates of this class. The columns to the right indicate the total numbers built (1 column = 1 frigate), by design.

The heading shows the year of building, and the last line gives the totals laid down in each year.

This table summarises and illustrates who was responsible for all of the 18-pdr frigates designed and built for the French Navy. As you can see, thirteen designers were responsible for forty-four frigates built between 1781 and 1800, and this number fell to seven designers between 1800 and 1803, for fifty vessels, and then to only two designers for the period 1809 to 1813, for forty-three frigates built. The role of Jacques-Noël Sané is predominant, with 73 vessels to his name out of the total of 143, and to these might be added the 9 frigates built in Italy and Holland, taking his total to 82 out of 152, or considerably more than half. Pierre-Alexandre Forfait provided the draughts for only eleven frigates, to which one might add the two vessels built by his follower Charles Tellier; while it is true that his designs influenced other shipwrights, this does not alter the conclusion that the 18-pdr frigate is above all the Sané frigate, as this table makes abundantly clear.

The total number of vessels laid down for each year also tells a story. Under the Ancien Régime, from 1781 to 1790, only seven 18-pdr frigates were built. Between 1791 and 1800, the total rose to twenty-seven, of which no less than ten were built in a single year, 1794. However, the real effort came between 1801 and 1813, with ninety-three frigates laid down, the peak being reached in 1812 with fifteen vessels laid down in a single year.

It is a sad fact to note that many of these beautiful vessels found their way into the English Royal Navy, with their crews interned in the prison hulks: fifty-seven 18-pdr frigates were captured between 1794 and 1814.



***LA VIRGINIE* (J.-N. Sané).** The draughts of this frigate date from May 1796 and were taken off within a month of her capture. No changes have yet been made, which makes it all the more valuable as a source document, illustrating to perfection a typical example of the numerous Sané-designed frigates.

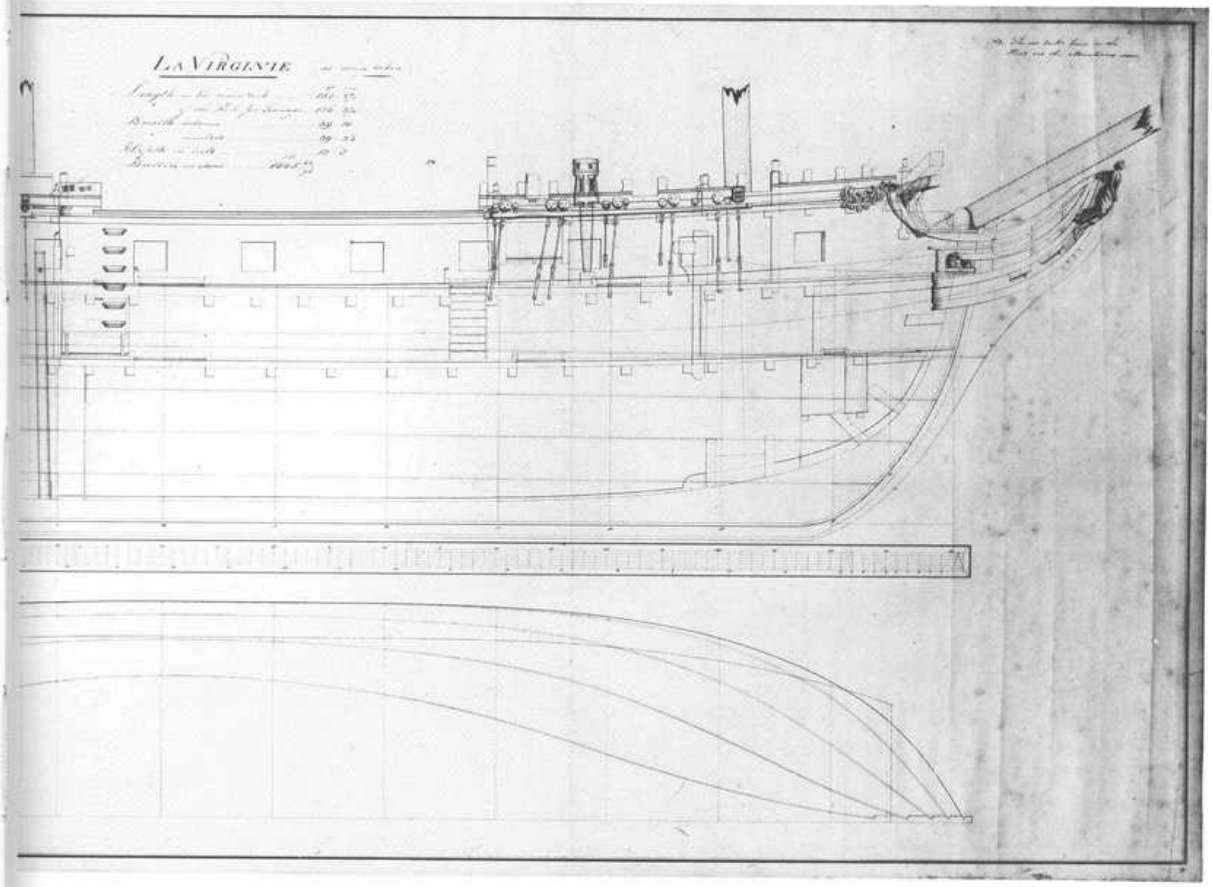
La Virginie was built at Brest in 1793. She has fourteen gunports on the upper deck, with the foremost port serving as a bowchase port only. The meticulous attention to detail in this draught shows that she was fitted with a poop (which is hardly aesthetic), had ports for two sea-howitzers on either side in addition to the seven ports for 8-pdr long guns, three of the ports being on the forecastle. The secondary armament thus totals eighteen pieces, bringing the overall armament to 46 guns; this must be regarded as a maximum, and one is forced to wonder whether or not the stability might not have been impaired by this increase in armament, since the vessel, it will be recalled, was originally designed to carry only six 8-pdrs and a total armament of 32 guns.

The outline of the head is elegant, and follows the steeve of the bowsprit harmoniously; the profile of the stem is attractively curved. Note the holes for the bobstays, the gammoning and its bolsters, the roller-hawseholes. The head is clearly drawn in, showing the detail of the collar-beam enclosing the bowsprit which is stepped on the gundeck. Five breasthooks or deckhooks can be counted; the riding bitts are placed just abaft the foremast, which allows the cable-hatch to be opened forward of the galley fires; a little further aft can be seen the forward ladderway for the crew. Like the galley fires, the casing of the bread-oven is carefully illustrated, installed between the main-hatch and the mainmast and on the gundeck. The four pumps are all elm-tree pumps, no doubt because of a shortage of bronze for the working-barrels of royal pumps. The pins of the main topsail-sheet bitts rise up above the level of the quarterdeck, whose breastwork has no belfry for a watch-bell; however, the belfry for the large ship's bell is shown over the forecastle breastwork. There is a fixed-block with five sheaves fastened to the plankshеer (for the fore-topmast studdingsail tack, the crow's-foot of the lower fore studdingsail, fore preventer-brace, and the staysail sheets).

The after ladderway for the crew is followed by the after-hatch. The main capstan has two barrels (the maximum diameter of the lower barrel seems a tight fit between the beams of the quarterdeck when it comes to unship it). Abaft the main capstan is a scuttle, no doubt serving as a skylight to provide illumination to the cockpit forward of the gunroom.

A further fixed-block with two sheaves is nailed to the plankshеer, for the mainsheets in foul weather.The after ladderway for the officers is in its usual place, and there are a pair of bitts between its companion and the mizen-mast. The double wheel is placed abaft the mizen. There are three stocks for swivels, two of which are at the level of the unattractive poop, with space for two bunks and a small cabin, all of which are traced with great care, as is a further fixed-block with four sheaves (mizen-topmast studdingsail tack, main-topmast studdingsail tack, mainbrace, main preventer-brace).

The façade of the stern rakes steeply aft, and this is mirrored in the angle of the quarter-galleries. This shift in line increases their elegance; two of their three lights are clearly false. The elliptical or horseshoe shape of the taffarel has been ruined by the projection of the poop and its small lights. The carved-work is restricted

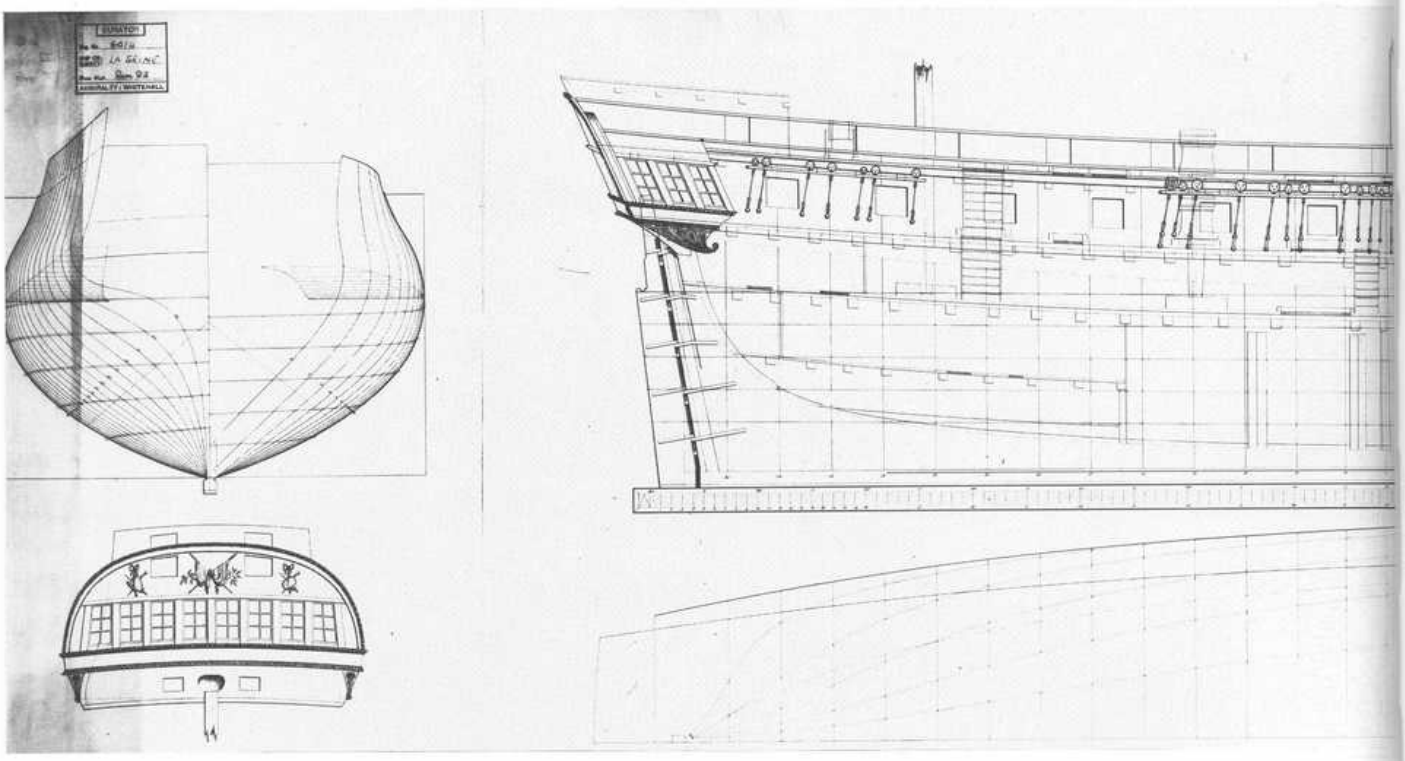


to a few garlands or festoons, with indications of foliage surrounding small figures of people, while the side counter timbers are decorated with lictor's fasces, completing a decoration which is very discreet; note that the stern-lights of the great cabin at either end are false. The decoration of the head is limited to a minute figure which is not at all of an appropriate scale to the head, with a flurry of foliage marking the end of the main rail abaft the cathead and its supporter.

In my comments on the other draughts on the following pages, I will merely highlight any major differences with these draughts of the *Virginie*.

Scale 1:190

Courtesy: National Maritime Museum, Greenwich.



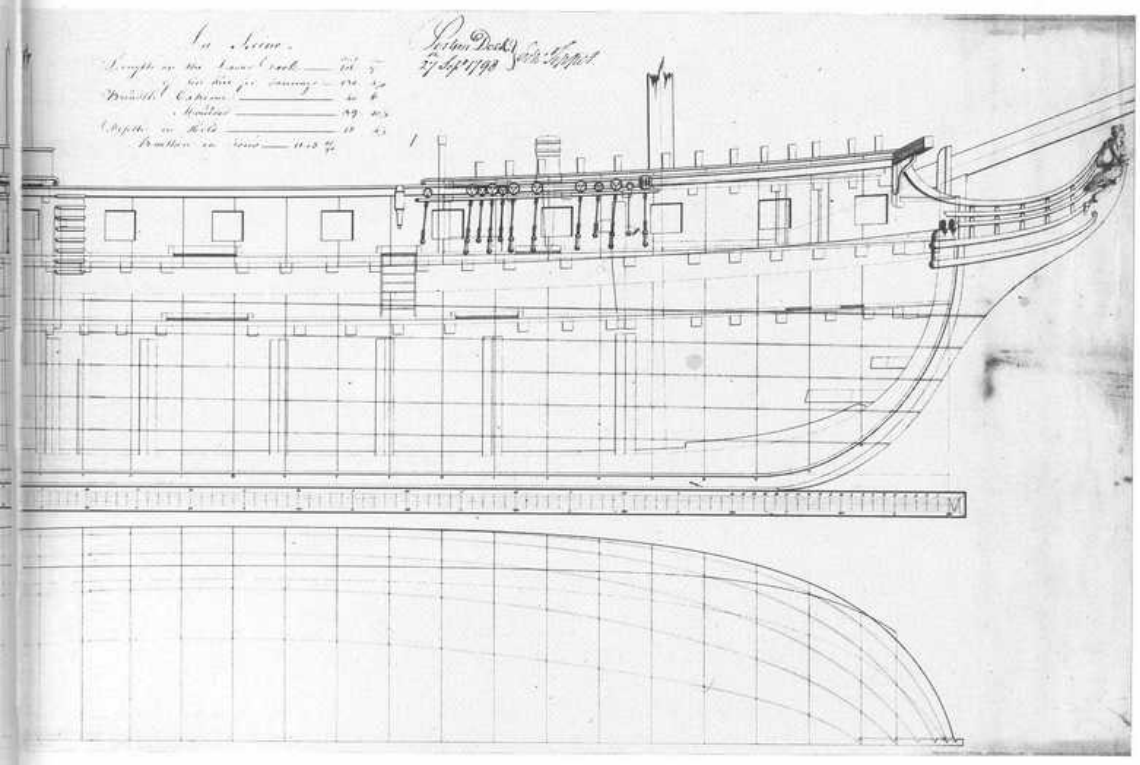
***LA SEINE* (P.-A. Forfait).** Built at Le Havre in 1793 and captured in 1798, these draughts dating from the same year give a clear idea of the fifteen frigates built to Forfait's draughts. Reproduced at the same scale as the Sané draughts of the *Virginie* on the previous pages, a useful comparison can be made.

We have already discussed the hull volumes, and I will restrict my comments therefore to a few details, highlighting the differences with the *Virginie*.

The shallow steeve of the bowsprit makes it possible to step the bowsprit on the upper deck. The bollard timbers are very high, in the English manner. To judge by the position of the spindle of the fore jeer capstan, the cable-hatch must be offset from the centre line. The shape of the timberheads on the forecastle is unusual. The eight riders run up as far as the lower deck. There are chestrees in the vessel's side.

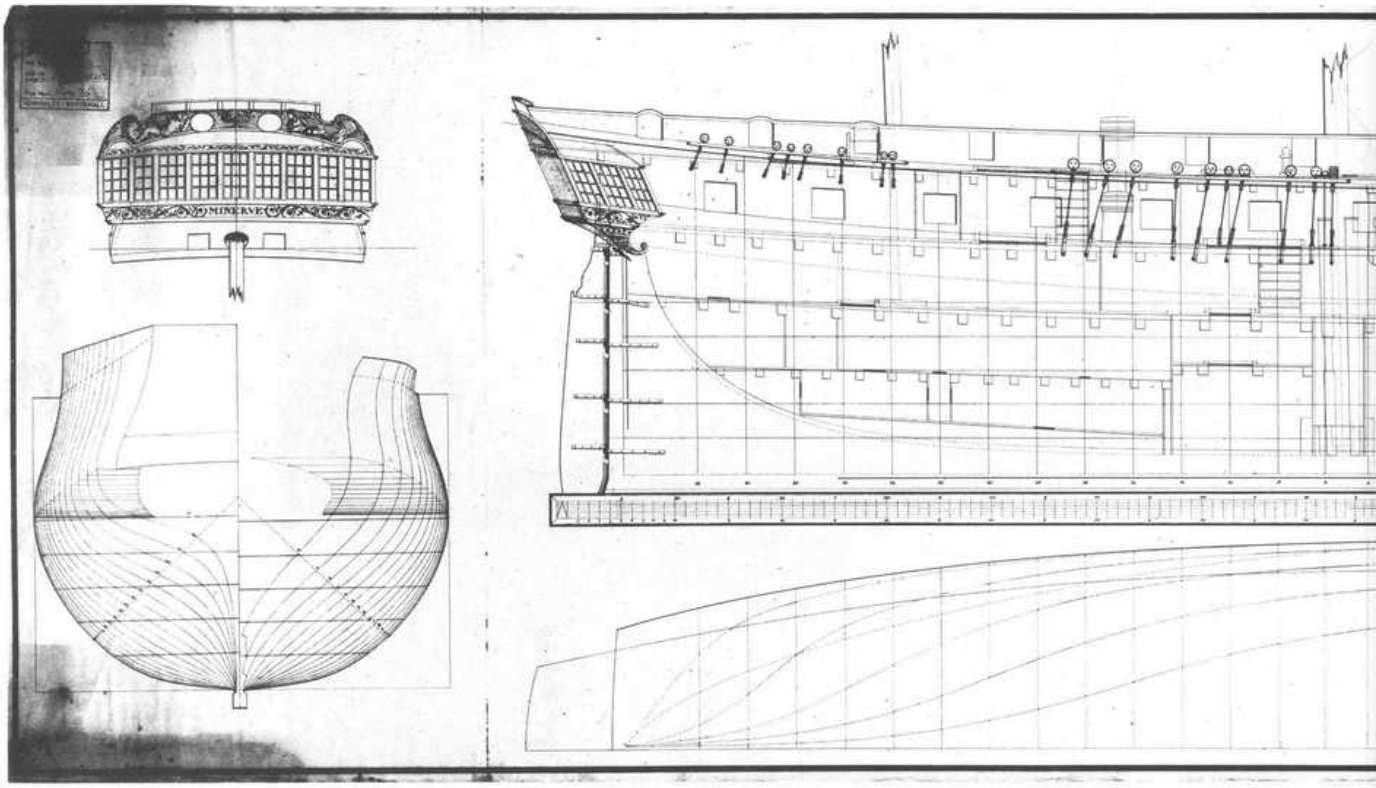
It would appear that the after-hatch, on the gundeck, is longer than is customary. Forward of the officers' ladderway there is a scuttle to provide light to the cockpit forward of the gunroom. The volume of the poop rather spoils the lines of the upper works, and the way the stern-lights of the poop cabin cut into the arch of the cove is not very felicitous.

The carved-work is reduced to a strict minimum; the figure is out of proportion, although it conforms with the Regulations which specified a height of 7 to 8 feet for frigates of this class.



Scale 1:190

Courtesy: National Maritime Museum, Greenwich.



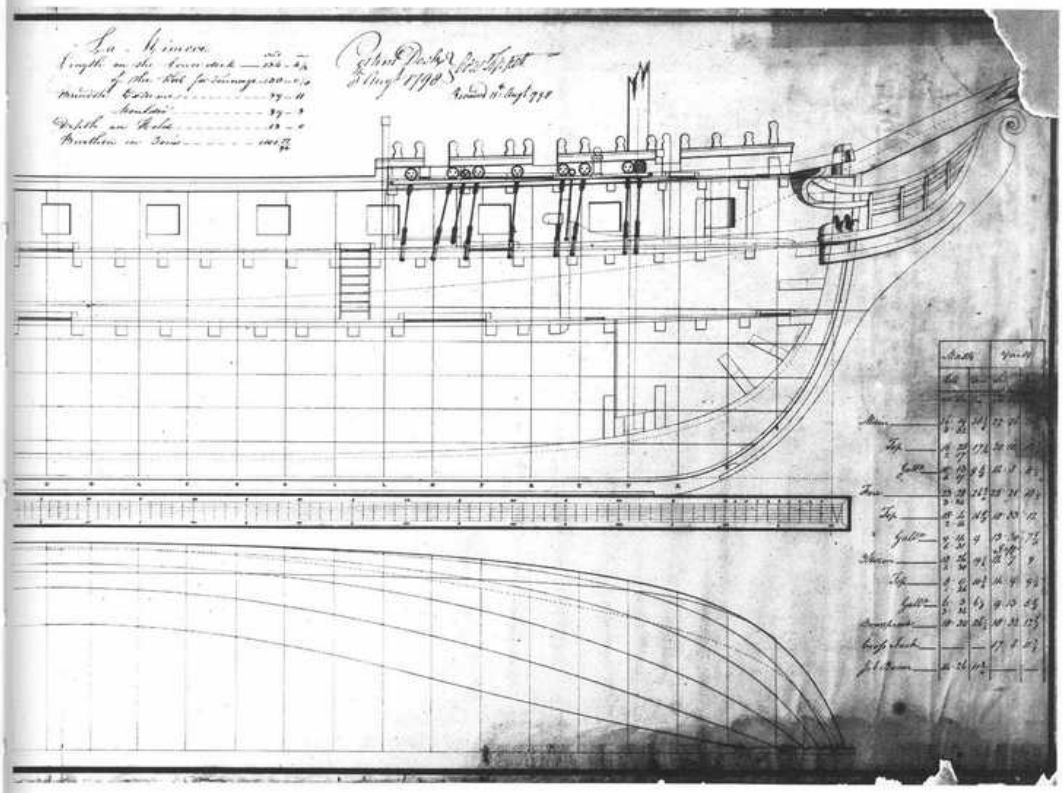
***LA MINERVE* (J.-M.-B. Coulomb).** Laid down at Toulon in 1793, this *Minerve* replaced an earlier 1782 *Minerve*, also by Coulomb, which was captured in 1794. She was however captured in her turn in 1795*.

This draught dates from 1798 and appears to have been taken off before any modifications were made. Note that there are thirteen gunports on the upper deck, plus one chase-port. In the earlier *Minerve* of 1782 there was no chase-port. There are three gunports on the forecastle and seven on the quarterdeck on either side; this is exceptional, since it brings the total armament of the frigate to 46 guns (it is unclear whether this includes the four 36-pdr sea-howitzers). This armament is explained in part by the absence of any quarterdeck cabin or half poop, and there are even two elliptical sternchase ports in the taffarel.

The midship bend has a roundness which is characteristic of J.-M.-B. Coulomb's style, and which re-emerged much later with the 30-pdr frigates (see Chapter X). The sternpost is not raked at all.

The stern is not of the usual horseshoe shape, leading to the question as to whether or not it is original. That some changes had been made is evident from the shifting of several ladderways, notably that of the officers which is shown just abaft the main capstan.

*The name *Minerve* seems to have been an unlucky one, and not just for the French Navy: no less than ten French vessels of that name (and one *Minerva*) were captured by the Royal Navy. On the other hand, two English and one Portuguese *Minerva* were captured by the French. The vessel which is the subject of this draught actually had the distinction of accounting for three of these fourteen captures: having been taken into the Royal Navy as H.M.S. *Minerve* in 1795, she was recaptured by the French in 1803; her name was then changed twice (*La Canonnière* in 1803, *La Confiance* in 1809), but this apparently made no difference, for she was captured yet again by the Royal Navy in 1810! [Trans.]



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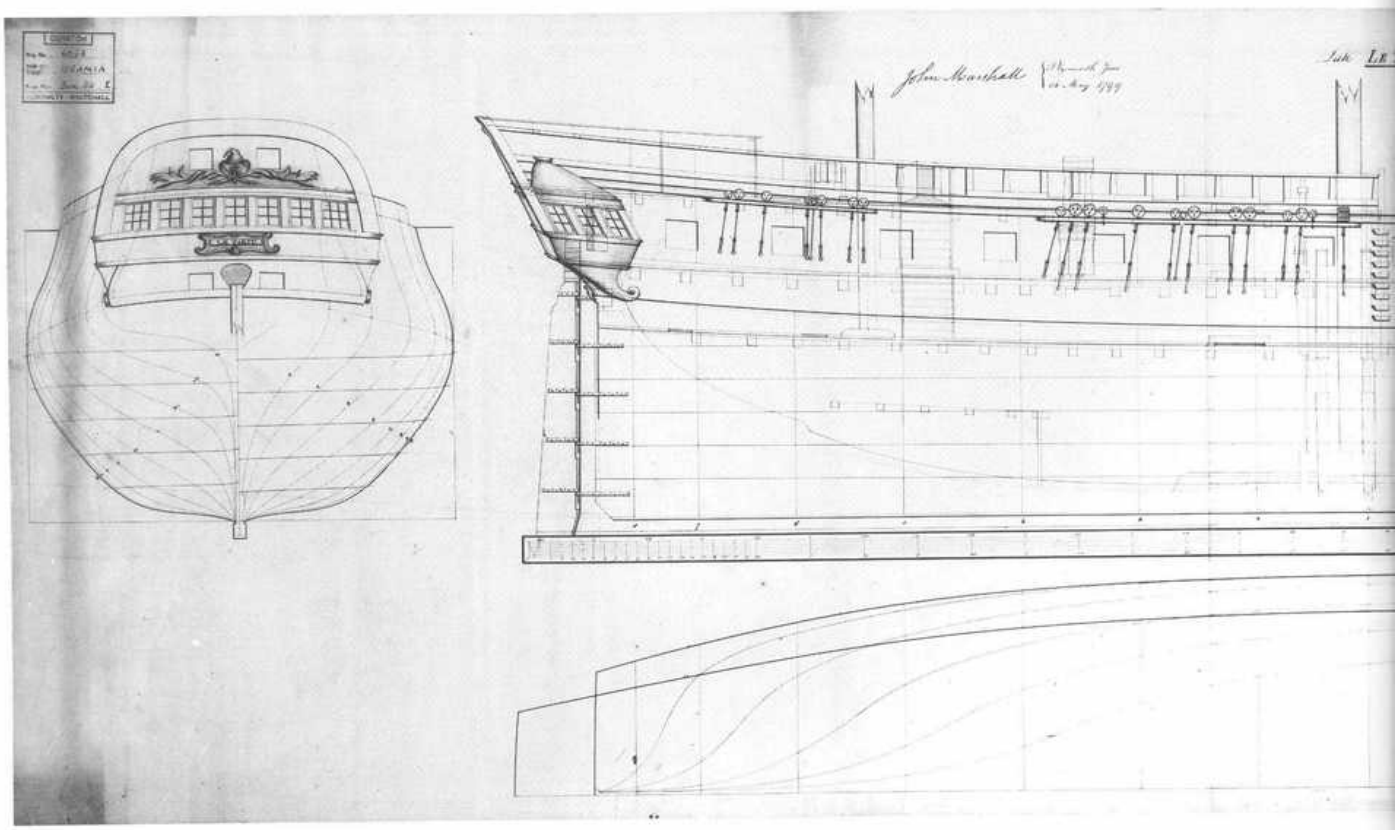
Courtesy: National Maritime Museum, Greenwich.

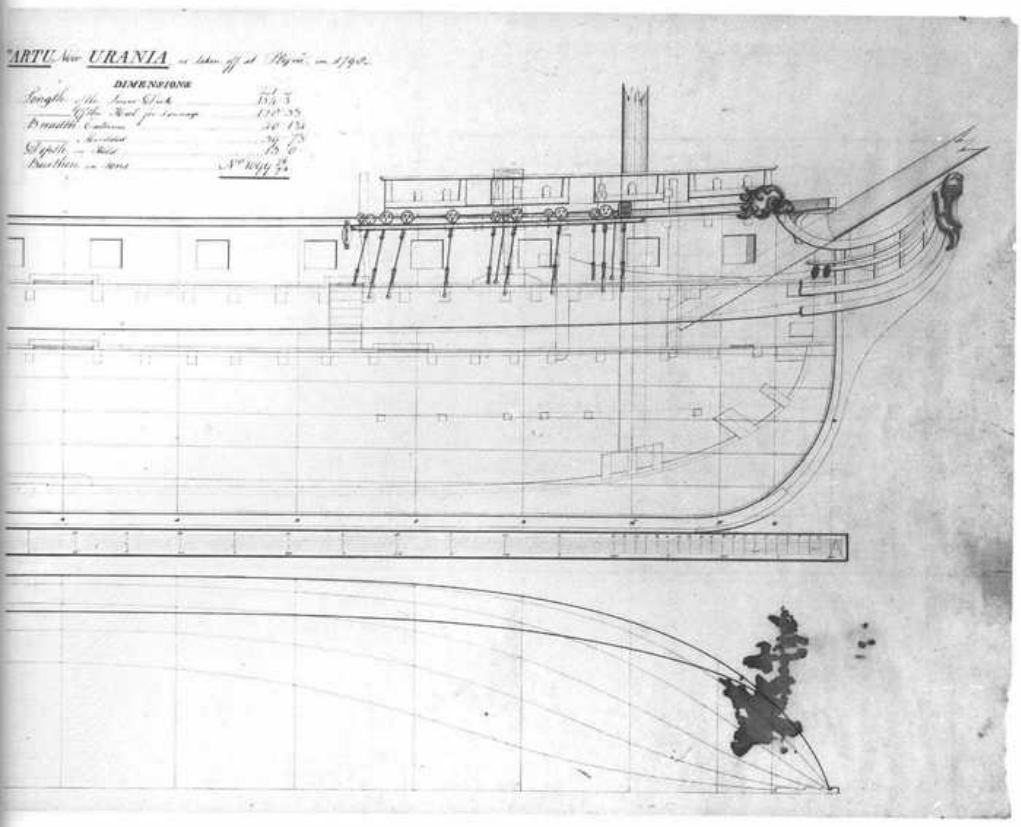


***L'URANIE* (C.-A. Segondat-Duvernet).** Built at Lorient in 1788 and renamed *Tartu* in 1793 after the name of her captain who had been killed in action, this frigate was captured in 1797. The draught, dated 1798, can be taken to apply to any of the eight frigates built to Segondat's designs.

The underwater lines are classical, and reminiscent of Sané. However, the profile of the stem, which is vertical above the waterline, and the unraked sternpost are quite unlike Sané's designs. The frigate has a "closed" head (round bow, without a beakhead bulkhead), and the bowsprit is stepped on the gundeck. There is no cable-hatch, and the cables pass down instead through holes in the fore corners of the main-hatch. There is however a hatch on the gundeck, forward of the crew's ladderway. Note the way the belfry is set off from the forecastle breastwork, and the presence of a massive block serving as chestrees.

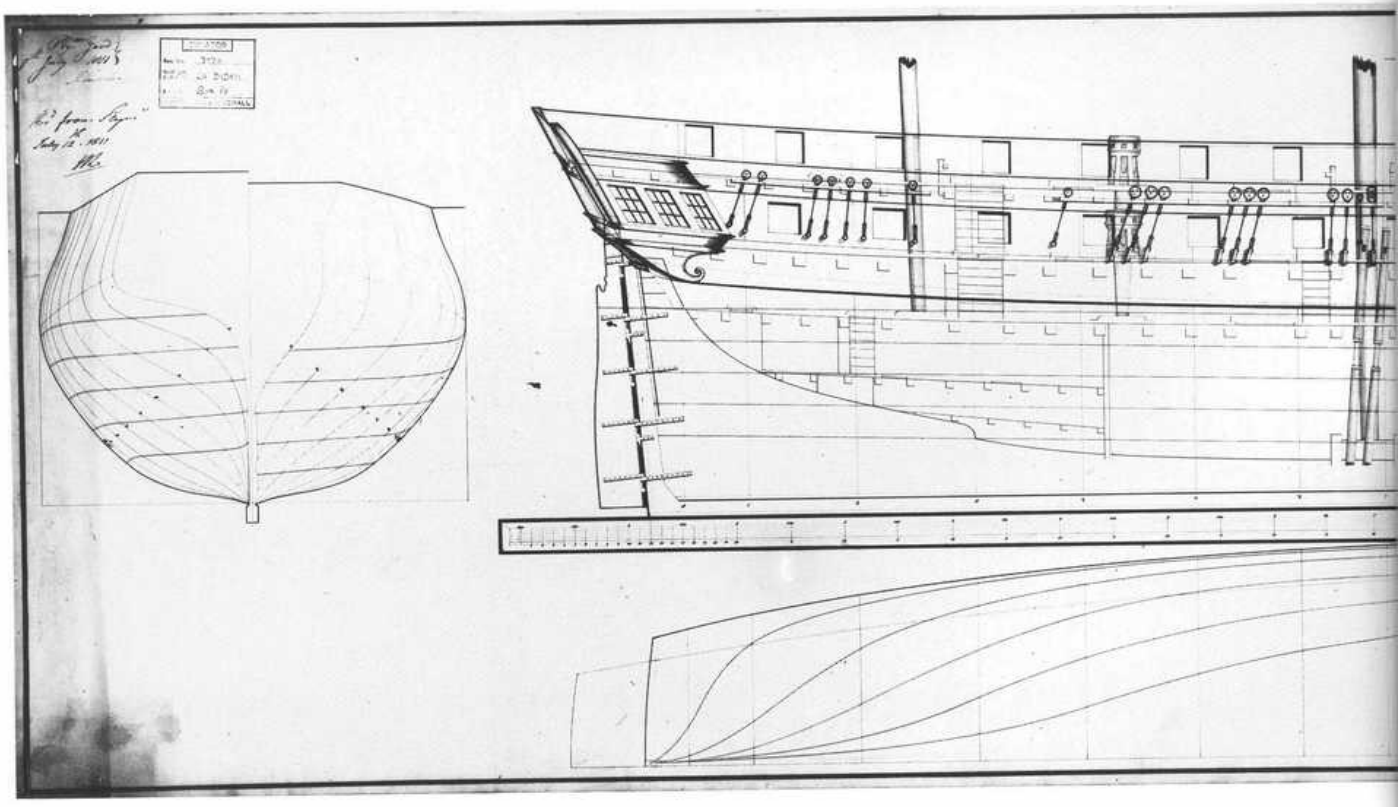
The four pumps are "royal" pumps, with bronze working-barrels, and there is still a knight forming the main jeer-bitts. The after ladderway for the crew is not indicated, but the holes in the decks are there. There is a poop, so that there is room for two sleeping cabins and a stateroom, lit by two stern-lights which might also serve as sternchase ports. There are fourteen gunports on the upper deck, plus a fifteenth bowchase port, three ports on the forecastle and (apparently) five on the quarterdeck.

The decoration is rather miserable, with the Arms of France replaced by a Phrygian cap which might easily be taken for a simple nightcap!



Scale 1:190

Courtesy: National Maritime Museum, Greenwich.

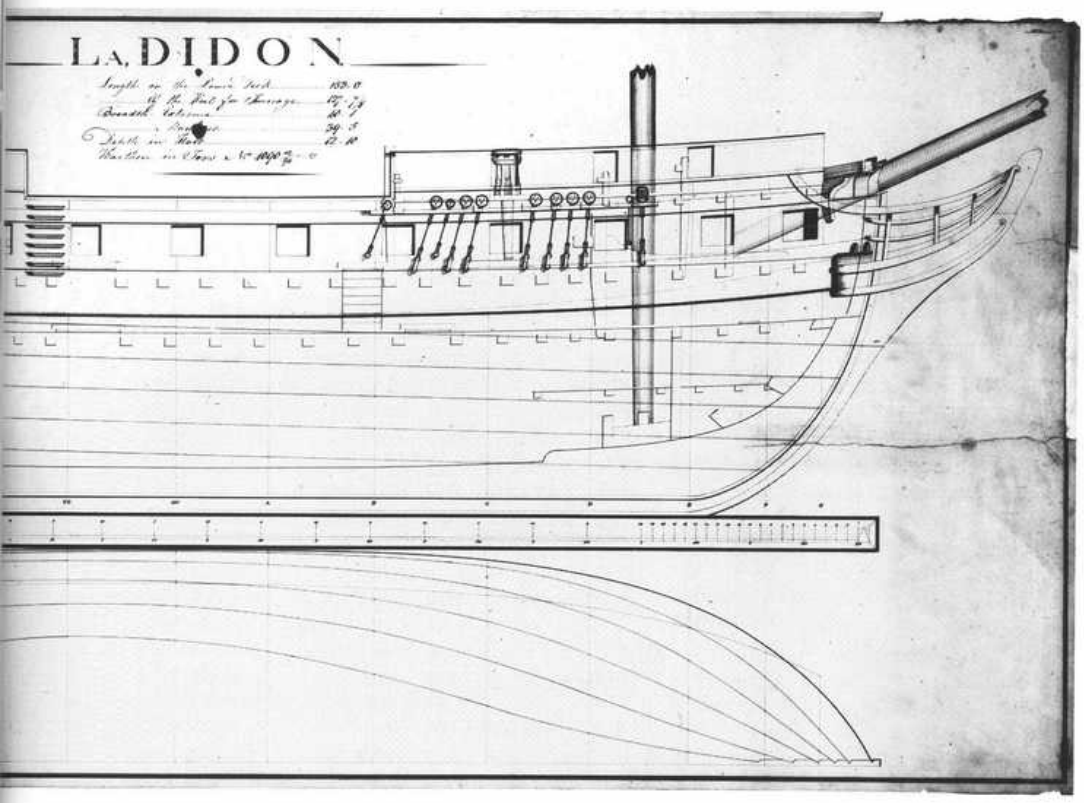


***LA DIDON* (F. Pestel).** Built at St-Malo in 1787, this frigate was captured in 1805. Eight vessels were built to these draughts, where the underwater hull is reminiscent of Sané, but with a steeper rise of floor.

There are fourteen gunports on the upper deck, with a fifteenth chase-port. Three ports on the forecastle, seven on the quarter-deck, made possible by the absence of a poop. In total therefore, 48 guns, of which probably four sea-howitzers at the stern.

The bulwarks continue through the waist, which has the effect of making the lines heavier. The steeve of the bowsprit is reduced, so that it is stepped on the upper deck. There is no cable-hatch, and we may deduce from that that the cables are coiled up abreast the mainmast, being led down through the main-hatch. The four pumps are royal pumps with a central part in bronze, and they are steeply raked, either because of the arrangement of the frames, or else for some other reason which is not apparent from the draught.

The after part of the hold is fitted out as usual in French vessels: the magazine at the lowest level with the breadrooms above, a scuttle leading to the lady's hole, the magazine-hatch and ladder leading down, and a further ladder for passing up cartridges in action.



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Courtesy: National Maritime Museum, Greenwich.

List of 18-pdr frigates in the French Navy (1781-1813)

Laid down	Name	Builder	Place of building	Length	Breadth	Depth in hold	Upper deck	Fo'csle/ Q'deck	Total	Struck from lists	Notes
1781	*Vénus*	J.-N. Sané	Brest	142'6"	36'8"	19'0"	1782			1789	Wrecked
1782	*Dryade*	J.-N. Sané	St-Malo	142'6"	36'8"	19'0"	26-28x 18	6x 8	32-34	1796	
1782	*Hébé*	J.-N. Sané	St-Malo	142'6"	36'8"	19'0"				1782	Dr. NMM*
1782	*Junon*	J.-M.-B. Coulomb	Toulon	142'0"	36'0"	18'9"				1799	Dr. NMM
1782	*Méduse*	C.-A. Segondat	Lorient	143'6"	37'0"	19'0"				1796	Burned
1782	*Minerve*	J.-M.-B. Coulomb	Toulon	142'0"	36'7"	18'9"				1794	Dr. NMM
1782	*Nymphe*	J.-A. Lamothe	Brest	144'5"	36'8"	19'3"				1793	Wrecked
1782	*Pomone*	Baron Bombelle	Rochefort	150'0"	37'6"	18'4"	1786				1794
1785	*Proserpine*	J.-N. Sané	Brest	142'6"	36'8"	19'0"	26-28x 18	10x 8	40-42	1796	Dr. NMM
1786	*Impérieuse*	J.-M.-B. Coulomb	Toulon	142'0"	36'7"	18'9"	4x 36 how.			1793	Captured
1788	*Melpomène*	J.-M.-B. Coulomb	Toulon	142'0"	36'7"	18'9"				1794	Dr. NMM
1788	*Thétis*	J.-A. Lamothe	Brest	144'5"	36'8"	19'3"	1789			1808	Dr. NMM*
1788	*Uranie*	C.-A. Segondat	Lorient	143'6"	37'0"	19'0"	28x 18	10x 8	42	1797	'93: *Tartu* – AR - SHM – Dr. NMM
1789	*Aréthuse*	P. Ozanne	Brest	142'2"	36'6"	19'0"	4x 36 how.			1793	SHM – Dr. NMM
1789	*Cybèle*	J.-A. Lamothe	Brest	144'5"	36'8"	19'3"				1809	
1789	*Perle*	J.-M.-B. Coulomb	Toulon	142'0"	36'7"	18'9"				1795	Dr. NMM
1790	*Sibylle*	J.-N. Sané	Toulon	142'6"	36'8"	19'0"				1794	Dr. NMM
1791	*Concorde*	J.-A. Lamothe	Brest	144'5"	36'8"	19'3"				1800	Captured
1792	*Carmagnole*	J.-N. Sané	Brest	143'0"	36'8"	19'0"				1800	'95 *Rassurante* – wrecked
1793	*Minerve*	J.-M.-B. Coulomb	Toulon	142'0"	36'7"	18'9"				1795	Dr. NMM
1793	*Seine*	P.-A. Forfait	Le Havre	146'4"	37'2"	18'0"				1798	Dr. NMM
1793	*Vertu*	C.-A. Segondat	Lorient	143'6"	37'0"	19'0"	1794			1803	AR – captured
1793	*Virginie*	J.-N. Sané	Brest	143'0"	36'8"	19'0"	28x 18	12x 8	44	1796	Dr. NMM
1794	*Cornélie*	J.-N. Sané	Brest	143'0"	36'8"	19'0"	4x 36 how.			1808	Captured
1794	*Courageuse*	J.-N. Sané	Brest	143'0"	36'8"	19'0"				1801	'95 *Justice* – Dr. SHM
1794	*Diane*	J.-N. Sané	Toulon	143'0"	36'8"	19'0"				1800	Captured
1794	*Furieuse*	P.-A. Forfait	Cherbourg	147'4"	37'2"	18'0"				1809	Dr. NMM
1794	*Impatiente*	C.-A. Segondat	Lorient	143'6"	37'0"	19'0"				1796	Wrecked
1794	*Preneuse*	R.-A. Haran	Rochefort	140'6"	36'6"	19'0"				1799	Captured
1794	*Révolutionnaire*	P.-A. Forfait	Le Havre	146'4"	37'2"	18'0"				1794	Dr. NMM
1794	*Spartiate*	P.-A. Forfait	Le Havre	146'4"	37'2"	18'0				1805	'95 *Pensée*
1794	*Volontaire*	J.-N. Sané	Rochefort	143'0"	36'8"	19'0				1806	ex-*Montagne* – AR – Dr. NMM
1794	*Zéphir*	J.-N. Sané	Brest	143'0"	36'8"	19'0				1803	Never completed
1795	*Africaine*	R.-A. Haran	Rochefort	140'6"	36'6"	19'0				1801	AR – Dr. NMM
1795	*Consolante*	F. Pestel	St-Malo	143'5"	37'0"	19'0				1803	Wrecked
1795	*Créole*	J.-A. Lamothe	Nantes	144'5"	36'8"	19'3				1803	Captured
1795	*Indienne*	P.-A. Forfait	Le Havre	147'0"	37'2"	18'0				1809	Wrecked
1795	*Loire*	P. Degay	Nantes	142'6"	37'0"	19'2				1798	Dr. NMM*
1795	*Valeureuse*	C. Tellier	Le Havre	145'0"	35'0"	18'0				1806	Sold to the USA
1796	*Thémis*	R.-A. Haran	Bayonne	140'6"	36'6"	19'0				1814	Armed with 12-pdrs
1796	*Uranie*	J.-F. Gauthier	Nantes	145'6"	37'6"	18'0				1814	Scuttled
1797	*Didon*	F. Pestel	St-Malo	143'5"	37'0"	19'0				1805	Dr. NMM
1798	*Guerrière*	J.-F. Lafosse	Cherbourg	145'0"	36'10"	19'0				1806	Captured
1799	*Infatigable*	C. Tellier	Le Havre	145'0"	35'0"	18'0				1806	Captured
1801	*Minerve*	J.-N. Sané	Nantes	143'0"	36'8"	19'1				1806	'03 *Président* – Dr. NMM
1801	*Rhin*	J.-N. Sané	Toulon	143'0"	36'8"	19'1				1806	Dr. NMM
1801	*Surveillante*	J.-N. Sané	Nantes	143'0"	36'8"	19'1				1803	Dr. NMM
1802	*Armide*	P. Rolland	Rochefort	141'5"	36'11"	19'0				1806	AR - Dr. NMM*
1802	*Atalante*	J.-N. Sané	St-Malo	143'0"	36'8"	19'1"				1805	Wrecked
1802	*Belle-Poule*	J.-N. Sané	Nantes	143'0"	36'8"	19'1"				1806	Captured
1802	*Pénélope*	P. Rolland	Bordeaux	141'5"	36'11"	19'0"				1816	
1803	*Amphitrite*	C.-A. Segondat	Dunkirk	143'6"	37'0"	19'0"				1837	'05 *Milanaise* – '14 *Sirène*
1803	*Astrée*	J.-N. Sané	Genoa	143'0"	36'8"	19'1"				1810	Dr. NMM
1803	*Bellone*	F. Pestel	St-Malo	143'5"	37'0"	19'0"				1810	Dr. NMM
1803	*Gloire*	P.-A. Forfait	Nantes	146'4"	37'2"	18'0"				1806	AR – Dr. NMM
1803	*Hermione*	A. Geoffroy	Lorient	146'4"	37'2"	18'0"				1805	'03 - *Ville de Milan*
1803	*Hortense*	J.-N. Sané	Toulon	143'0"	36'8"	19'1"				1840	
1803	*Pomone*	J.-N. Sané	Genoa	143'0"	36'8"	19'1"				1811	Captured
1803	*Sultane*	F. Pestel	St-Malo	143'5"	37'0"	19'0"				1810	'05 *Italienne*

Laid down	Name	Builder	Place of building	Length	Breadth	Depth in hold	Upper deck	Fo'csle/ Q'deck	Total	Struck from lists	Notes
1804	***Danäé***	F. Pestel	Genoa	143'5"	37'0"	19'0"				1812	Destroyed by explosion
1804	***Flore***	P. Rolland	Rochefort	141'5"	36'11"	19'0"				1811	AR
1804	***Manche***	J.-N. Sané	Cherbourg	143'0"	36'8"	19'1"				1810	Captured
1804	***Minerve***	P. Rolland	Rochefort	141'5"	36'11"	19'0"				1806	AR - Dr. NMM
1804	***Piémontaise***	F. Pestel	St-Malo	143'5"	37'0"	19'0"				1808	Captured
1804	***Topaze***	P.-A. Forfait	Nantes	146'4"	37'4"	18'3"				1809	Dr. NMM
1804	***Calypso***	P.-A. Forfait	Nantes	146'4"	37'4"	18'3"				1825	
1805	***Iphygénie***	C.-A. Segondat	Dunkirk	143'6"	37'0"	19'0"				1825	'07 *Oder* – '14 *Thémis*
1805	***Junon***	P.-A. Forfait	Le Havre	146'4"	37'4"	18'3"				1809	Broken up
1805	***Nymphe***	C.-A. Segondat	Dunkirk	143'6"	37'0"	19'0"				1873	'07 *Vistule* – '14 *Danäé*
1805	***Renommée***	J.-N. Sané	Nantes	143'0"	36'8"	19'1"		1806		1811	Captured
1805	***Vénus***	P.-A. Forfait	Le Havre	146'4"	37'4"	18'3"	28x 18	8x 8	44	1810	Captured
1806	***Amazone***	P.-A. Forfait	Le Havre	146'4"	37'4"	18'3"		8x 24 car.		1811	Burned
1806	***Amphitrite***	P. Rolland	Cherbourg	141'5"	36'11"	19'0"				1809	Burned
1806	***Andromède***	P. Rolland	Rochefort	141'5"	36'11"	19'0"				1821	'07 *Saale* – '14 *Amphitrite* – AR
1806	***Caroline***	J.-N. Sané	Antwerp	143'0"	34'8"	19'1"				1809	Captured
1806	***Elisa***	J.-N. Sané	Le Havre	143'0"	34'8"	19'1"				1810	Wrecked
1806	***Méduse***	J.-N. Sané	Nantes	143'0"	34'8"	19'1"				1816	AR
1806	***Pallas***	J.-N. Sané	Nantes	143'0"	34'8"	19'1"				1821	
1806	***Pauline***	J.-N. Sané	Toulon	143'0"	34'8"	19'1"				1840	'14 *Bellone*
1807	***Adrienne***	J.-N. Sané	Toulon	143'0"	34'8"	19'1"				1847	'14 *Aurore*
1807	***Amélie***	J.-N. Sané	Toulon	143'0"	34'8"	19'1"				1842	'14 *Junon*
1807	***Aréthuse***	J.-N. Sané	Nantes	143'0"	34'8"	19'1"				1849	'07 *Elbe* – '14 *Calypso*
1807	***Ariane***	J.-N. Sané	Nantes	143'0"	34'8"	19'1"				1812	Burned
1807	***Clorinde***	J.-F. Gauthier	Nantes	145'6"	37'6"	18'0"				1814	Dr. NMM
1807	***Fidèle***	J.-N. Sané	Flushing	143'0"	34'8"	19'1"				1809	Captured
1807	***Nymphe***	J.-N. Sané	Nantes	143'0"	34'8"	19'1"				1832	
1808	***Andromaque***	J.-N. Sané	Nantes	143'0"	34'8"	19'1"				1812	Burned
1808	***Aréthuse***	J.-N. Sané	Nantes	143'0"	34'8"	19'1"				1833	Cut down to a sloop
1808	***Émeraude***	P. Rolland	Bayonne	141'5"	36'11"	19'0"				1819	
1808	***Galathée***	F. Pestel	Genoa	143'5"	37'0"	19'0"				1837	
1808	***Néréïde***	F. Pestel	St-Malo	143'5"	37'0"	19'0"				1811	Dr. NMM*
1808	***Niémen***	P. Rolland	Bordeaux	141'5"	36'11"	19'0"				1809	AR - Dr. NMM*
1808	***Perle***	C.-A. Segondat	Dunkirk	143'6"	37'0"	19'0"				1823	
1808	***Atalante***	J.-N. Sané	Lorient	143'0"	36'8"	19'1"				1825	ex-*Eurydice* – '14 *Duch. d'Angoulême*
1809	***Eurydice***	J.-N. Sané	Rotterdam	143'0"	36'8"	19'1"				1847	
1810	***Alcmène***	P. Rolland	Cherbourg	141'5"	36'11"	19'0"				1814	Dr. NMM
1810	***Cérès***	J.-N. Sané	Brest	143'0"	36'8"	19'1"				1814	Dr. NMM
1810	***Cybèle***	J.-N. Sané	Le Havre	143'0"	36'8"	19'1"				1833	Launched '15 – cut down to a sloop
1810	***Didon***	J.-N. Sané	Lorient	143'0"	36'8"	19'1"				1891	'16 *Duch. de Berry* – launched '17 – '30 *Résolue*
1810	***Érigone***	J.-N. Sané	Antwerp	143'0"	36'8"	19'1"				1825	Dr. MM
1810	***Iphygénie***	J.-N. Sané	Cherbourg	143'0"	36'8"	19'1"				1814	Captured
1810	***Médée***	J.-N. Sané	Genoa	143'0"	36'8"	19'1"				1850	
1810	***Prégel***	J.-N. Sané	St-Malo	143'0"	36'8"	19'1"				1825	'14 *Eurydice*
1810	***Terpsichore***	J.-N. Sané	Antwerp	143'0"	36'8"	19'1"				1814	Dr. NMM
1810	***Trave***	J.-N. Sané	Amsterdam	143'0"	36'8"	19'1"				1813	Dr. NMM
1811	***Antigone***	P. Rolland	Bordeaux	141'5"	36'11"	19'0"		1827		1821	Launched '16 – AR
1811	***Circé***	P. Rolland	Rochefort	141'5"	36'11"	19'0"	28x 18	2x 8	44	1832	Cut down to a sloop - AR
1811	***Eurydice***	J.-N. Sané	Rotterdam	143'0"	36'8"	19'1"		16x 24 car.		1814	Ceded to Holland
1811	***Gloire***	J.-N. Sané	Le Havre	143'0"	36'8"	19'1"				1822	
1811	***Hébé***	J.-N. Sané	Venice	143'0"	36'8"	19'1"				1814	Ceded to Austria
1811	***Illyrienne***	J.-N. Sané	St-Malo	143'0"	36'8"	19'1"				1840	'14 *Hermione*
1811	***Meuse***	J.-N. Sané	Rotterdam?	143'0"	36'8"	19'1"				1814	Ceded to Holland
1811	***Rubis***	J.-N. Sané	?	143'0"	36'8"	19'1"				1814	Wrecked
1811	***Weser***	J.-N. Sané	Antwerp	143'0"	36'8"	19'1"				1813	Captured
1812	***Ambitieuse***	J.-N. Sané	Amsterdam	143'0"	36'8"	19'1"				1814	Ceded to Holland
1812	***Amstel***	J.-N. Sané	Amsterdam?	143'0"	36'8"	19'1"				1814	Ceded to Holland
1812	***Armide***	J.-N. Sané	Nantes	143'0"	36'8"	19'1"				1866	
1812	***Astrée***	J.-N. Sané	Nantes	143'0"	36'8"	19'1"				1842	Launched '20

Laid down	Name	Builder	Place of building	Length	Breadth	Depth in hold	Upper deck	Fo'csle/ Q'deck	Total	Struck from lists	Notes
1812	***Cléopâtre***	P. Rolland	Cherbourg	141'5"	36'11"	19'0"				1823	Launched '17
1812	***Constance***	J.-N. Sané	Brest	143'0"	36'8"	19'1"				1836	Captured
1812	***Dryade***	J.-N. Sané	Genoa	143'0"	36'8"	19'1"				1835	'19 *Fleur de Lys* – '30 *Résolue*
1812	***Ems***	J.-N. Sané	Rotterdam	143'0"	36'8"	19'1"				1822	'14 *Africaine*
1812	***Inconstante***	J.-N. Sané	Antwerp	143'0"	36'8"	19'1"				1814	Allowed to France
1812	***Jadhe***	J.-N. Sané	Rotterdam	143'0"	36'8"	19'1"				1821	'14 *Psyché*
1812	***Précieuse***	J.-N. Sané	Antwerp	143'0"	36'8"	19'1"				1814	Ceded to the Allies
1812	***Ruppel***	J.-N. Sané	Amsterdam	143'0"	36'8"	19'1"				1814	Allowed to France
1812	***Rancune***	J.-N. Sané	Toulon	143'0"	36'8"	19'1"				1825	'14 *Néréïde*
1812	***Étoile***	J.-N. Sané	Nantes	143'0"	36'8"	19'1"				1814	Captured
1812	***Cornélie***	P. Rolland	Bordeaux	141'5"	36'11"	19'0"		1837		1814	
1813	***Fidèle***	J.-N. Sané	Rotterdam	143'0"	36'8"	19'1"	24x 18	2x 8	46	1814	Ceded to Holland
1813	***Immortelle***	J.-N. Sané	Amsterdam	143'0"	36'8"	19'1"	4x 30 shell guns	16x 24 car.		1814	Ceded to Holland
1813	***Magicienne***	P. Rolland	Rochefort	141'5"	36'11"	19'0"	28x 18	2x 8	44	1840	Launched '23
1813	***Sultane***	J.-N. Sané	Nantes	143'0"	36'8"	19'1"				1814	Dr. NMM
1813	***Vénus***	J.-N. Sané	Venice	143'0"	36'8"	19'1"				1814	Ceded to Austria
1813	***Vestale***	J.-N. Sané	Rotterdam	143'0"	36'8"	19'1"				1814	Ceded to Holland
1813	***Thétis***	J.-N. Sané	Toulon	143'0"	36'8"	19'1"				1866	Launched '19
1813	***Istrienne***	J.-N. Sané	Trieste	143'0"	36'8"	19'1"				1813	Fate unknown
										Total 137	

*The guns of the main battery are always 18-pdrs, called long-pattern in 1824 when a short-pattern 18-pdr was introduced in the Navy, but never employed in frigates of this class. The 8-pdrs are always long-pattern guns.

The dimensions given in these lists are, as far as the lengths are concerned, taken off from the draughts preserved in the National Maritime Museum. *The length is measured at the load waterline and is taken from rabbet to rabbet, to outside of plank.* The other dimensions are measured in accordance with usual French practice. Cross-checking these dimensions with various other documents reveals a number of disagreements or imprecisions, but in such cases we have always favoured those indicated by the NMM draughts (37 in all).

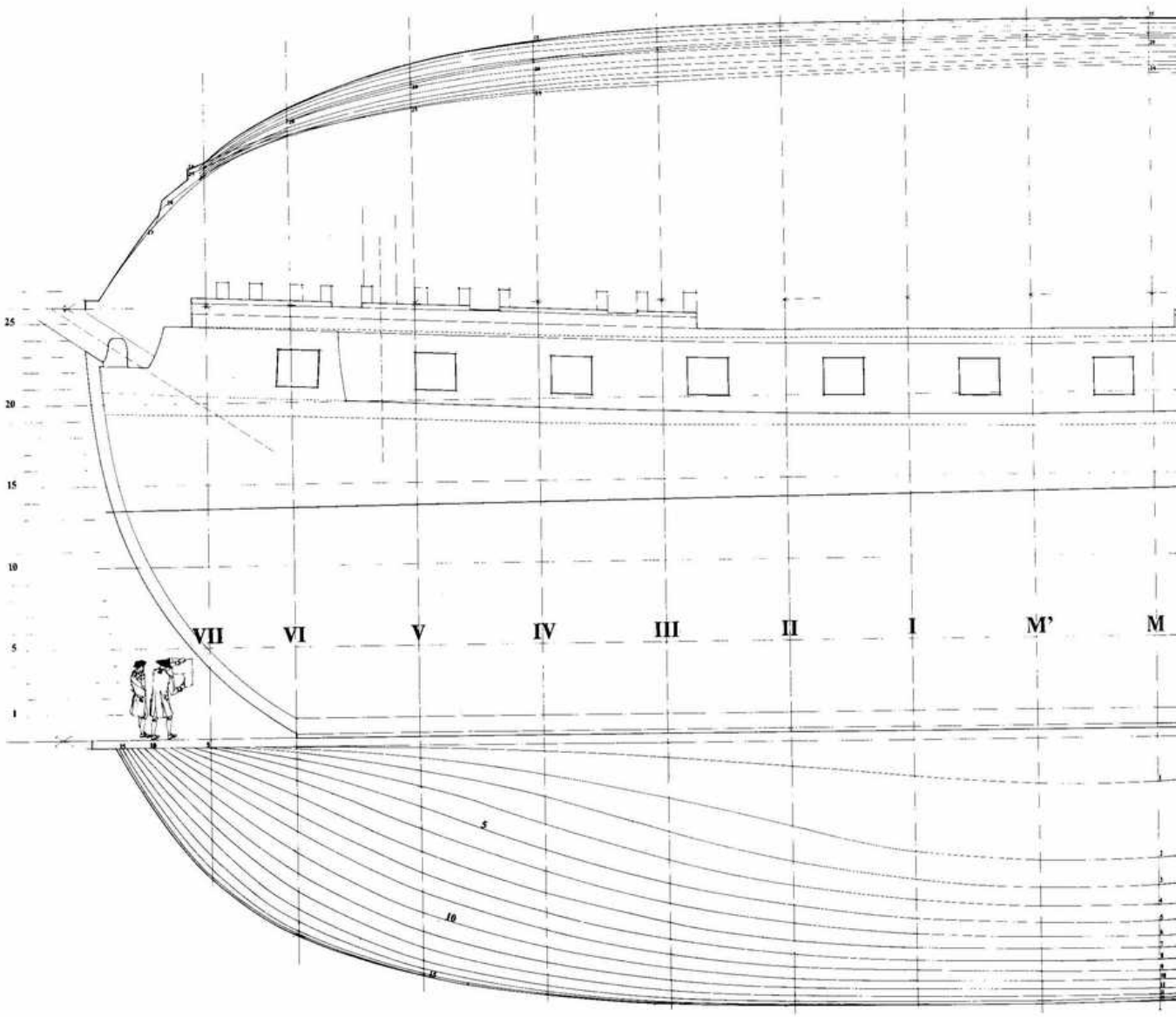
In the *Notes* column are a number of initials indicating the various archives or museums where relevant manuscripts or draughts of the vessel in question may be found:

AR: Rochefort Dockyard Archives, Rochefort
AN: Archives Nationales, Paris
AT: Toulon Dockyard Archives, Toulon
DNA: Danish National Archives, Copenhagen
MM: Musée de la Marine, Paris
NMM: National Maritime Museum, London (A small asterisk indicates draughts as converted for the Royal Navy, as opposed to draughts "as taken").
SHM: Service Historique de la Marine, Vincennes
Dr. Draught; the principal source for these is the collections at the National Maritime Museum; there are also various draughts at the Musée de la Marine and at the Service Historique de la Marine (series 8 DD[1]). Other graphical documents are the drawings of carved-work (see Chapter XII).

A number of other vessels could be added to this list: two 18-pdr frigates built for the Italian Navy – *Princesse de Bologne* and *La Piave*; others of the same class built in Holland – *Yssel - Aurore - Maria Reyersberghen - Frise - Minerve - Kenau hasselaar - Wanderwerf.* All these frigates were given to Holland in 1814. It is reasonable to suppose that they were all built to Sané's draughts.

All the frigates whose draughts are preserved at the NMM were captured. For those vessels where the date struck from the lists is not accomapnied by an explanatory note, the reason for their being struck off was simply that were no longer serviceable.

Chapter VIII
THE 18-Pdr FRIGATE *LA VÉNUS*



LA VÉNUS 1782

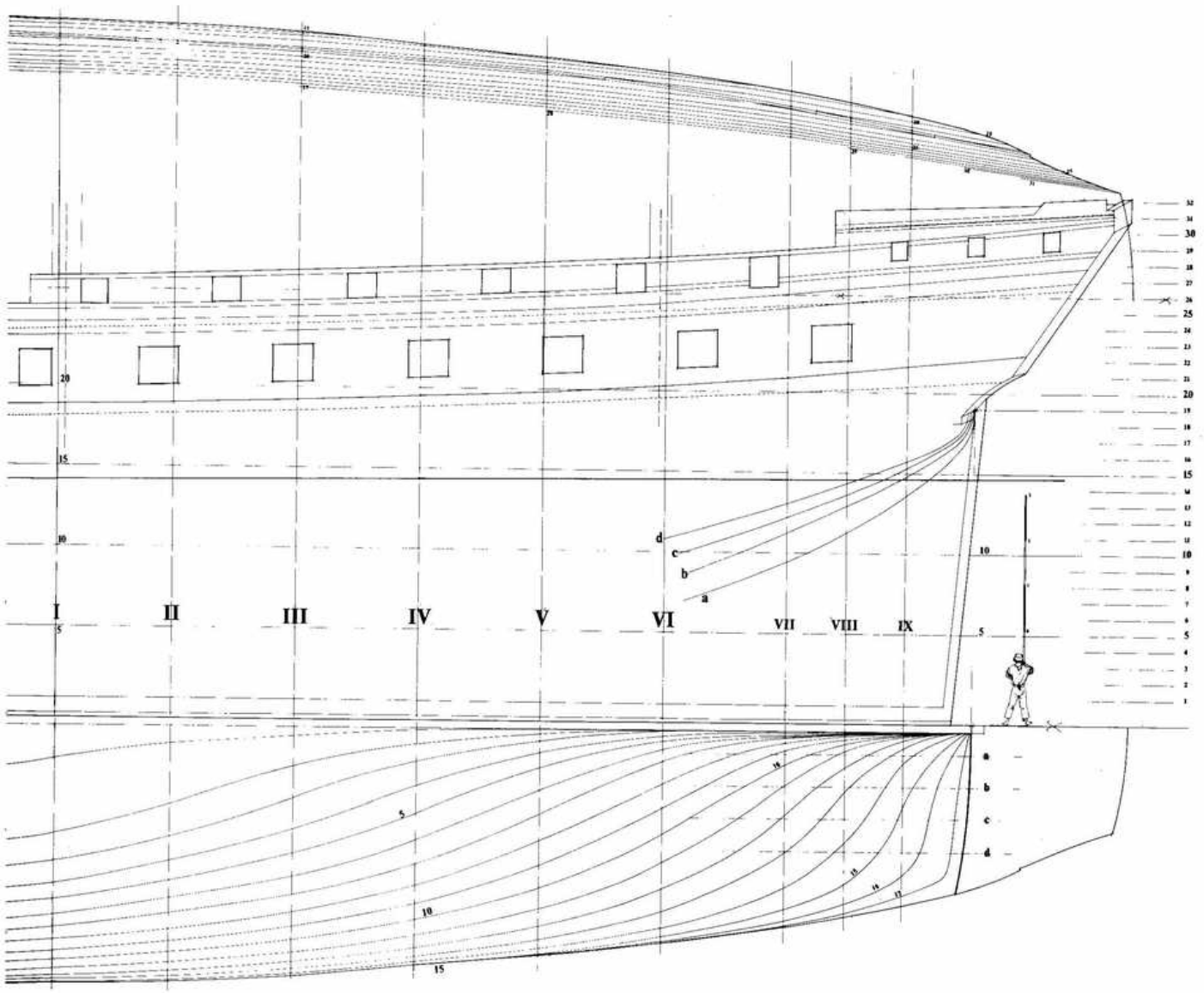
As with the earlier chapters devoted to the *Renommée* and the *Belle-Poule*, this chapter uses the example of the *Vénus*, the first Sané frigate and thus in a way the prototype of the 18-pdr class, to illustrate the details of these vessels in a way which is perhaps more succinct, because it is graphical, than the text in the preceding chapter. The illustrations are once again taken from the monograph, first published in 1979. Only a selection of the Plates from the original work are reproduced here, and as such they are not suitable for building a model, but for the general historian it is hoped that they will prove a useful adjunct to the previous chapter on the history of the development of this class of vessel.

PLATE I:
LINES OF THE HULL: LONGITUDINAL SECTIONS (HALF-BREADTH)

The volume of the hull in the half-breadth plan is defined by a series of horizontal sections, the outer limit of which represents **the hull to outside of plank.**

This Plate also shows the positions of the the eighteen sections perpendicular to the keel from Plate II.

In order to give greater clarity to the hull volumes at the stern, there are four further sections which are vertical, but parallel to the keel: these are marked *a, b, c, d*. Thirty or so horizontal sections[1] marked with Arabic numerals define the shape of the hull, as always to outside of plank, at any given point. The line marked **1** is situated 8 mm above the lower face of the false keel. The paper format has made it necessary to divide the half-breadth



plan into two parts, the horizontal sections of the hull below the height of breadth are *beneath* the schematic elevation, and the axis of the sections is aligned with the lower face of the false keel in the elevation; the horizontal sections above the height of breadth are to be found *above* the elevation, and with some care it is possible to make out their axis superimposed over the upper edge of the elevation. The same close attention is needed to make out a number of jagged edges on certain of the horizontal lines: these "accidents" correspond to their intersection with the wales or rails of the hull, which stand proud of the normal hull planking.

The elevation, which on this Plate is no more than schematic, gives all the key elements. The load waterline is indicated by a continuous bold line. The line of deck (at side) of the upper deck is shown by a dotted line, indicating the notional meeting-point of the upper face of the deck beams with the inner face of the hull timbers (see **Fig. 2** opposite). Above this line can be seen the upper edge of the wale, and then the arrangement of the gunports, whose upper and lower sills are parallel to the line of deck, and whose sides are perpendicular to the keel. The foremost gunport is cut into the cheeks of the bow, which explains why the sides appear to be slightly curved. The curved line shown just abaft the foremost gunport and running up from the wale to the plank sheer, corresponds to an area of thicker planking (the *anchor-lining*).

Above the upper deck gunports there is a rail running from the beakhead bulkhead to the taffarel; the line of deck of the forecastle, gangways and quarterdeck is parallel to that of the upper deck, and is indicated in the same way as the former.

The various drift-rails fore and aft are shown, as is the arrangement of the gunports on the forecastle and quarterdeck. Note the slightly larger size of the aftermost ports on the quarterdeck, designed to accommodate the sea howitzers, and, further aft, the small scuttles in the officers' cabins beneath the half-poop.

The axes of the masts are shown, as are the bollard-timbers embracing the bowsprit.

1. It should be noted that these are *not* waterlines, since they are parallel to the keel rather than to the horizon. [Trans.]

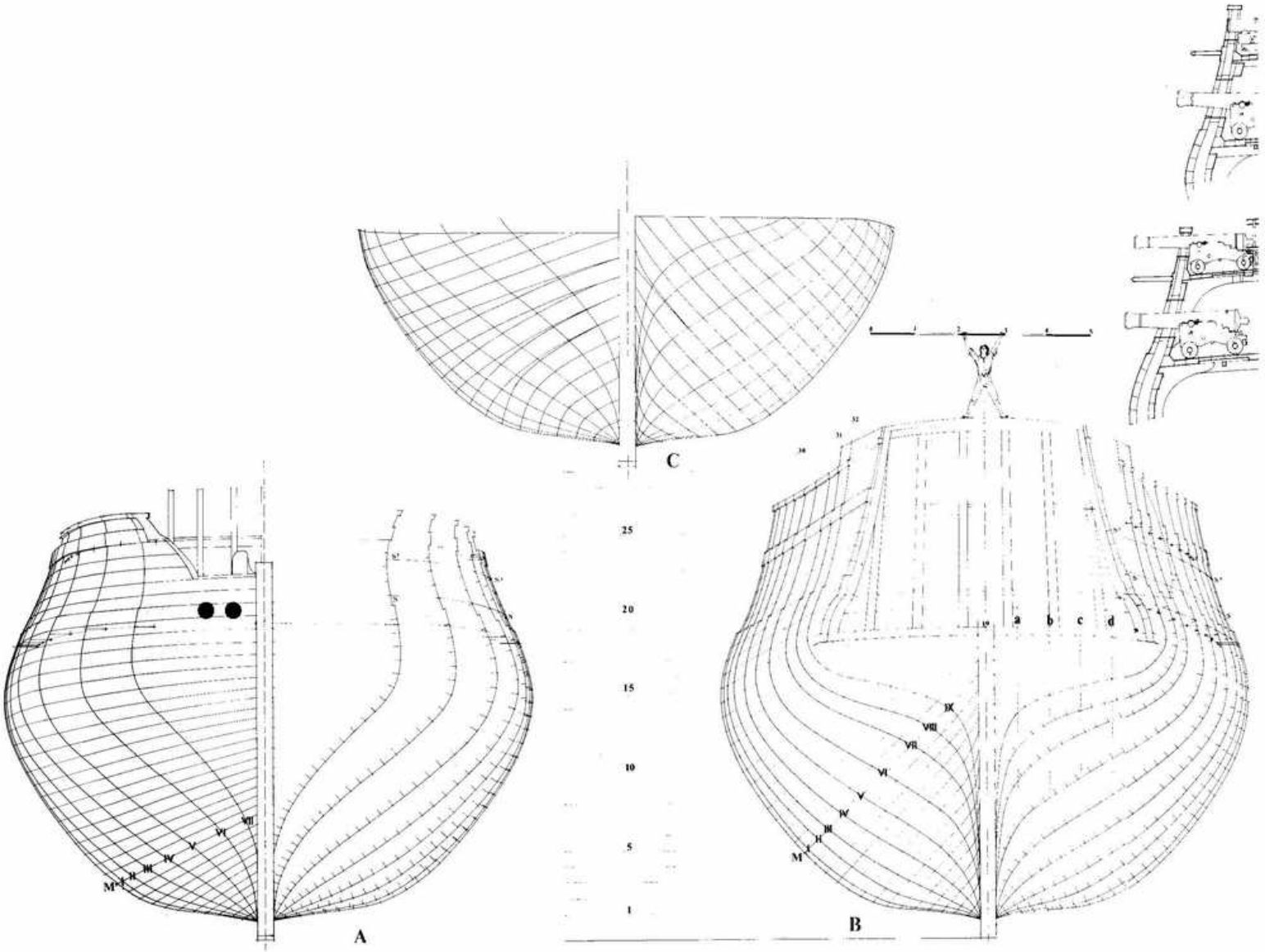
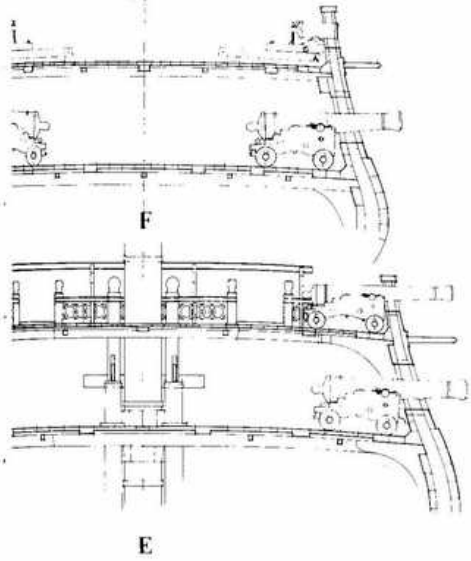


PLATE II:
LINES OF THE HULL: BODY PLAN, BOW AND STERN, TRANSVERSE SECTIONS

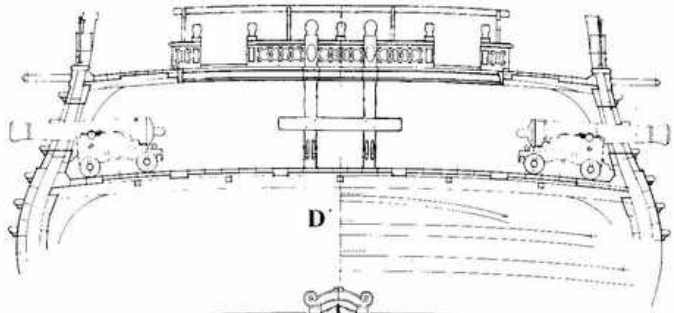
A. The view of the fore body, easily recognisable from the hawseholes, shows the vertical sections from the midship bend **M'** to the beakhead frame **VII**.
The horizontal lines of deck at side are shown by dotted lines, and the solid points on these lines (see **Fig. 2** above) indicate the precise point of intersection of the upper face of the beams with the inner face of the hull timbers.
All the individual strakes of the hull planking are shown, as are those of the rails and wales, which, are no more than strakes of thicker planking. Note the jagged interruption of the smooth run of planking which at each section corresponds to the greater thickness of the wales compared to that of the ordinary planking of the hull.
On the right-hand side of the drawing the strakes of planking are simply indicated by small ticks corresponding to the seams separating them, these being perpendicular to the hull timbers in every case, except for that of the upper face of the wale, which is horizontal. Note the way the strakes land on the stern.
Still on the right-hand side of the drawing, two lines can be seen, marked S^1 and **S**, indicating the lower and upper sills of the gunports. These lines are parallel to the line of deck of the upper deck (excluding planking). When transferring these lines onto the transverse sections, it is most important to be scrupulously accurate (making due allowance, where necessary, for the thickness of plank).

B. The second series of vertical sections is shown on the drawing to the right of the first. These sections correspond to those of the after-body, from the after midship bend marked **M**; these sections are numbered **I** to **IX**, moving towards the stern. Sections **VII**,

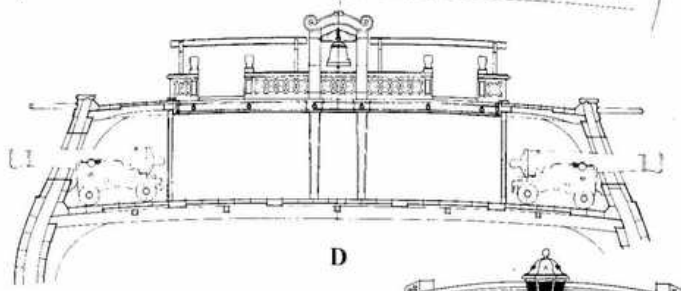


F

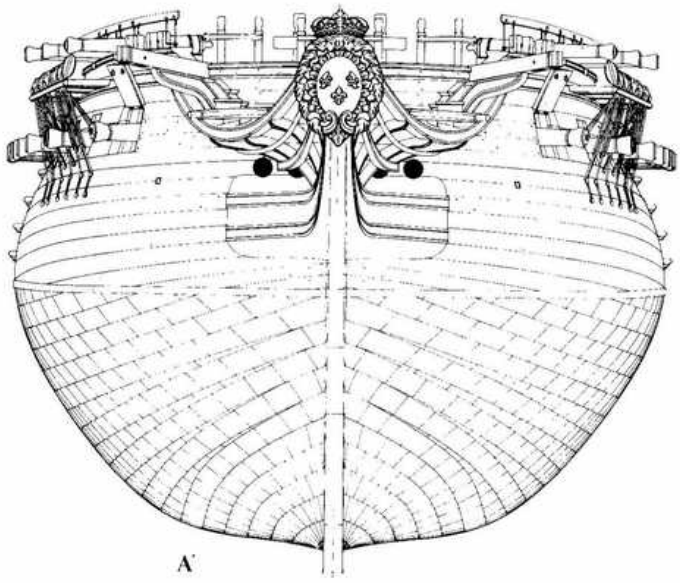
E



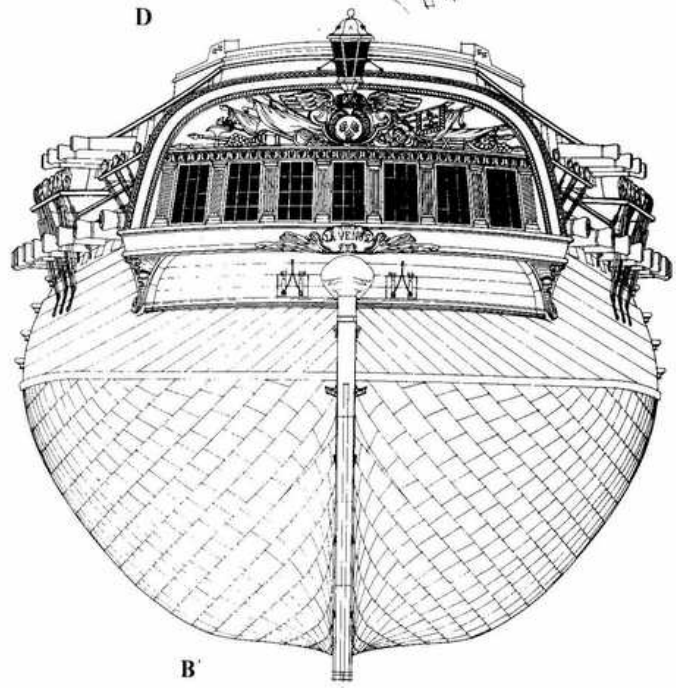
D'



D



A'



B'

VIII and **IX** are closer together, thereby allowing a more accurate representation of the lines of the stern; the lines *a, b, c, d* show the positions of the vertical sections parallel to the keel which are shown on PLate IV. In other respects, this body plan shows the run of the planking, rails, lines of deck etc., in the same way as in the previous drawing **A**.

The wing transom is clearly indicated; note that a number of strakes of hull planking land in its rabbet. Above the wing transom are shown the various timbers of the structure of the stern, but this is merely a decorative device on my part, since in principle I have assumed that the model will be built solid, rather than plank-on-frame.

A dotted line to the right shows the horseshoe outline of the taffarel.

Between the two plans **A** and **B** are shown the various levels corresponding to the horizontal sections.

C. Copper sheathing Between plans **A** and **B** and above them is drawing **C**. This shows the same view as in **A**, but restricted to the quick works of the frigate. Here, the rows of copper plates forming the sheathing are represented by the points where each plate meets each vertical section.

The right-hand side of the same drawing shows the after-body, as in Drawing **B**, the view being otherwise the same.

A' View of the bow: This is no more than a cumulation of the other drawings of the planking and the sheathing, with the addition of the timbering of the head.

B' View of the stern: The same comments apply as for the previous drawing.

D Transverse section at the forecastle breastwork: (at section III of the forebody).

This section, which like the others in this series is only partial, terminates at the planking of the upper deck. It illustrates the way the sides of the vessel are timbered, and also the structure of the gangways.

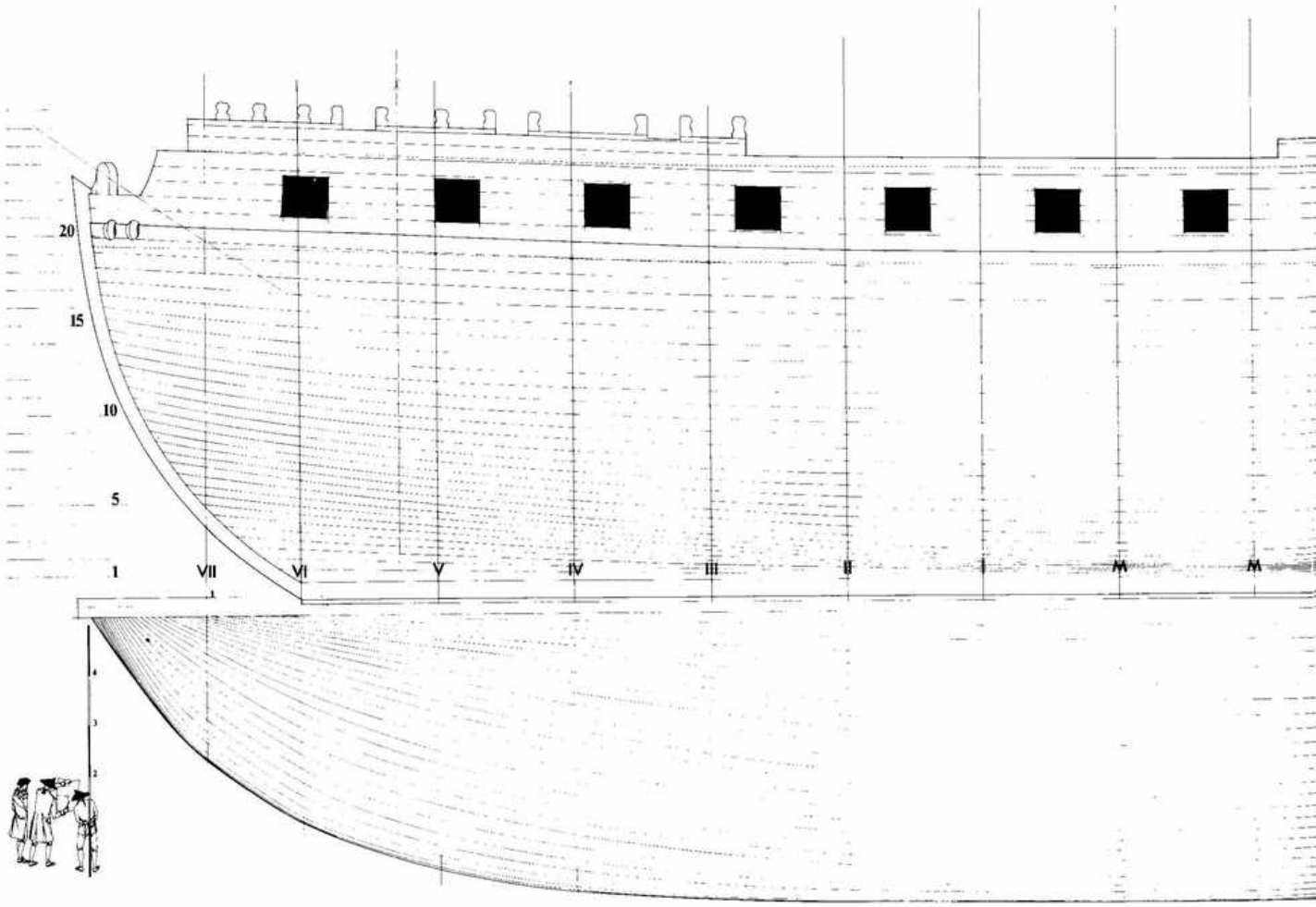


PLATE III:
PLANKING OF THE HULL

This outboard profile shows the various vertical sections or stations, the lines of deck (for the upper deck, forecastle and quarterdeck), and the axes of the masts. The wales are defined by a bold black line corresponding to the upper edge of the upper wale (the black strake and the lower wale diminish to merge with the planking of the hull).

31 strakes are needed to plank up the hull, from the rabbet of the keel to the upper wale, including the latter.

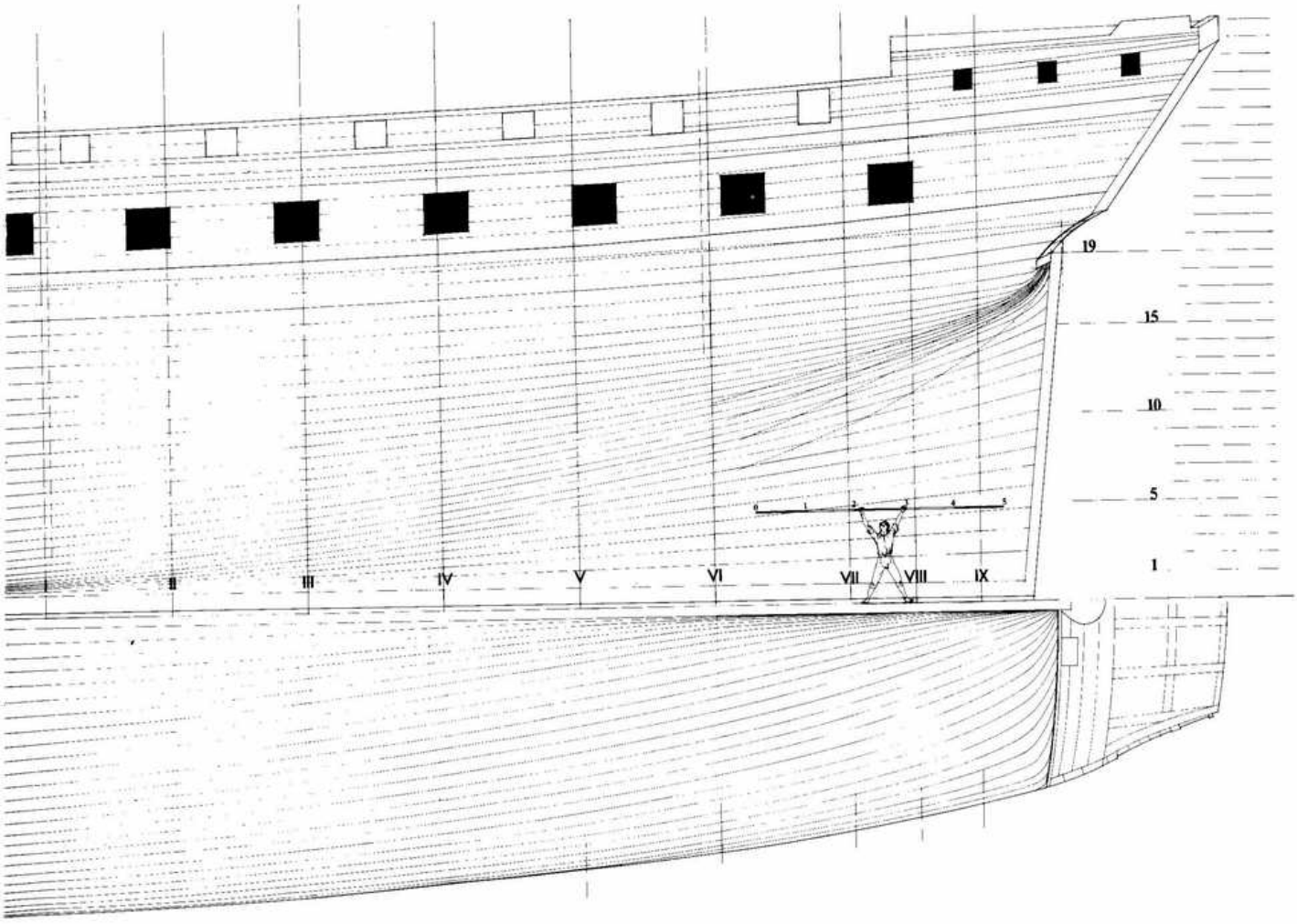
5 strakes form the planking of the upper deck battery, above which is the waist-rail, which stands slightly higher than the line of deck at side of the forecastle, gangways and quarterdeck because of the thickness of plank on the deck and the height of the waterway, which runs uninterrupted from head to stern.

The forecastle ends in a planksheer, cut into by the three gunports, which are *en barbette* (exposed).

The quarterdeck has a drift rail running along the line of the lower sills of the four quarterdeck ports, but it is cut into by the two howitzer ports. The planksheer forms the upper sills of all the ports, and continues aft as far as the stern. It is however itself cut into by the scuttles of the cabins.

Note the way the timberheads are shaped, some of which forming the side-timbers of the forecastle gunports. Note also the hawse-holes, the shape of the bollard-timbers, and the curve of the beakhead bulkhead, running down to the platform of the head (two dotted lines indicate the thickness of the planking of the head and of the forecastle above, just forward of the beakhead bulk-head). The anchor-lining between the upper wale and the plank-sheer shown on Plate I is not illustrated on this drawing.

At the stern, a low rail marks the height of the bulwarks on the poop, and this is capped by a planksheer to which is fastened a



solid timber block into which are let a number of sheaves for the rigging lines which run down to the stern of the vessel.

Beneath the drawing of the outboard profile is a view of the under side of the hull, which shows among other things how the double-curved strakes at the stern land in the rabbet of the wing transom.

This same view also shows the detail of the planking of the counter, the helm-port, and the butts of the planking of the side where they finish on the side counter timber.

The complete cross section at the after midship bend (**Fig. 5** opposite) shows the thickness of the planking at the wales, the diminishing strakes, the height of the lower deck*, and the arrangement of the planking of the ceiling.

*Despite the absence of guns on this deck, it continued to be called the *gundeck*, by analogy with the structure of the earlier two-deck frigates of the 17th century. [Trans.]

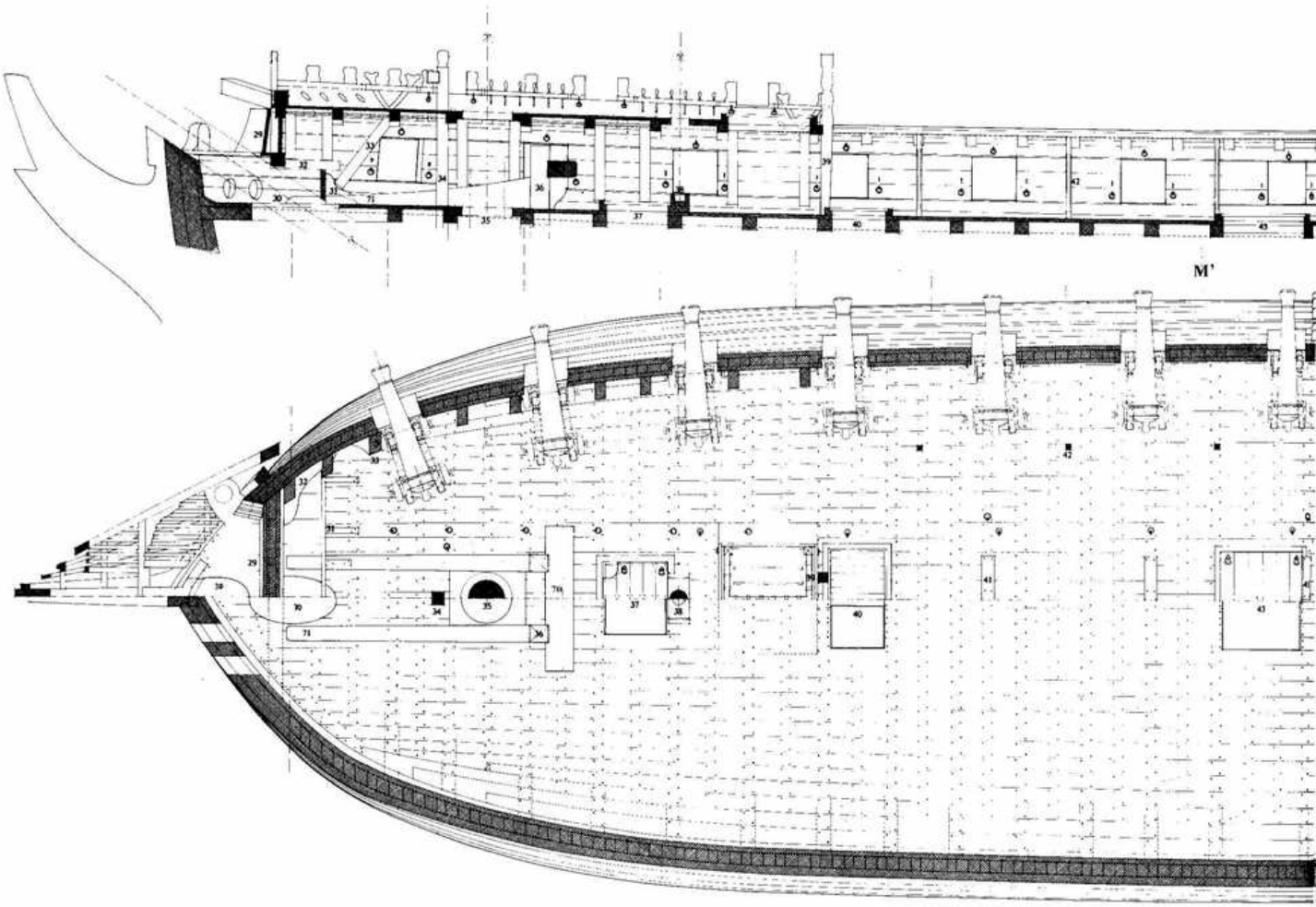
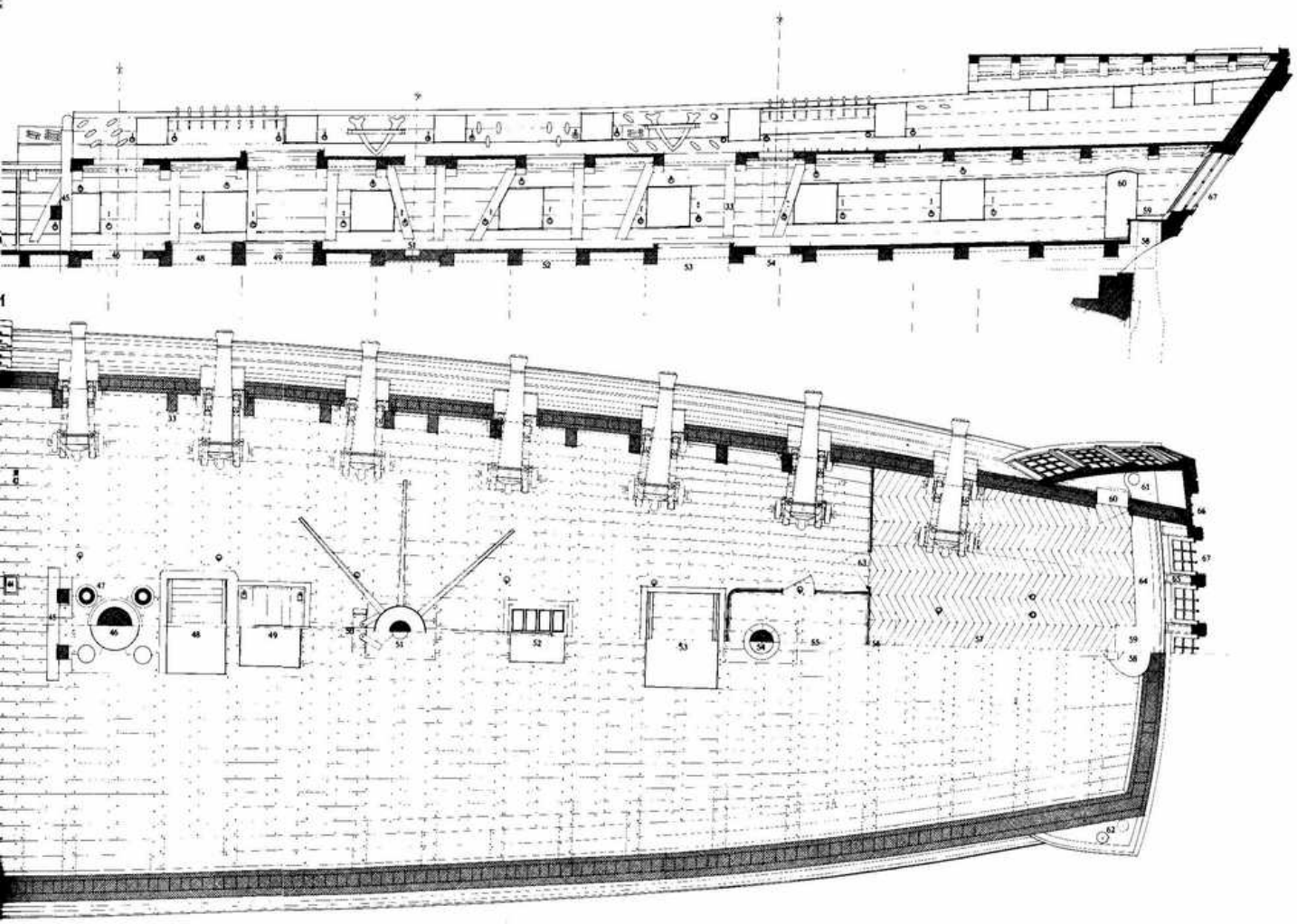


PLATE V:
PLAN OF THE UPPER DECK AND PARTIAL PROFILE OF INBOARD WORKS

To starboard of the centre-line the section is taken at a plane corresponding to the lower face of the upper sills of the gunports. The port half is at a plane corresponding to the upper face of the chine of the waterway. The numbers are explained in the full list in the next Chapter; the same number always refers to the same item, irrespective of the drawing on which it is shown.

Starboard half-breadth plan: the continuation of the same plane forward at the head explains the previous drawings of this part of the vessel. The hanging knees (**33**) supporting the beams are cut through on this plane roughly at their belly, where the lodging arm begins. A close look at the profile above shows the positions of each of these knees. Abaft the beakhead bulkhead can be seen the manger, which extends forward under the platform of the head; the standards of the riding-bitts (**71**) end within the manger. Between the bitt standards is the pin of the fore topsail-sheet bitts (**34**), the foremast (**35**), and abaft the cross-piece of the bitts can be seen the scuttle of the cable-tier (**37**), with an opening in the corner for the cables to run down; hard up against this scuttle is the step of the fore jeer capstan (**38**). Athwart the fourth gunport is the forward ladderway for the crew (**40**), running down from the upper deck to the gundeck, on which the crew have their berths. Athwart the seventh gunport is the main-hatch (**43**), and after that, continuing towards the stern, are the main topsail-sheet bitts (**45**), the mainmast with the pumps (**47**) around it, the after ladderway for the crew (**48**), the after-hatch (**49**), the lower barrel of the main capstan with its bars rigged, and then a small glazed scuttle (**52**) to provide light for the cockpit below, forward of the gunroom. The main companionway for the officers (**53**) runs up just forward of the mizen-mast (**54**), which is in the middle of an enclosed area serving as a meat-room (**55**)



and set up forward of the cabin bulkhead. The great cabin has a parquet floor laid over the deck planking; leading off from this vast cabin are the doorways to the quarter-galleries; the principal furniture of the great cabin consists of a double sideboard (**56**) set against the bulkhead, and a long table with benches running down the middle of the cabin.

On either side there are sleeping cabins. enclosed by screens of canvas stretched over wooden frames (shown by dotted lines), which provide accommodation for four officers. These cabins measure about six feet in length, but two of them are encumbered by the two aftermost guns of the main battery. Beneath the stern-lights are lockers (**64**) which serve as benches, and in the middle is a large chest (**59**) which projects into the cabin and hides the rudderhead (see the profile above).

Port half-breadth plan: on this side of the vessel the guns are not shown, and the various openings in the deck are marked with a bold line. The deckhead beams are shown for the first part of their length only with dotted lines, while the pattern of the nails in the deck makes it possible to follow the arrangement of the upper deck beams below. The position of the hawseholes is shown, while at the stern can be seen the lower stool of the quarter-gallery with the raking line of the funnel (soil-pipe) of the privy.

Inboard profile: the main purpose of this drawing is to show the run of the internal planking of the hull, the arrangement of the deck-beams, the partners of the various openings in the deck, and the positions of the gunports.

Note that the first gunport at the bow has its sides more or less perpendicular to the rounding of the frigate's bow (see the starboard half-breadth). The height of the beams and of the deck planking is shown for the upper deck, forecastle, quarterdeck and poop.

A dotted line shows the outline of the rudder and the chest covering it in the cabin. Dotted lines also indicate the line of deck at side, where the upper face of the beams meets the timbering of the side.

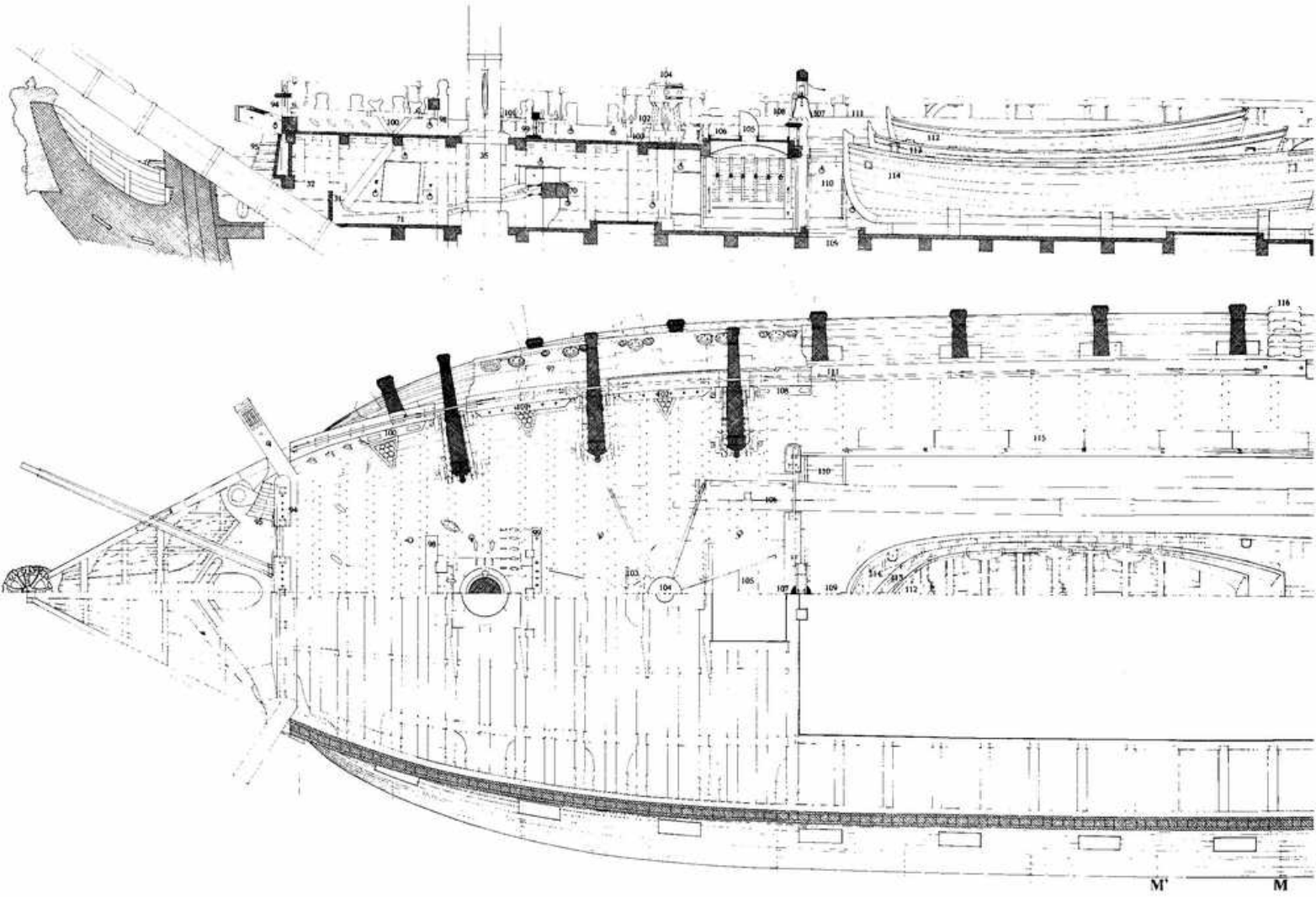
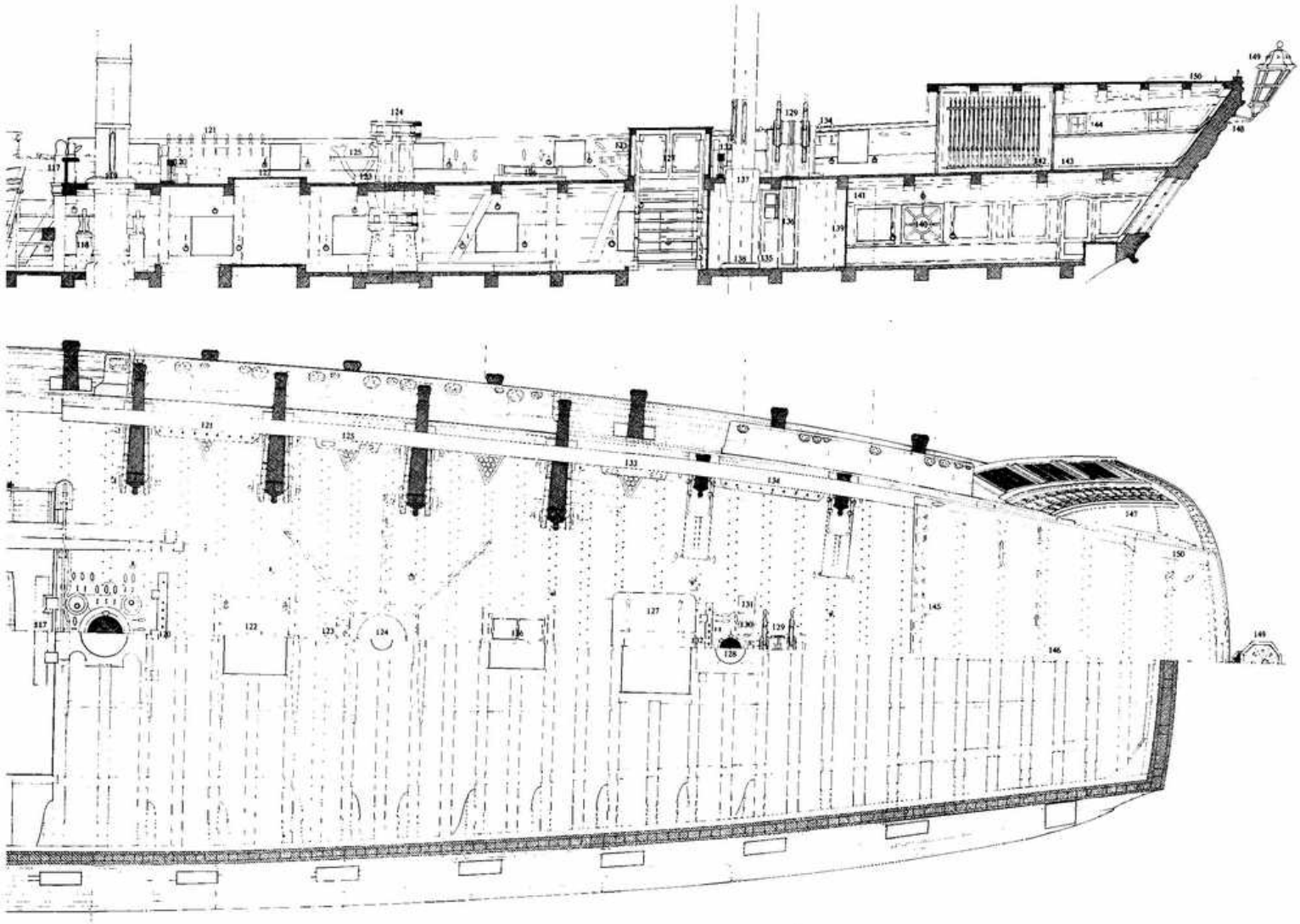


PLATE VI:
PLAN OF THE FORECASTLE & QUARTERDECK; PARTIAL PROFILE OF INBOARD WORKS

Starboard half-breadth plan: the forecastle and quarterdeck of the frigate are entirely fitted-out, with boats, spare spars (fore-topmast and fore topsail-yard to starboard, main-topmast and main topsail-yard to port), guns, anchors, etc. all in their place.
The head is in its finished state, but the bowsprit has not been shown, in order not to hide the details of the head. Note the fittings on the upper face of the head-rail, the bumpkin, the seat of ease, and the cleats leading down to it. The rake of the beakhead bulkhead is relatively marked, and is worth close study.
Starting from the beakhead bulkhead, note the fore topsail-sheet bitts (**98**), the foremast, the ninepin bitts (**99**), the fore jeer capstan (**104**), the hood of the galley, the forecastle breastwork (**107**) with the stanchions and canopy of the belfry (the very small watch-bell on the mizen-mast is not shown); next, the gangways with their chicken-coops (**115**) against the stanchions and breastrail in the waist; tucked into the corners of the gangways, between them and the spare spars, are the ladders (**110**) leading up from the upper deck. Note also the bulwarks in the waist, interrupted for the entering ladder. Moving aft, the quarterdeck breastwork (**117**) incorporating the pins of the main topsail-sheet bitts, and abaft these the mainmast and the scuttles for the royal pumps; further aft, the main ninepin bitts (**120**), the after-hatch (**122**), the upper barrel of the main capstan (**124**), and behind it, the glazed scuttle (**126**) overhead the one already noted on the upper deck. The after ladderway is covered by a companion or hood (**127**), and against its after side can be seen the mizen topsail-sheet bitts (**132**), the mizen-mast, the double wheel (**129**) with its binnacles (**131**) and the jars (**130** containing water for the officers on deck. The poop is seen from above, with its planking nailed down on the beams, but I have shown the outline of the cabins beneath: there are two



of these on either side of a central corridor, that of the Captain to starboard; in the stern is the large cabin serving as the great cabin, ordinarily reserved for the Captain.
There is nothing particular to be noted on the outside of the frigate; we have already noted the bumpkin, but also visible are the catheads, the channels, and forward of the main-channels the iron for the main studdingsail swinging-boom; the armament of the quarterdeck includes two howitzers abaft the 8-pdr long guns, and further aft can be seen the upper finishing of the galleries, the stern-lantern, etc.

Port half-breadth plan: the plane of section corresponds to the upper face of the chine of the waterways.
The planking has been left off in order to show the structure of the quarterdeck and forecastle with their composite beams, carlings and ledges, knees, partners, etc. The tumblehome of the side can be seen from the indication of the external planking of the hull and the gunports.

Inboard profile: the frigate is shown fitted-out, so that a large number of items of gear mask the inner planking of the hull; this justifies the representation in the previous plate of the "bare" hull. Note the joinery-work in the great cabin, the glazing of the aftermost gunport (**140**), the arms-racks (**142**) in the corridor, and sundry other details such as the wheel and the tiller-ropes, the mast-wedges, etc.

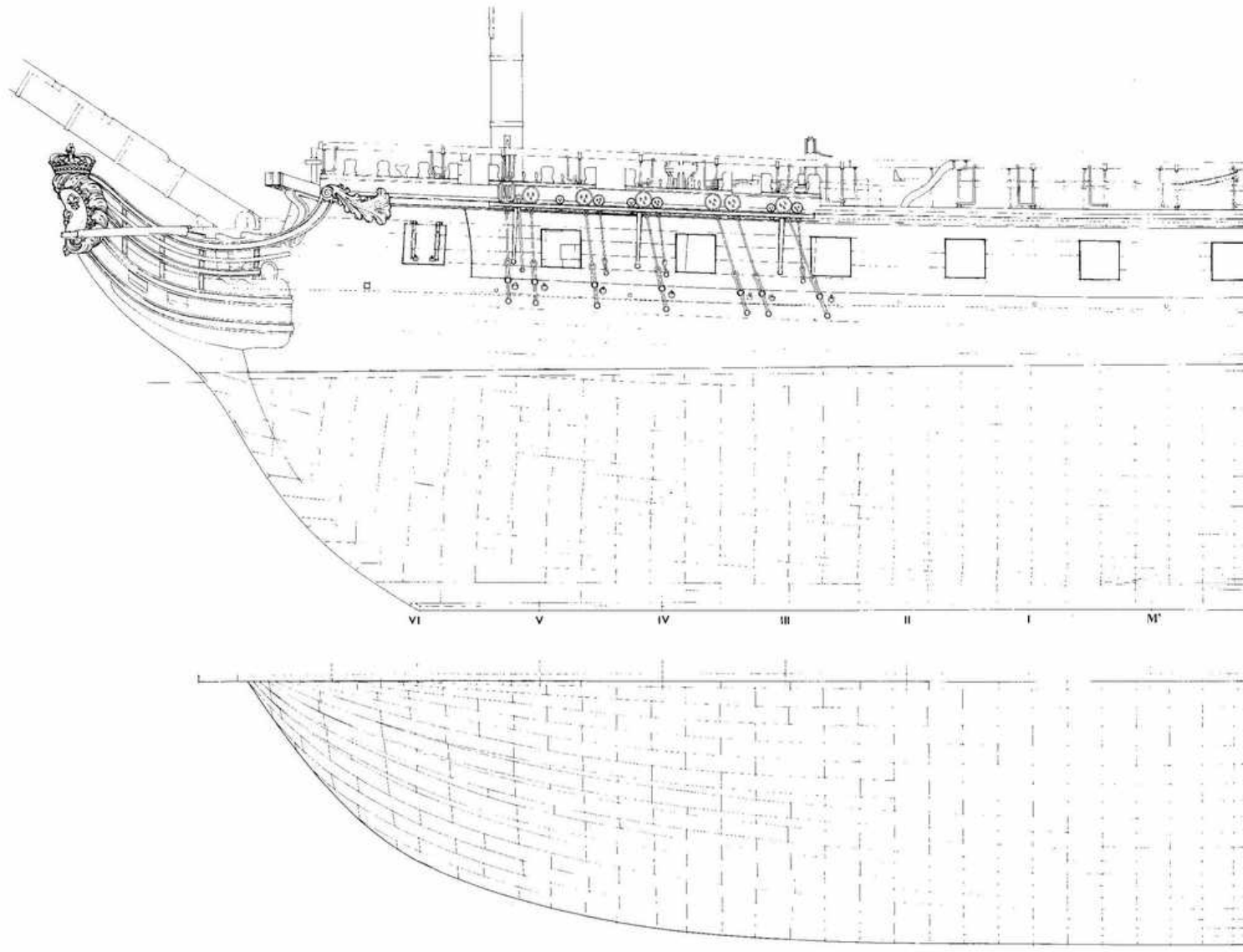


PLATE VII:
PROFILE OF OUTBOARD WORKS

The frigate is not shown fitted-out in this plate: the rigging is restricted to the first few feet of the masts, and the gunports are unarmed.

Note in particular:

– the full port-lid over the foremost gunport (the bow-chase port);

– The square scuppers in the way of the manger and the pumps, the others being round.

This Plate should provide sufficient information for the coppering to be executed correctly, and the additional drawing beneath the profile shows the coppering of the starboard side of the underwater hull. Note that the strakes of copper plates fine away to a point. A little way above the load waterline (marked by a line at either end of the vessel), can be seen a wooden batten which is nailed to the hull planking over the lip of the coppering.

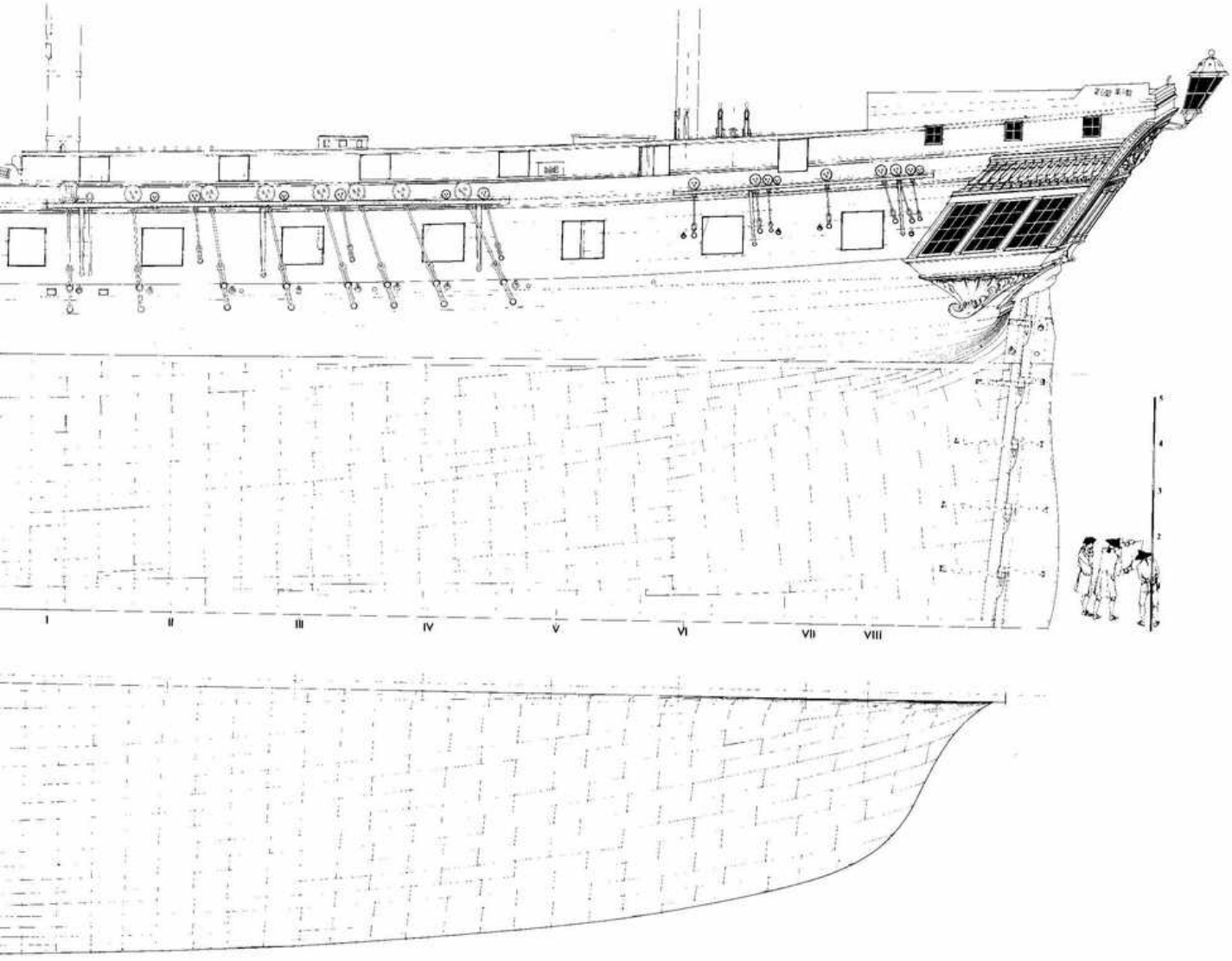

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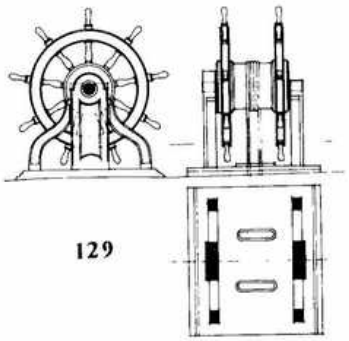
PLATE VIII

GEAR AND FITTINGS



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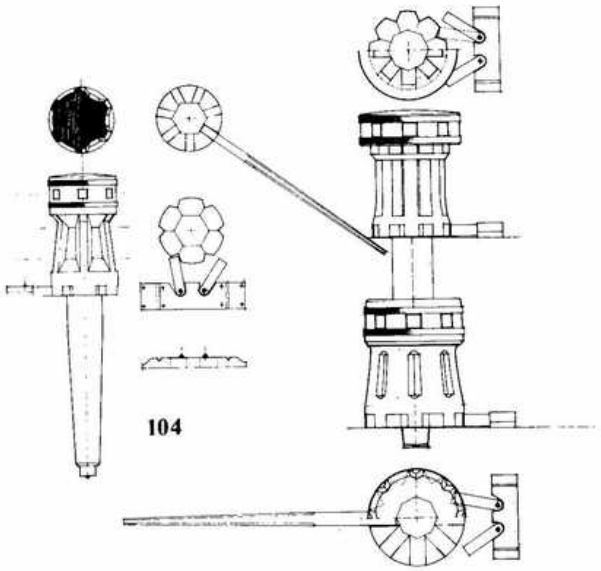

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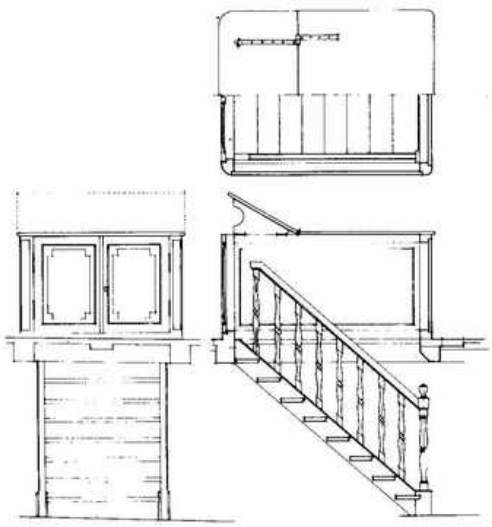

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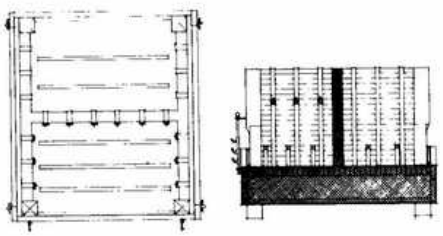

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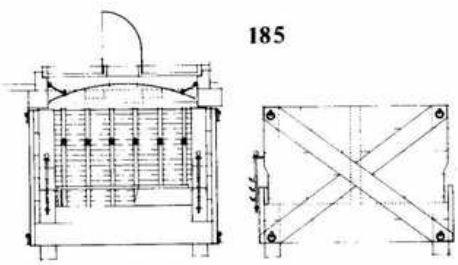

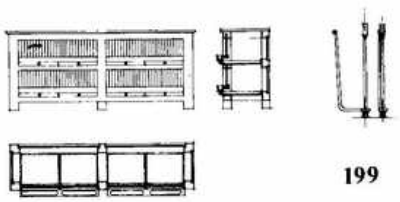

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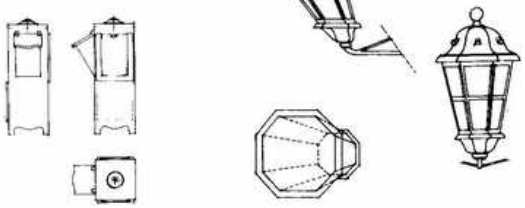

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Chapter IX
TWENTY FOUR-POUNDER FRIGATES

24-Pdr FRIGATES

The adoption at the end of the 18th century of large frigates armed with 24-pdr guns was preceded by a number of trials of which it is important to be aware.

In the middle of the 18th century, the French Navy possessed a class of small two-decked ships armed with 50 or so guns. The gundeck armament consisted of twenty-two to twenty-four 18- or 24-pdr guns. This class of ship, of which there were a large number in the 17th century Navy, were by now no longer considered useful. Despite their small size, their upper works were unavoidably of the same height as those of much larger ships such as 74s or 80s. This height made it necessary to carry a proportional amount of ballast, adding still more weight. The hull volumes had to be of an appropriate size, which was extremely prejudicial to their speed of sailing, already compromised by the height of their upper works. To avoid "inflating" the underwater hull inordinately, shipwrights were obliged to limit their height of gundeck sill, to 4 feet at the most. This had the inevitable disadvantage of making it difficult to run out the lower deck guns as soon as there was any wind or a sea running. Finally, the weakness of the gundeck armament when armed with only 18-pdrs meant that they were quite unable to stand in the line of battle. However, despite the evidence of all these shortcomings, several more 50-gun ships were built in 1748 and 1749, as much from habit as for any other reason. Even as late as 1768, the Secretary of State for the Navy asked three shipwrights to prepare draughts for a 50-gun ship armed with 24-pdrs on her gundeck.

It was against the background of this sort of competition that S[r] Boux intervened; although he had come up from the lower deck, as the expression went, he was a man of real merit, and was finally admitted by the aristocratic corps of officers to the rank of *lieutenant de vaisseau* in 1770.

Boux proposed that no more 50-gun ships should be built, advocating in their place large and powerful frigates of a similar displacement (2,000 tons). The principal difference consisted of doing away with the second tier of guns. This would result in a considerable saving in weight of artillery and in the upper works, as well as a significant lowering of the centre of gravity, thereby allowing the ballast to be reduced also. Moreover, the scantlings of the hull timbers would be lighter, calculated for a vessel with a main breadth slightly less than for a 50-gun ship and with a larger space between the timbers.

This weight saving both in the building and in the ballast would make it possible to design the hull lines with an eye to speed of sailing, while still making it possible to stow victuals for twelve months rather than the usual six (with water and firewood remaining unchanged at 3 months' provision).

Boux addressed his proposals to the Minister (the Duc de Choiseul-Praslin, 1766-1770), who asked the Chevalier de Borda to examine it. The Chevalier reported back favourably, confirming Boux' contentions, adding the rider however that such frigates should be reserved for operations in distant waters. In de Borda's opinion "the hull lines do not differ materially for the underwater lines from those drawn out in the usual manner. Their proportions of length to breadth are those of good frigates, while their volumes are those of small 50-gun ships; as for their stability and speed of sailing, I believe that they are superior, not only to 50-gun ships, which is not to say much, but even to good frigates". This new type of frigate, heavily armed with twenty-six 24-pdrs, had thirteen gunports on the upper deck. With a height of gundeck sill of six feet, and being much more manœuvrable than a ship of the line, such a vessel could easily take on a ship without serious disadvantage (remember that a 64-gun ship of the period was armed identically with twenty-six 24-pdrs on the lower deck, but with a height of gundeck sill of only five feet at most).

With stores for a commission lasting a year, commerce raiding in the Indian Ocean against English merchantmen was entirely feasible, despite the lack of land bases in the region (France at the time only possessed the Île de France and the Île de Bourbon, and there is no doubt that five or six such frigates operating in the Indian Ocean at the outbreak of hostilities could cause considerable damage to enemy merchant shipping.

For the time being, however, Boux' project was not followed up. The Duc de Praslin departed from office at the end of 1770, and was followed by the very brief interregnum of de Terray, before he was replaced in April 1771 by de Boynes. This latter appointment was decisive for Boux, who became a trusted adviser to the new Minister; de Boynes, a lawyer, was unfamiliar with the Department of the Navy, and he accordingly surrounded himself with advisers, among whom was Boux, the former common seaman. With the backing of his new patron, Boux obtained permission for two frigates to be built to his proposals at Lorient. The *Ordonnance* of 1772 attempted to organise the Navy along the lines of the Army, and raised a storm of protest from sea officers, and the death of Louis XV and this opposition forced the resignation of the Minister, who was replaced in July 1774 by Mr de Sartine. His first action was to revoke the *Ordonnance*. A natural consequence was that Boux lost all credibility with the new Minister. Despite the fact that he had been promoted *capitaine de vaisseau* in March 1772, the fact that he had risen from the ranks could not be glossed over, and he continued to be rejected by the officer corps of the Navy. Moreover, since he was not a member of the corps of master shipwrights, his bona fides in the domain of naval architecture were also contested.

The frigates laid down in the Spring of 1772 were to pay the price for their author's predicament; they were relegated to the role of storeships with their armament reduced, suffering this demotion from motives of jealousy and revenge. This killed off an experiment of exceptional interest, which might have made its mark of the War of American Independence.

More than twenty years were to elapse before, in 1794, another large frigate was laid down at Lorient. This was the aptly named *Forte*, armed with 24-pdrs and presenting all of the principal characteristics of the Boux vessels. It is to be regretted that nothing any longer survives concerning the originator of this initiative, since the archives of the Revolutionary period are very sparse, and we have found nothing as yet on the subject. Be that as it may, a new interest in large frigates had surfaced again. In 1793-4, two more 24-pdr frigates but of rather smaller tonnage were built at Paimbœuf, and in 1799 a sister ship to the *Forte* was built at Toulon.

Despite the apparent success of these frigates, the formula was then abandoned, under the fallacious argument that their cost of building was excessive when compared to that of a ship of the line!

At precisely the moment when France was rejecting the large frigate, it was taken up by the young Navy of the United States[1]. It was their success, during the war of 1813-4 with the British, which provoked a veritable storm of enthusiasm in Europe for this type of frigate[2]. European Navies "discovered" the large American frigate.

In France, a programme was set up in May 1817 for the design of 50-gun frigates armed with thirty 24-pdrs on the main-deck[3], to carry victuals for 6 months and water for 4, with a crew of 450

men. The draughts of the *Forte* were proposed to the designers as a model, or at least as a source of inspiration. Three different designs were accepted, and were followed for the building of seven frigates. For the first time, Jacques-Noël Sané played no part in the design of a large vessel for the French Navy[4].

The voyage of Charles Dupin, academician and naval architect, to England[5] no doubt influenced the brief for the design competition of 1817, and it must be recognised also that at this date the very existence of a Navy was controversial. Fortunately however, Baron Portal, Minister of the Navy from 1818 to 1821, was able to obtain support, not without difficulty and to his lasting credit, for a Navy of real significance.

The shape of the post-Napoleonic French Navy was defined in an Order in Council dated 1820, confirmed by a further Order in 1824: the Navy was to have 40 ships of the line and 50 frigates, with a further 80 secondary vessels. The proportion of the total force given over to frigates provides ample evidence that their role was now considered in a very much more important light than had been the case previously: "they are veritable ships of the line with a single tier of guns", wrote Baron Tupinier (1779-1850) at the time.

In 1822, Tupinier (who was by then Director of Naval Construction), wrote a paper entitled *Observations on the Dimensions of Ships and Frigates in the French Navy*. This was nothing less than a complete redefinition of the French Navy, and an interesting comparison might be drawn between the influential role that Tupinier was to have with that of the Chevalier de Borda some forty years earlier.

As far as the frigates of the 1817 competition are concerned, this is what Tupinier had to say on the subject[6]: "To construct no more Frigates of the same dimensions as those whose draughts were the result of the competition opened in 1817". In their place, he recommended the adoption of three ranks of frigates, all armed with 60 guns, half long guns and half carronades, with 36-pdrs for the first rank, 30-pdrs for the second, and 24-pdrs for the third. This uniformity in the total number of guns was not, in the event, followed, the proposal being considered perhaps too radical. The so-called Paris Commission[7], which had been charged with the task of developing new class designs, accepted the need for three classes of frigate but armed them with 60, 50 and 40 guns respectively. The second rank was armed with twenty-eight 24-pdrs on the main-deck, in accordance with the Establishment for guns of 1824.

Three class designs, each by a different shipwright, were adopted between 1826 and 1829, and fourteen new frigates were laid down in the years from 1826 to 1830. From 1843 to 1847, another ten frigates were laid down, but to new draughts: launched between 1853 and 1869, they were all converted on the stocks to auxiliary steam vessels. I will do no more than mention these in passing, since they fall outside the subject of this book, the frigate of the sailing navy.

The adoption in 1821 of the 30-pdr calibre and the generalisation of their employment (see Chapter X) brought about a further modification of the armament of frigates of the second rank in 1837, and again in 1849, as did the introduction of shell-guns. A number of frigates, designed for the 24-pdr class, remained fifteen to twenty years on the stocks[8] and were finally launched as 30-pdr vessels. However, in order to avoid any confusion I have included them in this Chapter, on the basis of their original design armament.

1. The United States Navy had half a dozen powerful 24-pdr frigates, of which the first three were launched in 1797.
2. It is perhaps worth mentioning the proposal, in England, included in Stalkartt's *Naval Architecture* of 1781, for a frigate armed with thirty 32-pdrs and twelve light 12-pdrs. The design, for which full draughts were proposed, was never adopted by the Royal Navy. [Trans.]
3. The term *main-deck* was by this period more commonly used to describe the deck of frigates on which the principal armament was carried, the anachronistic "upper deck" having been dropped. [Trans.]
4. Sané had been responsible for the class designs not only of the 18-pdr frigate, but also for those of the 74-, 80- and 118-gun ships; he moreover prepared the designs of the intermediate rates of 64- and 110-gun ships, as well as an alternative 74-gun ship design, these apart from his designs for sloops-of-war and brigs, so that the naval matériel of the Imperial Navy was essentially a Sané creation.
5. Charles Dupin (1784-1873): *Voyages dans la Grande Bretagne entrepris relativement aux services publics de la guerre, de la marine et des ponts et chaussées, en 1816, 1817, 1818, 1819 et 1820*, 6 vols 4[to] plus atlas of Plates (Polak 2956). Several versions of parts of the main work were also translated into English. During his travels, Dupin was able to inspect a number of powerful English frigates, built in emulation of the American vessels.
6. Tupinier's paper, which first appeared as an article in the *Annales Maritimes* of 1822 and was then printed for restricted circulation by the Imprimerie Royale, was translated into English by Captain William Jones and published privately (and anonymously) in 1830, to emphasise his alarm at Tupinier's proposals. The quotations from Tupinier's work in this Chapter are taken from Jones' (sometimes imperfect) translation. [Trans.]
7. The Commission of Naval Construction, composed of Sané, Rolland, Tupinier, de Lamorinière and Lair, all naval architects. This Commission was either the originator, or else the body responsible for approving, the various class designs of the new Restoration navy. Its role was especially conclusive with regard to the new 90- and 100-gun ships of the line.
8. The policy with regard to new building, adopted under the Restoration and continued under the July Monarchy, consisted of holding on covered slips, in an advanced state of building, a large number of vessels, which were then launched according to the Navy's requirements. This policy meant that by the 1830s the Dockyards needed more than fifty covered slips.

24-pdr FRIGATES **Names of vessels and their designers**	**Length at the waterline**	**Breadth at the h. of b.**	**Depth in hold**	**Draught of water**	**Height of gundeck sill**	**Total displacement**	**Block coefficient**	**Distance of c. of g. of underwater hull forward of the mid-point of the length**	**Distance below load waterline**	**Distance of metacentre from c. of g. of the underwater hull**
Forte 1794 F. Caro	51.36	13.37	7.01	5.70	2.19	2042	0.509	1.13	2.01	3.72
Artémise 1826 J.-B. Hubert	52.10	13.78	7.05	5.90	2.00	2289	0.527	1.22	2.24	3.60
Poursuivante 1827 L. Barallier	52.10	13.78	7.05	5.90	2.00	2344	0.539	0.90	2.16	3.87
Alceste 1828 P. Leroux	52.10	13.78	7.05	5.90	2.00	2301	0.533	1.24	2.21	3.54

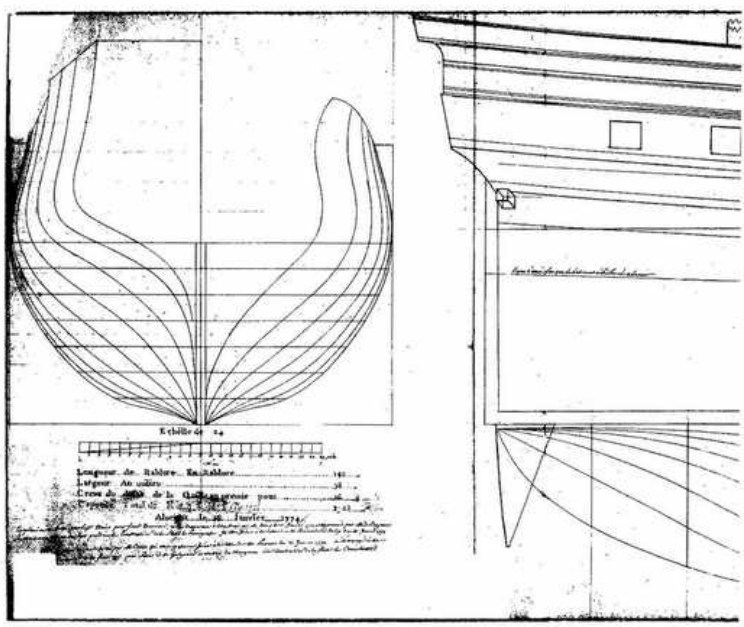
Figures in metres; Length at the waterline from rabbet to rabbet, to outside of plank; Breadth to inside of plank.
Note the fact that the principal dimensions of the three types of frigate of the 1822 programme are identical, with very small variations in the displacements and block coefficients. In short, these calculations give almost the same results, even though the underwater lines of the three vessels were different.

Report by the Chevalier de Borda

The 26-gun 24-pdr frigates proposed by S^r Boux, lieutenant de vaisseau, are destined for cruising in distant waters on commissions which require them to stay at sea for long periods. None of our ships or frigates could carry out such a mission, since they can carry at most stores for six months, and their crews.
The frigates which are proposed, at 16 feet of draught, displace the same as a 50-gun ship, yet they have to bear but a single tier of guns weighing 42 tons less than those borne by a 50-gun ship.
The guns and the upper works of the upper deck weigh 60 tons, making 102 tons in all.
As for the ballast in either case, it is a function of the weight of the guns and the upper works.
As I have said, the proposed frigates have but a single tier of guns raised 6 feet above the water, while 50-guns ships have two, weighing 102 tons more, and their average centre of gravity is raised 8 feet 6 inches, thereby producing a moment which is considerable, such that the proposed frigates will require but half the ballast, which is a matter of 50 tons of ballast.
The reduction is thus 152 tons; if we now examine the masts, the rigging, the anchors &c., we find differences which are in proportion to their beam, which is to that of ships as 38 is to 39 feet 6 inches (the Amphion *is but 39 feet in breadth), which makes an additional difference of 35 tons. The difference is thus up to 187 tons.*
*If we examine the weight of the hull of the one and the other vessel, we see: 1° that 50-gun frigates [*sic*] employ 51,000 cubic feet of timber, while those proposed employ but 43,000 feet. The expense and the scantling are thus demonstrably less than for such 50-gun frigates, to which must be added a lesser scantling. The scantling is not calculated from the beam but from the calibre of the guns, so that it must be the same for the ship and for the frigate, relative to 38 feet of breadth and a single tier of guns. For the same reason the space can be a sixth greater, which diminishes the weight in proportion; so that, finally, the two hulls may differ by 100 tons, in addition to all that we have already examined, so that the proposed frigates will be 287 tons less. If we add to these observations the reduction in half-rations for the petty officers, which make up about a sixth of the space occupied by the victuals, we will have demonstrated the possibility of [stowing] nearly a year of stores for 400 men, since frigates have between 80 and 100 men less than 50-gun ships; as for the superior speed of sailing of the proposed frigates, it is visibly demonstrated by their stores disposed along their length and the upper works of frigates; in that regard it is possible to add to the report made by the Chevalier de Borda; which I believe leaves nothing to be desired on this point.*
It would be regrettable if Your Grace were not to yield to the persuasion of a most honourable and zealous officer, who has no other wish than to serve well, and who moreover is deserving of confidence, with which he has already been honoured in the past in similar matters.
The policy which the consequence of the building of such frigates imposes, and their employment at the outbreak of hostilities, seems to demand that they be built, with the aim of striking a heavy blow against English merchant shipping in the Indian Ocean.
The proposed frigate is to be armed with twenty-six 24-pdr guns on a single deck.
The hull lines do not differ materially for the underwater lines from those drawn out in the usual manner. Their proportions of length to breadth are those of good frigates, while their volumes are those of small 50-gun ships; as for their stability and speed of sailing, I believe that they are superior, not only to 50-gun ships, which is not to say much, but even to good frigates.
Indeed, it is recognised that when two vessels are of the same strength, that which is the larger has, all other things being equal, greater stability, and keeps the sea better; it follows therefrom that the proposed frigate, especially in a seaway, sails faster than good frigates of the ordinary size, not only because its greater stability allows it to carry more sail, but also because the motion of the sea will interfere less with the speed of its way.
It may also be noted that since this vessel is very flush in proportion to her size she will also be best able to sail close to the wind.
Thus everything leads us to believe that in general the proposed frigate will have superior qualities, but to decide whether it is advantageous to build a vessel it is not enough to be assured in advance that it will have good qualities, but it must also be known what advantages it may have, with regard to the various employments which may be given it from time to time.
There is one in particular which appears apt for the frigate in question, which is to send her to cruise against the enemy's frigates and merchantmen, but since such cruises may be undertaken off the coasts of Europe or in much more distant seas, it is important to examine separately the qualities of the vessel with regard to these two aims.

Boux' Frigate Designs

Laid down at Lorient, the first vessel was launched in November 1772, the second not until June 1775. It is the draughts of the latter vessel which are illustrated here. The frigate is described as a storeship, and christened significantly *La Pourvoyeuse* ["Supplier"], while the first vessel was named *La Consolante*. The draught indicates the main-deck armament as twenty-six 24-pdrs, with a secondary armament of twelve 8-pdrs, although in fact the 24-pdrs were dropped in favour of 18-pdrs.
The length from rabbet to rabbet is 152 feet – breadth 38 feet – depth in hold 16 feet 6 inches (from the horizontal line of the berth deck) – displacement 1,928 tons.
There are a number of notes written on the draught, which is a copy. In the upper part is the comment that the original draught did not show any gunports on either the forecastle or the quarterdeck, the text at the bottom left indicating that the earlier draught was dated January 1772 and approved by the Minister; it goes on to say that the copy was made by Mr Train, Master Shipwright, as modified in several respects by Mr Guignace.
It should be noted that the length to breadth ratio is 4.0; observe also the relatively short floors and their steep deadrise, giving underwater lines which are very sharp and a block coefficient of 0.51 which is typical for a frigate (compared, for example, with a coefficient of 0.62 for the storeship *La Normande*). Thus it may be presumed that the hull volumes would have been insufficient for a storeship. No Sailing Reports have survived for either of these two vessels, so that we have no information as to their sailing qualities.
The frigate has no difference in draught fore and aft, which is extremely unusual for the period; reading from the scale on the plans, the draught is 19′6″, with a height of gundeck sill of 6 feet. There is a round (closed) bow, and there is a poop over the quarterdeck with a small gallery. Note the limited rake of the stem and the complete absence of rake to the sternpost. The draught is preserved at the *Service Historique de la Marine* (SHM D[1] 65-15).



It is not difficult to decide whether frigates such as are proposed might undertake cruises off our coasts with the same advantage proportionate to their expense than frigates which are smaller. It is certain that large frigates being faster than ships of the line would be able to choose their adversaries and only engage where they have the advantage, but it must also be said on the other hand that their great strength would be a complete waste against merchant vessels, and in that regard they would be no more apt than small frigates which would cost much less, save in the very small matter that is the safety of the vessel, and, more than that, the certainty of taking the prize, rather than the fear that one might be taken oneself. It is not well proved that for this objective large frigates should be employed rather than small ones.

Yet if this advantage of the large frigates seems doubtful, when we consider cruises off the coasts of Europe, it is by no means the same when we talk of distant expeditions; indeed, leaving aside the speed with which such vessels would arrive at their destination, and their ability to surmount any obstacle which they might encounter from contrary winds, I will merely remark that they can carry a great quantity of stores, which is, without fear of contradiction, the most important factor for this type of expedition.

To establish the truth of what I contend, one has but to compare the proposed frigate with a 50-gun ship, which, as I have already said, has near enough the same displacement, and it will be apparent that this frigate, which has a deck and a whole tier of guns less, will be able to replace the weight of this deck and tier of guns with a considerable quantity of stores; moreover, these stores which replace the weight saved being stowed much closer to the keel than the weight which has been saved, and the forecastle and quarterdeck being lowered by the whole height of a deck, it follows that the frigate will have a much greater stability than the 50-gun ship, and in consequence she will not need such a great quantity of ballast as the ship; and indeed might dispense with it altogether to the advantage of still more stores. If we add to all these considerations that the crew of such a frigate would be less numerous than that of a 50-gun ship, then we might be easily convinced of her great suitability for undertaking such cruises in distant waters.

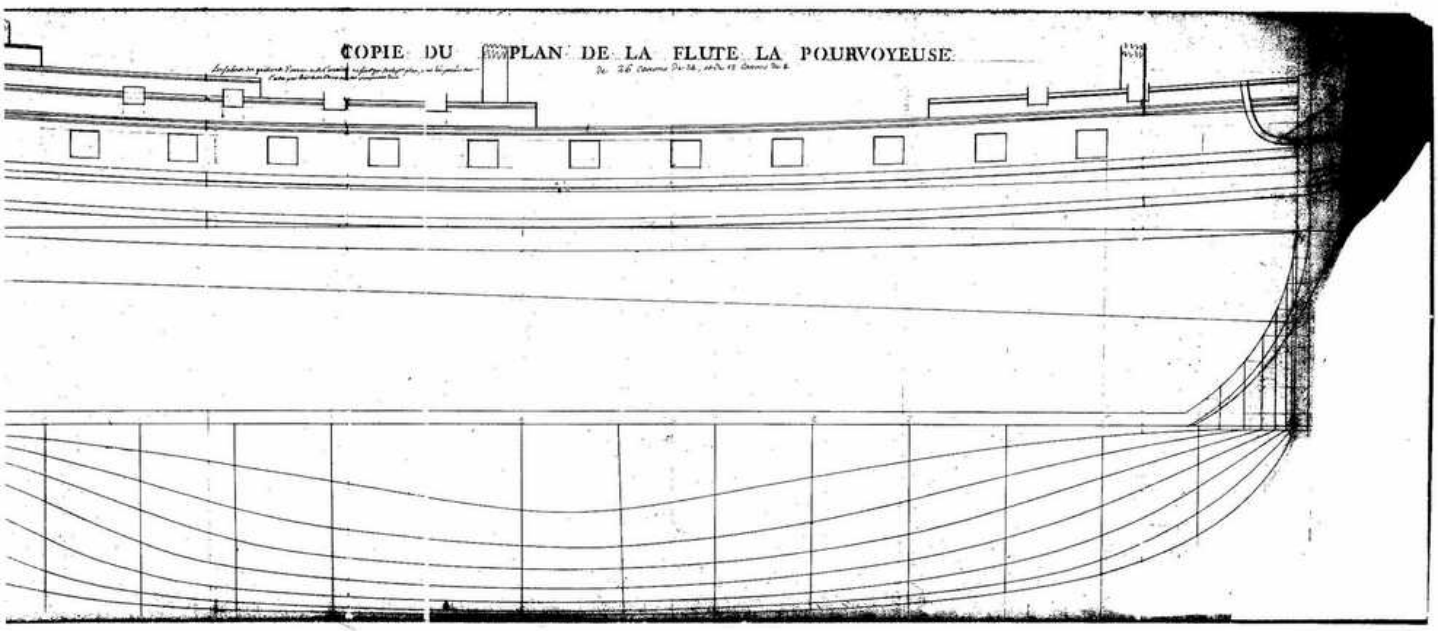
We must recognise also that no other type of vessel unites the advantage of carrying such a great quantity of stores with the qualities of a cruising ship, such as speed of sailing, the ability to beat to windward, &c., &c., from which it follows that the proposed frigate is the sort of vessel which is best suited to such expeditions. Signed, the Chevalier de Borda.

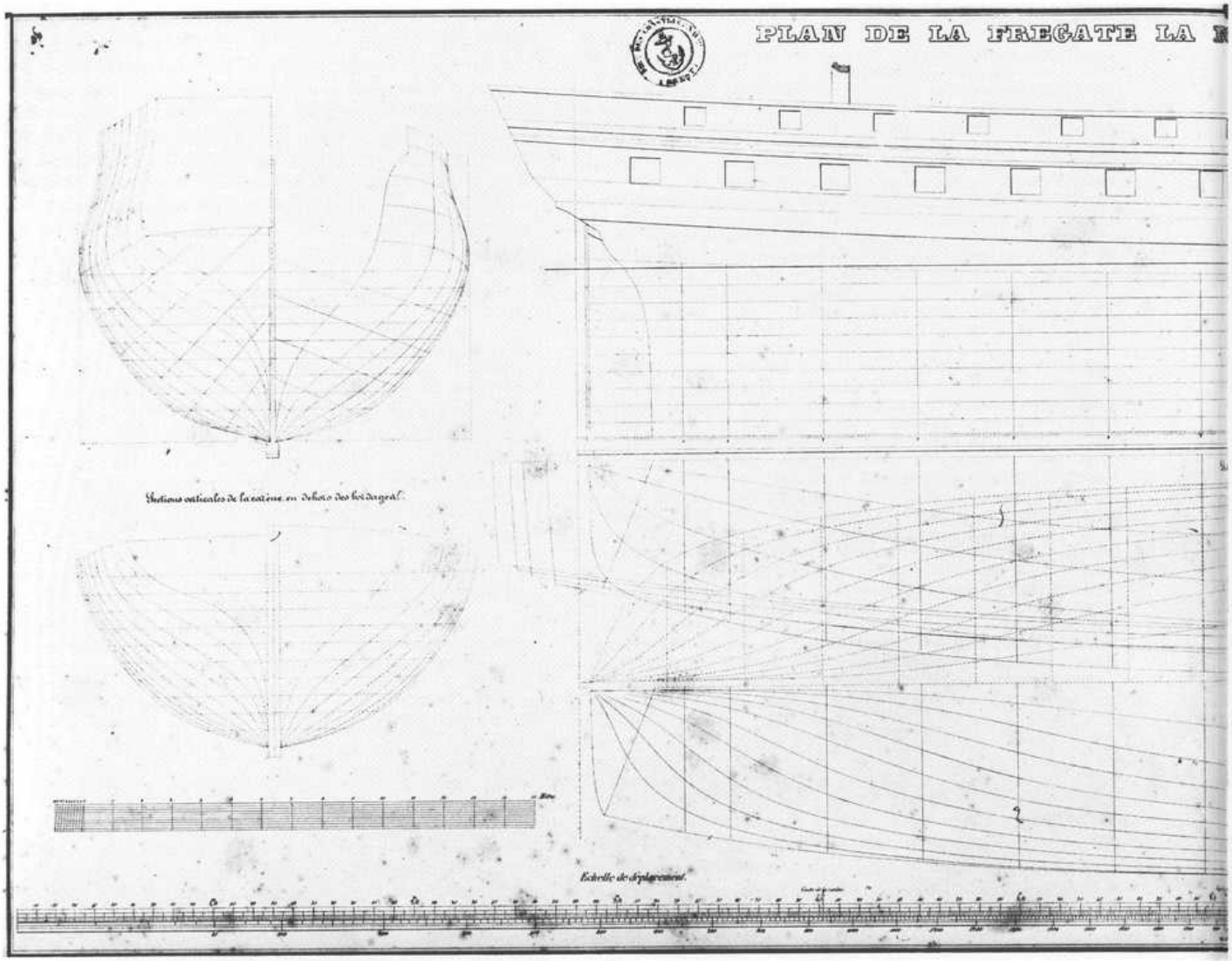
Report by the Chevalier de Borda

The significance of Boux' proposal, which lay at the origin of the adoption of the large frigate in the 19th century, makes it appropriate to reproduce here, *in extenso*, the report written by the Chevalier de Borda, despite its occasional lack of clarity and repetitiveness; the first part takes up the arguments advanced by Boux, but having already quoted from this report at the beginning of the Chapter, we will not go over the arguments again, but recommend instead that you read through it. The original manuscript is preserved in the *Archives Nationales* (fonds marine, D[1] 16).

The frigates proposed by Boux were intended to engage in long-distance cruises, and thus commissions of considerable length, calling for victuals for 350 men for a year. But such victuals are comprised primarily of bread (biscuit), flour, dried vegetables, salt meat and wine. As far as water and firewood are concerned, it is only possible to stow three months' supply, which made it essential to have safe havens where fresh water and firewood were available. A map showing such logistical possibilities is an essential prerequisite when trying to understand naval strategy, which is all too often studied in the abstract.

I should perhaps add that a crew victualled on the basis of the usual daily allowance (see *74-G.S.*, vol. IV), would begin to feel the effects of scurvy three to four months after setting sail. This is an important point which has not been taken into account, and which imposes the necessity of having places where the men can recuperate in safety; a knowledge of these, and of the the watering places alluded to above, is essential.



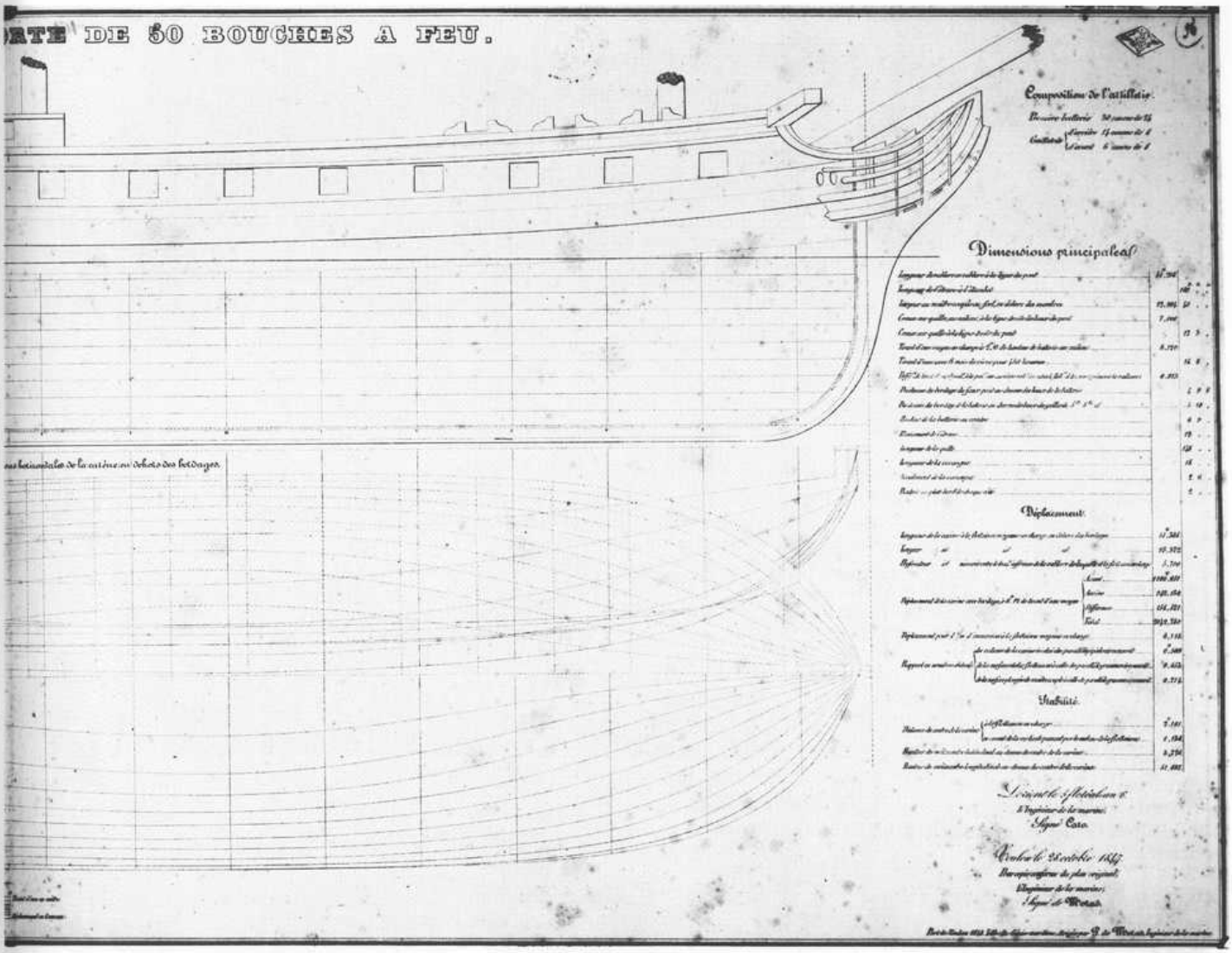


LA FORTE

This draught appears in one of the volumes of the *Atlas du Génie Maritime*, an indispensible source when considering the French Navy of the years 1820-1850. As we have seen, it was the competition of 1817 which caused the draughts of the *Forte* to be rescued from oblivion. Their author, the shipwright François Caro, was born in 1740; he entered the service of the East India Company as a trainee shipwright in 1756, and was later sent to attend the School of Naval Architecture in Paris. He designed and built a large number of ships for the Company (see J. Boudriot: *La Compagnie des Indes 1720-1770*, 2 vols., Paris, 1983). When the Company was dissolved, in 1770, Caro continued to work for his own account, as a merchant builder. In 1794, transferred to the service of the State, he drew up the plans of the *Forte*. Laid down in May 1794 and launched in September of the same year, the frigate entered service the following May. This achievement earned Caro promotion in 1795 to the rank of *ingénieur constructeur ordinaire*. Renowned for her excellent sailing qualities (as we shall see at the end of this Chapter), the *Forte* was captured in 1799 in the Bay of Bengal; her subsequent career in the Royal Navy was short, for she was wrecked off Jeddah in 1801. In 1799 another frigate, the *Égyptienne*, was built to the same draughts; she was surrendered to the British in 1801 at the capitulation of Alexandria.

It is worth quoting Admiral Willaumez, writing in his maritime dictionary published in 1820. Under the entry *draught of water*, he has the following to say: "a vessel built with no drag is one in which there is no difference in draught fore and aft, so that she is neither trimmed by the bow nor by the stern; this is a form of underwater lines which a few builders are at last adopting, and which we owe to Mr Caro, formerly shipwright to the East India Company in Lorient; all the seamen of our generation knew the admirable lines of his frigate the *Forte*, which were such as to make her superior to every vessel and on every point of sailing: she mounted thirty 24-pdrs on her main-deck, twenty on the spar-deck, drawing 19 feet of water fore and aft. It was above all the stability of this vessel which was remarkable".

It is worth remembering that Boux' frigates were also designed with no difference in draught fore and aft. Since they were also



built at Lorient, it is only natural that Caro followed their building, so that they may well have provided a source of inspiration for him: there are a number of similarities between the draughts of the two designers.

Baron Tupinier, writing in 1822 in the same work to which we have already alluded, makes a very significant remark on the subject of 24-pdr frigates: "In 1811, the *Constitution* American frigate came to Cherbourg. Her armament and equipment were examined and described by a commission, whose report was sent by the Duke Decrès, the minister of marine, to the council of Naval Constructions, with an order to examine it. This council made a report, in which it is said, 'that the American frigate had no other advantage over the *Iphigénie*, French frigate of 44 guns, than the superiority of her ordnance; that there appeared to be nothing new about her equipment and rigging; – That this sort of vessel seemed, however, the most proper for cruising on distant expeditions; – That France had possessed the *Forte*, armed with 24-pounders, a ship which had excellent qualities, but that this species of construction had been abandoned in our ports, out of motives of economy'.

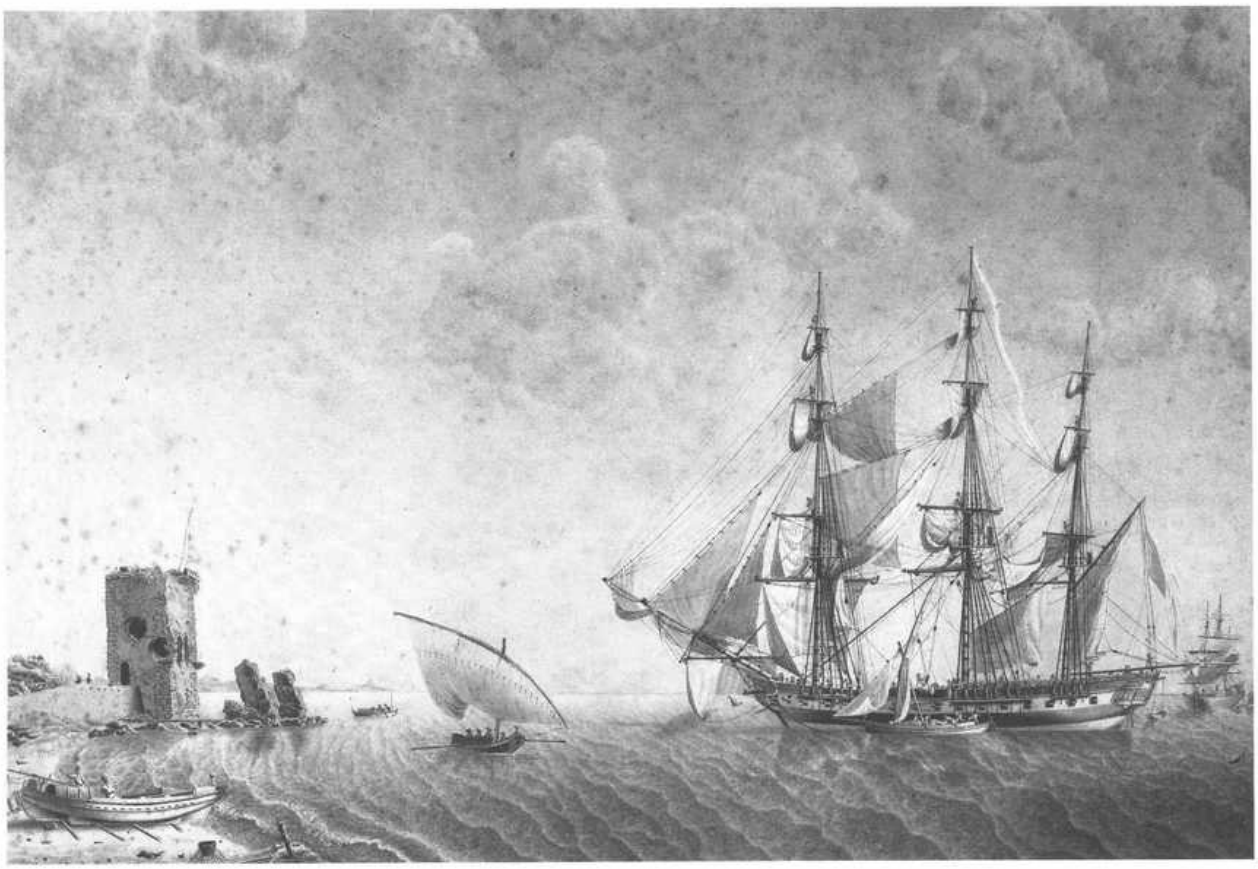
"The Minister retorted with justification 'it is as if you said that there would be economy in putting 18-pounder guns in the place of those of 24. Now to do that, is certainly a smaller expense, but it is not an economy; economy, properly speaking, is that which gives the same results at a less expense; and here the results are different'".

Despite this judicious rebuttal, as we have seen there was in the event no change to the policy of building only 18-pdr frigates.

It should perhaps be added that the United States were conscious of the inferiority of their naval force compared with that of the English. Rather than building ships of the line, where the number would never have been significant by comparison with the Royal Navy, they preferred to build powerful frigates in their place, which by their novelty caused consternation during the conflict of 1813. The result was clear: every time an American frigate encountered an English frigate, the advantage was on the side of the former. The greater speed of these large vessels, proportionately larger and more manœuvrable, meant that they could avoid if necessary the need to fight a ship of the line or several enemy frigates.

Despite the fact that this same option was open to France, it was a choice which the French Navy refused to make, for reasons of conservatism which are so often characteristic of committees.

*See overleaf for the principal dimensions of the *Forte*.



The text which appears on the previous pages on the Plate from the *Atlas du Génie Maritime* is difficult to read, so the principal entries are transcribed below:

Principal Dimensions:

Length from rabbet to rabbet at the horizontal of deck	51.268 m	
Length from stem to post		160′0″
Breadth at the midship bend to inside of plank	12.994 m	40′0″
Depth in hold amidships, to the horizontal line of beam of the deck	7.000 m	
Depth in hold from the keel to the horizontal line of deck		17′5″
Draught of water laden at 2.10 m height of gundeck sill amidships	6.120 m	
Draught of water with 6 months' stores for 450 men		14′6″
Distance from the plank of the berth deck to under side of beam of the main-deck		4′9 1/2″
From the plank of the main-deck to under side of beam of the f'castle & q'deck	5′8″	5′10″
Height on the main-deck amidships		6′9″
Rake of the stem		12′0″
Length on the keel		148′0″
Length of the floor		18′0″
Deadrise		2′6″
Tumblehome at the plankshеer on either side		2′0″

Displacement

Length on the average load waterline to outside of plank	51.368 m
Breadth ditto	13.372 m
Depth from under side of rabbet of the keel to load waterline	5.700 m

Displacement of planked hull at 6.12 m average draught	Forward	1,100 t. 651 kgs
	Aft	942 t. 130 kgs
	Difference	158 t. 521 kgs
	Total	2,042 t. 780 kgs
Displacement for 1 cm immersion at the load waterline		6 t. 115 kgs

Ratios	Block coefficient (volume)	0.509
	Block coefficient (area)	0.853
	Immersed area of midship bend to parallelogram circumscribed	0.714

Stability

Distance from centre of underwater hull	to the load waterline	2.101 m
	forward of a vertical line passing through the middle of the load waterline	1.136 m
Height of lateral metacentre above centre of hull		3.726 m
Height of longitudinal metacentre above centre of hull		51.697 m

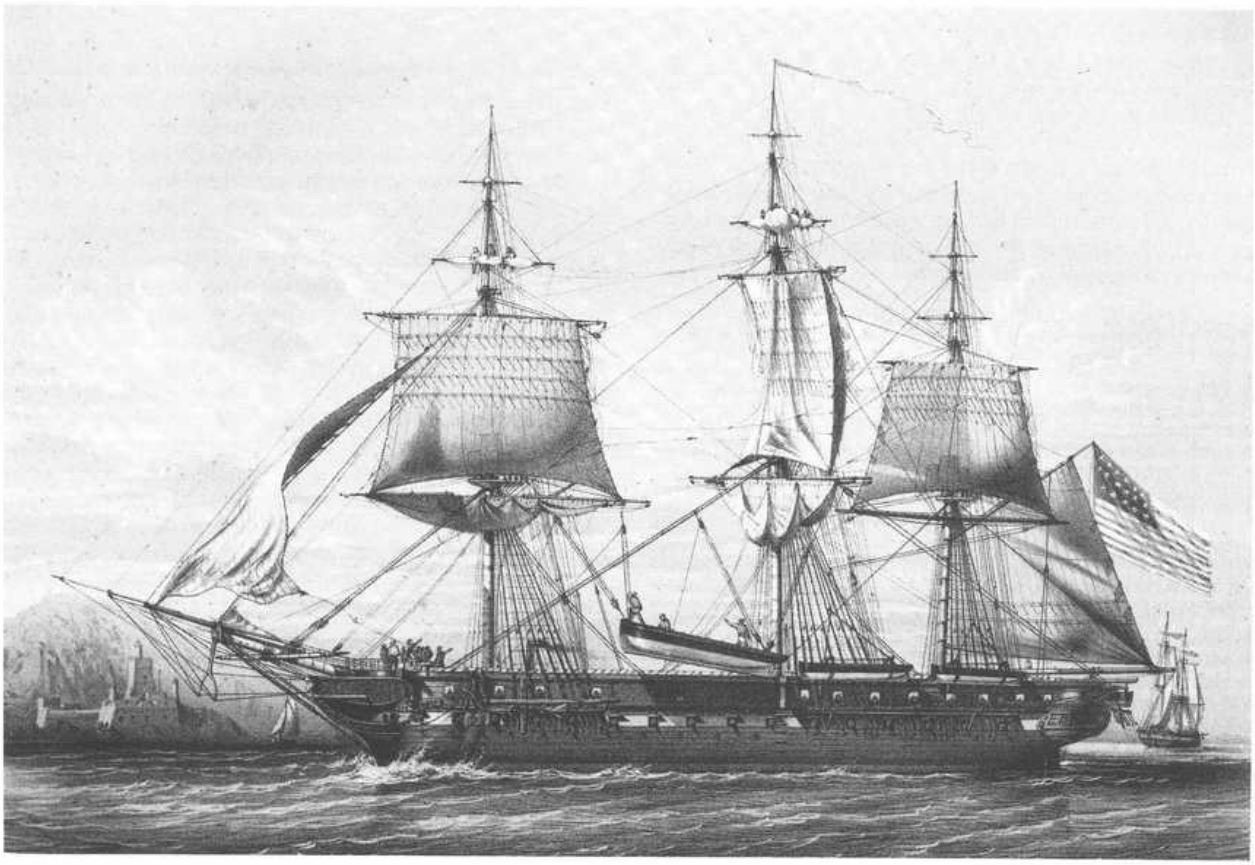
Armament

Main-deck	30x 24-pdrs
Quarterdeck	14x 8-pdrs
Forecastle	6x 8-pdrs

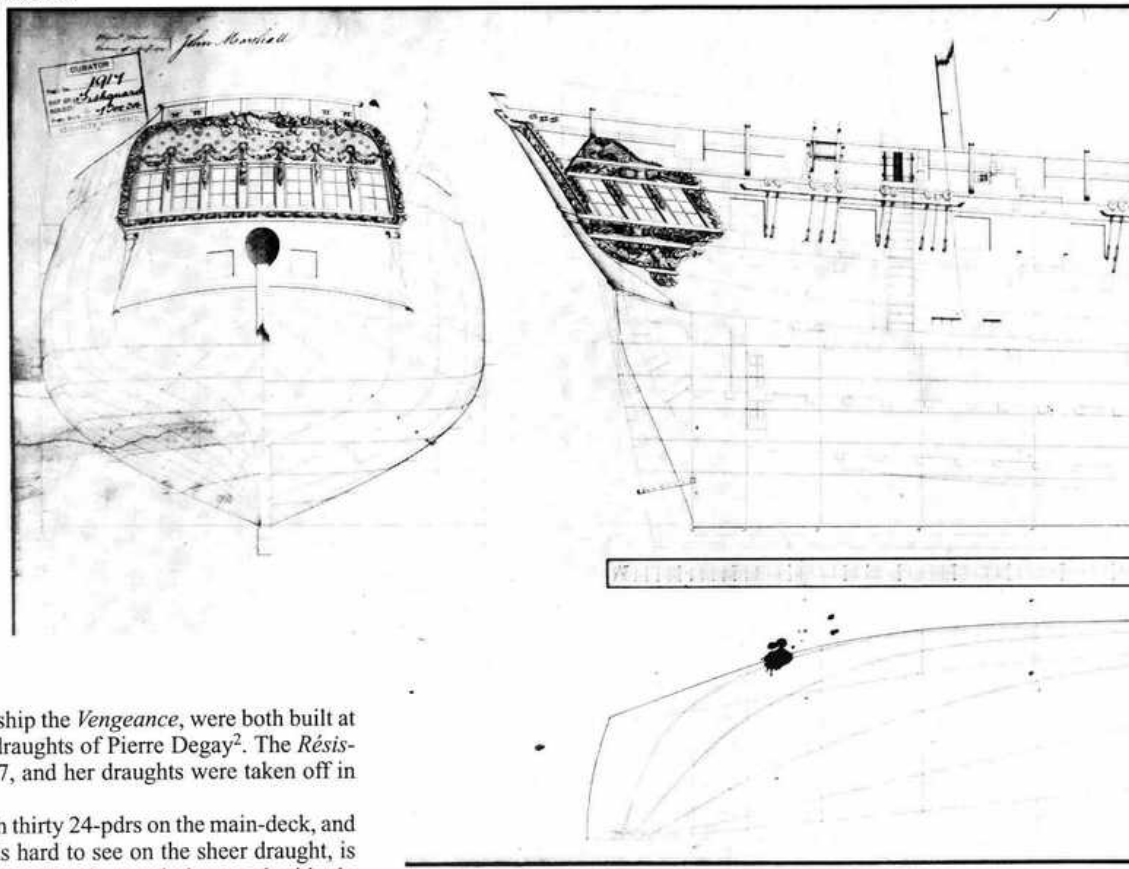
There are two models of the *Égyptienne* at the Musée de la Marine in Paris, one of which is rigged. The draughts of this frigate, which was identical to the *Forte*, are preserved at the *Service Historique de la Marine* (ref. 8 DD[1] 6 n° 24), as well as a table of scantlings (ref. SH 324). The Sailing Report of the *Égyptienne*, drawn up at the end of her 1801 (An IX) commission to Corsica, indicates that she was armed with thirty 24-pdrs on the main-deck and twenty 8-pdrs on the forecastle and quarterdeck, to which had been added four 36-pdr sea-howitzers, two 57-pdr carronades (1 of English origin), and two brass 12-pdrs! This wide variety of calibres and types cannot have made it easy to furnish her with the correct munitions.

The artist (Baugean?) appears to have portrayed a frigate like the *Forte* or the *Égyptienne*. I base my presumption on the armament, since the main-deck has fifteen gunports, with seven more on the quarterdeck and three on the forecastle. The depiction is however fictitious insofar as the frigate is flying a white pendant and ensign, indicating the Restoration period. Nevertheless, the main interest of the painting is the rigging, which has been very clearly detailed. She is carrying a spread of sail, with royals on all three masts bent, not to topgallant poles, but to royal-masts. The bowsprit has a flying jibsail bent to flying jibboom; this in turn dictates the rigging of a dolphin-striker, which in this instance is double. Something of a rarity by this period is the spritsail, which tends to get in the way of the bobstays. Note the laniards of the deadeyes which have been leathered (or parcelled), the hammocks in their nettings over the quarterdeck bulwarks, and, a nice detail, the rails on the after sides of the tops.
A yardarm tackle is being used to hoist up a cask, with a stay-tackle serving as a guy. The feluccas which the artist has depicted are also worth close examination; they are commonly found in Baugean's work (Jean-Jérôme Baugean, *Recueil de navires de guerre* (1812), *Collection de toutes les espèces de bâtiments de guerre* (1814), *Recueil de petites marines* (1817), etc.).

U.S. Navy frigate. A disciplined representation by L. Lebreton of this type of powerful frigate, armed with 56 guns. As we have seen, it was the American example which influenced all the European navies, and the French Navy rediscovered the advantages of a type of vessel which she had been unwilling to adopt more than twenty years earlier. The reproduction here of this lithograph is thus entirely justified.
The frigate is hove-to in order to hoist in her barge, and I will merely make a few short comments on this manœuvre, which Lebreton has so carefully detailed. The yardarm tackles (main-yard and foreyard) have raised the boat up above the bulwarks of the waist, and a stay-tackle and another tackle made fast in the foretop will now be used to complete the manœuvre and lower the barge down into the longboat.



Courtesy: National Maritime Museum, Greenwich



LA RÉSISTANCE

This frigate, and her sister ship the *Vengeance*, were both built at Nantes[1] in 1793-4, to the draughts of Pierre Degay[2]. The *Résistance* was captured in 1797, and her draughts were taken off in August of the same year.

This frigate was armed with thirty 24-pdrs on the main-deck, and the aftermost port, which is hard to see on the sheer draught, is opened in the quarter-gallery. The forecastle is armed with six 12-pdrs and the quarterdeck carries 14 more guns of the same calibre. The armament is thus more powerful than that of the *Forte*, which carried 8-pdrs as her secondary armament.

A memorandum[3] preserved at the *Service Historique de la Marine* (ref. SH 320), written by Degay in the month of Brumaire, An V (October-November 1797), provides valuable additional information. Here are some extracts:

PRINCIPAL CHARACTERISTICS

Length from rabbet to rabbet on the waterline	150′0″
Breadth to inside of plank	39′0″
Depth in hold from the upper face of the keel to the horizontal of the beam	19′10″
Draught of water fitted out as usual (same fore and aft)	16′6″
Height of gundeck sill amidships	7′2″
Displacement at 17 feet draught, stored for 6 months	1,556 tons

APPROXIMATE BREAKDOWN OF WEIGHT OF STORES

Ropes, blocks, anchors, sails, spares	110 tons
Ballast	128
24-pdr and 12-pdr guns, powder and shot	170
Victuals for 6 months and 390 men, firewood	152
Water for 4 months and 390 men	150
Weight of casks	21
Crew, including their clothing	40
Officers' table	16
Boats, small items	14
	801 tons
Weight of the hull entirely rigged, incl. spare spars	755 tons

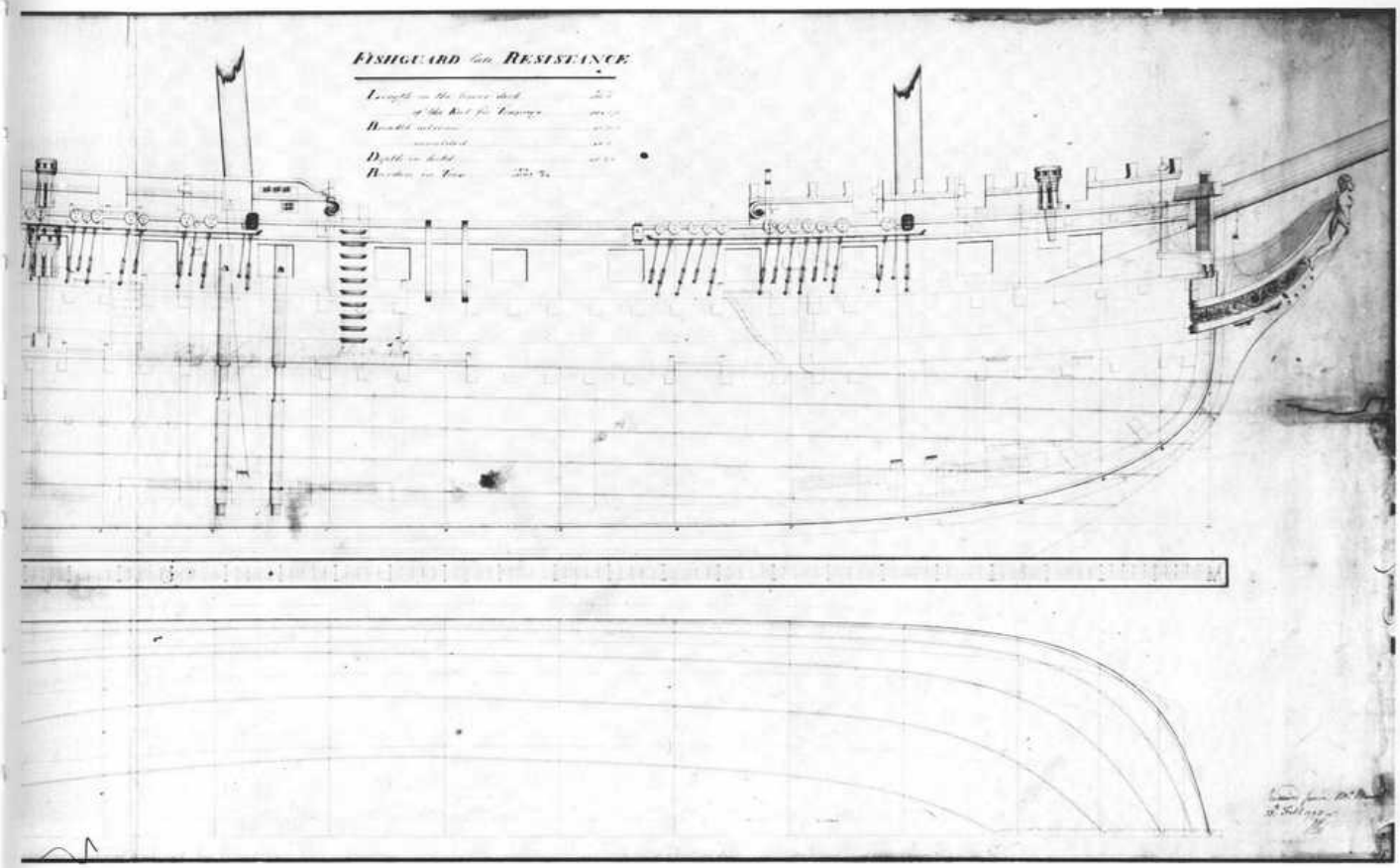
Degay describes the arrangements to be followed when stowing the ballast, of which 75 to 80 tons are permanent. All of the ballast is made up of iron pigs, laid on beds of cordage and chestnut branches, presumably so that its height can be adjusted, thereby altering the centre of gravity; the same applies to the shifting ballast, which is also used to correct the trim fore and aft.

Degay gives instructions for the stowage of the water casks, and the cables are to be coiled on flats athwart the well.

The memorandum also gives the dimensions of the spars (lengths, given diameters, small diameters).

The second part of the document includes *Observations on the Frigate's Sailing*. Degay insists that when sailing close-hauled the tiller should be kept amidships, so that it is necessary to control the centre of effort by adjusting the positions of the masts: the foremast can be moved forward but not aft, the mizen aft but not forward, and the mainmast can be adjusted in either direction. The large surface area of the rudder makes it all the more necessary to "balance" the helm and avoid the most common tendency of vessels to gripe (keep a weather helm), although some may be slack.

The hull volumes are largest at the load waterline and the tumblehome has been reduced, so that the frigate is extremely stable. Her designer requests that trials should be carried out on the *Résistance*, to examine her behaviour with changes made to the stowage of the ballast, the rake of the masts, the setting up of the shrouds, and that these observations should be strictly reported; one may doubt whether this was in fact ever done, since a series of trials of this type would be difficult to carry out and even harder to report back unless Degay himself were actually on board.



Obviously, the vessel herself was considered to be experimental; the draughts themselves make this sufficiently clear. The hull lines are not dissimilar to those found in Forfait's designs. The rake of the stem is extreme[5], and this has made it necessary to fit what amounts to a false-keel at the bow, a forward extension of the gripe designed to provide lateral support.

The rake of the post is also considerable; one can only guess that this was thought to improve the effectiveness of the rudder.

The draught shows (rather faintly on this reproduction) powerful wooden jackscrews for adjusting the positions of the mainmast and foremast; the mizen is adjusted simply by means of wedges. Degay states that the masts are to be steeply raked, and this is evident on the draught; he set the rake at 4 lines (1/3 inch) per foot of length for the foremast, 8-10 lines for the mainmast, and 16-18 (1 1/2 inches) for the mizen.

A few details are worthy of comment: the hawsepieces are shaped in the English fashion; there is no cathead supporter; the fore gear capstan is placed forward of the foremast[6]; the lower sills of the gunports are correct for 18- and 8-pdrs which implies that the carriages had been lowered for the larger calibre guns; there is what appears to be a deck-cabin on the quarterdeck; the main ladderway is situated abaft the mizen-mast; the rabbet of the post appears to have a break near the top; the counter is very arched; and the rake of the taffarel is pronounced.

I though that it was worth devoting a relatively full commentary to the *Résistance*, in view of her original design features which do credit to her designer. It is to be regretted that no Sailing Reports have survived from her time in the French Navy, so that we know nothing of her performance at sea; but perhaps there are some preserved in the archives of the Royal Navy. Be that as it may, the experiment represented by the *Résistance* was not followed up.

1. The indication of Nantes as the place of building is in fact theoretical, since there were no large building slips at Nantes itself, because of the silting up of the Loire. The yards were in fact established at Paimbœuf and nearby.

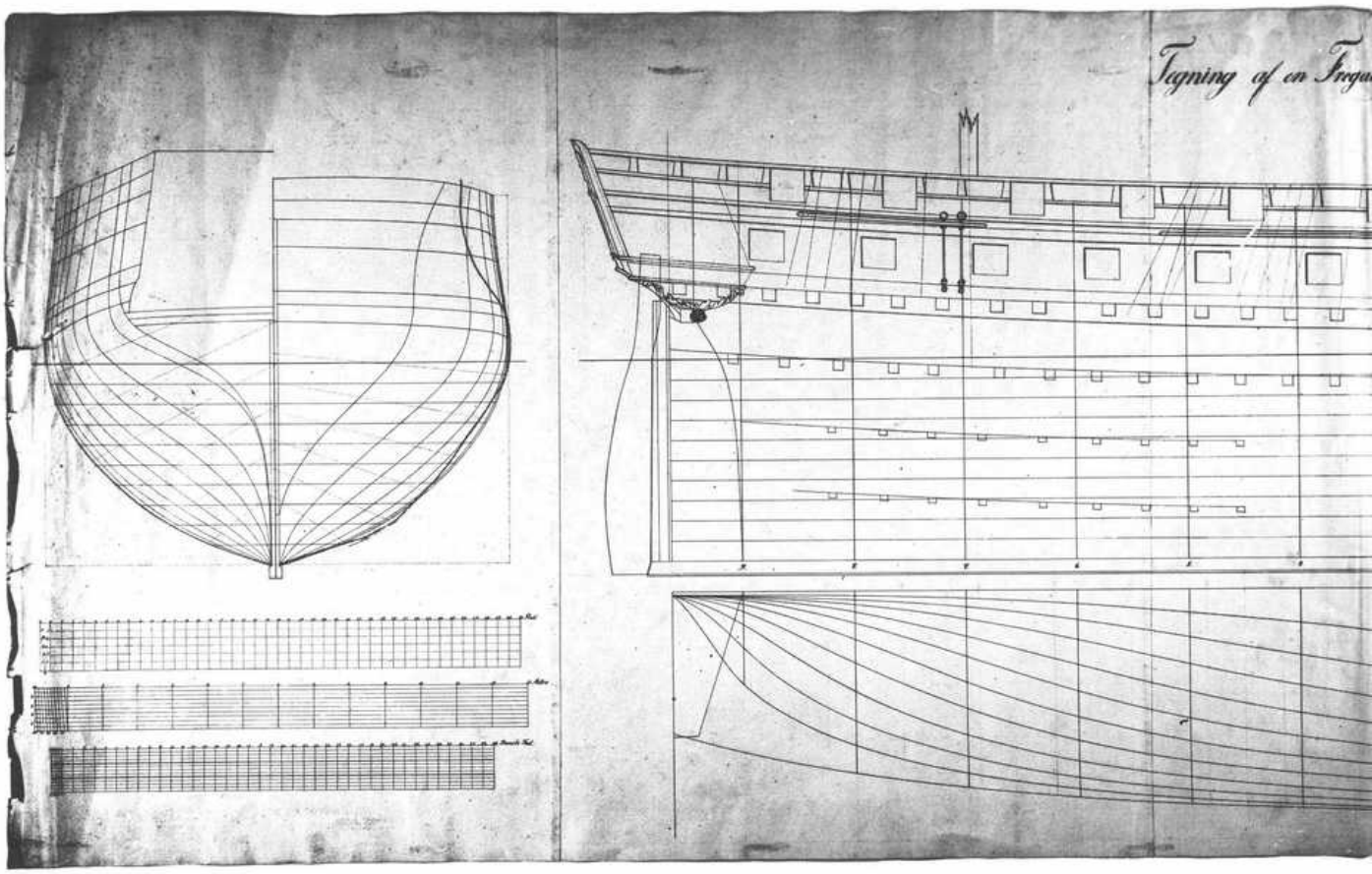
2. Pierre Degay or Gay (1758-1819). Entered the Paris Schools in 1783 and made *sous-constructeur* in 1786, Degay contributed to the *Encyclopédie Méthodique (Marine)*, in the form of the article "shipbuilding" (vol. 1, pp. 454-504), together with a series of Plates. The article is meticulously written, and based on the work carried out on the *Couronne* (80), rebuilt at Brest between June and September 1781, following a fire on board at the beginning of April the same year. Degay had just been accepted (in June 1781) as *aspirant-élève constructeur*.
Vial du Clairbois, responsible for the *Encyclopédie*, made the following comments about his collaborator: "We owe this section on the work of the yards to Mr De Gay, a young shipwright who possesses a rare combination of intelligence, expertise and talent, together with an application to his profession to which this memorandum amply attests: there is all the less reason to fear that any small detail may have escaped his attention in that he wrote it day by day following the building of a ship of the line."
I should add that the *Couronne* had been built at Brest in 1766-8 to the draughts of Antoine Groignard, in the place of the earlier *Couronne* of 74 guns built at Rochefort in 1749 to the draughts of Blaise Geslain.
I would also draw your attention to the fact that the *Encyclopédie* was the subject of a facsimile reprint by Éditions Oméga in 1986 (available through Jean Boudriot Publications).
Pierre Degay worked with the Chevalier de Borda, and it was "on principles which are entirely new" that he drew up the draughts of the *Résistance* and the *Vengeance* in 1793-4 and the *Psyché* in 1798, the latter being fitted with a false keel of astonishing depth.

3. A contemporary copy. The *Résistance* was captured in 1797: does this imply that when Degay wrote his report in November 1798 he was as yet unaware of the loss of the frigate?

4. A form of dunnage.

5. There is a precedent for this in the draughts of the *Prosélyte* of 1785, armed with twenty-six 12-pdrs, which also had an exaggerated rake to the stem. Such an extreme rake has to be compensated for by increasing the hull volumes in the fore body, which explains the pronounced fullness of the waterlines in this part of the hull.

6. This was made necessary by the position of the foremast, the axis of which is situated at $18/100^{ths}$ of the length from stem to post, rather than the more usual $11/100^{ths}$.



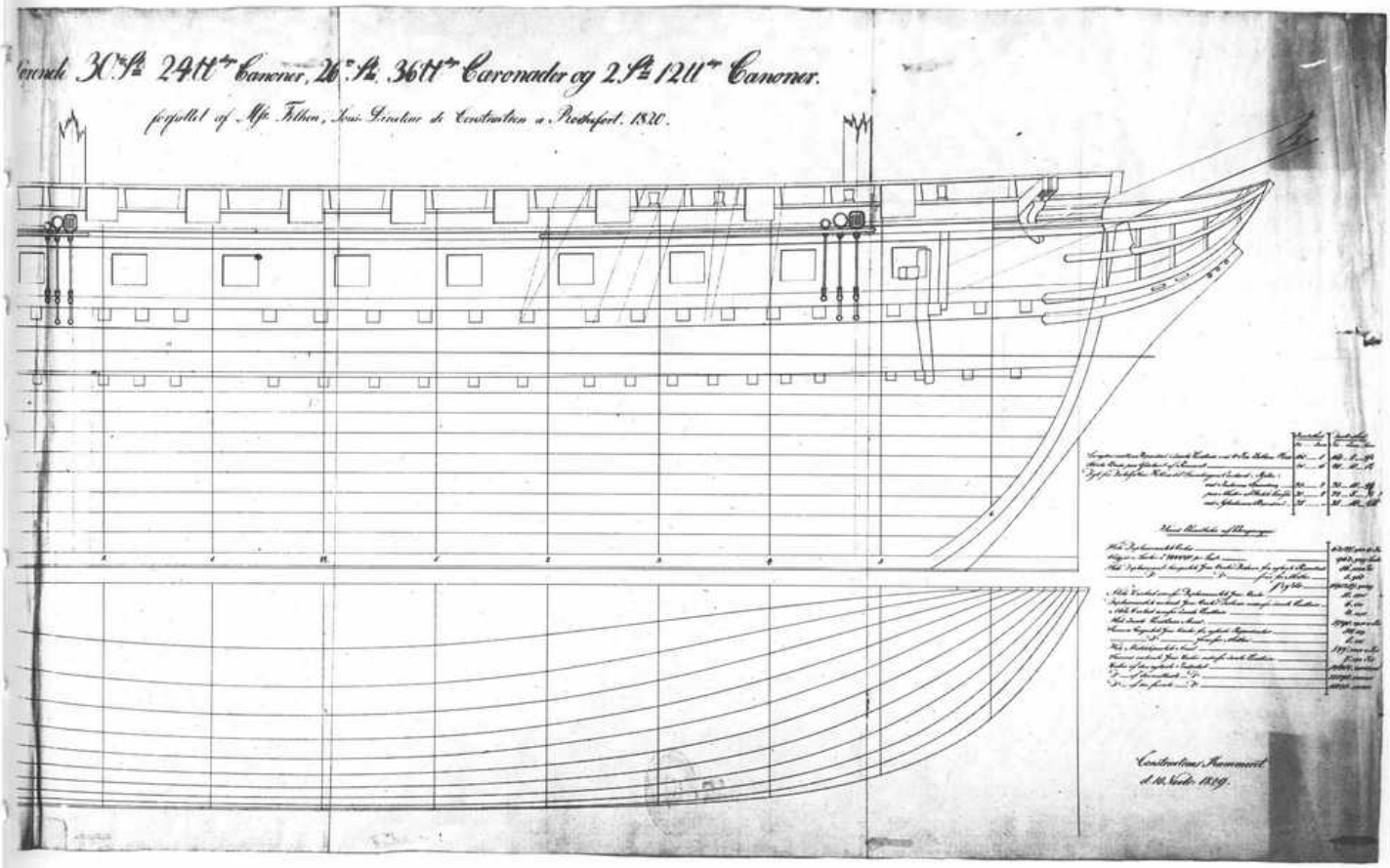
LA VESTALE

This draught is preserved in the Danish National Archives. The designer was *Paul Filhon*, and the same draughts served for the building of the *Vénus* and the *Atalante*.
The programme established in May 1817 set the maximum hull volume at 2,100 French tons of 2,000 pounds (978 kgs), equivalent to 2,004 cubic metres, with the following dimensions:

Length from rabbet to rabbet on the load waterline	160′0″	(51.97 m)
Breadth at the midship bend at the height of breadth to inside of plank	40′6″	(13.16 m)
Depth in hold from the upper face of the keel to the horizontal line of beam	21′6″	(6.98 m)
Height of gundeck sill	6′0″	(1.95 m)
Draught amidships	19′2 1/2″	(6.24 m)
Height of the keel and false keel	1′5″	(0.46 m)
Depth of the hull	17′9 1/2″	(5.78 m)
Volume of the parallelopipedon of the underwater hull		3,593 m^3

The vessel was designed to sail with no difference in draught fore and aft.
Armament: thirty 24-pdrs, two 12-pdrs, eighteen 36-pdr carronades.
Crew: 450 men, victuals for 6 months, water 4 months.

In July 1819, while the eight frigates of the 1817 competition were still on the stocks, the decision was made to increase the armament by eight 36-pdr carronades, the increase in weight (30 tons) being compensated for by the addition of 2 inches (5.4 cms) to the depth in hold. In another revision, a seventh month of stores was planned (adding a further 44 tons).
It was then realised that the weight of the hull was 70 tons greater than intended. Finally, various items of gear and equipment had not been correctly calculated, so that the total excess weight finally reached 164 tons, which, despite the increase in the depth of hold, resulted in the height of gundeck sill being reduced to 5 feet 4 inches (1.73 m).
In 1828, it was decided to replace the 36-pdr carronades with 24-pdrs, resulting in a weight saving of 24 tons, but the vessels were still significantly overweight.
This is the verdict of Tupinier on the 1817 vessels: "That these Frigates (otherwise very handsome and perfectly well-built,) have too little capacity for the weight which they have to carry, from which results an immersion of 27 centimetres (10⅝ English inches) more than was intended on their original draughts; and that they carry their ports too low by 22 centimetres (8⅝ in.) notwithstanding the precaution taken to augment their fullness by 54 millimetres (2⅛ in.);
"That these essential defects result from inaccuracies in calculating the weights which vessels of war have to carry, and above all, to the practice which has too long obtained, of confining within limits excessively straitened, the adjustment of the dimensions of the immersed body."
In the conclusion to his report*, Tupinier expresses himself in the following terms: "To construct no more Frigates of the same dimensions as those whose draughts were the result of the competition opened in 1817; but to turn to account such of those vessels as are at present on the stocks, either by arming them with

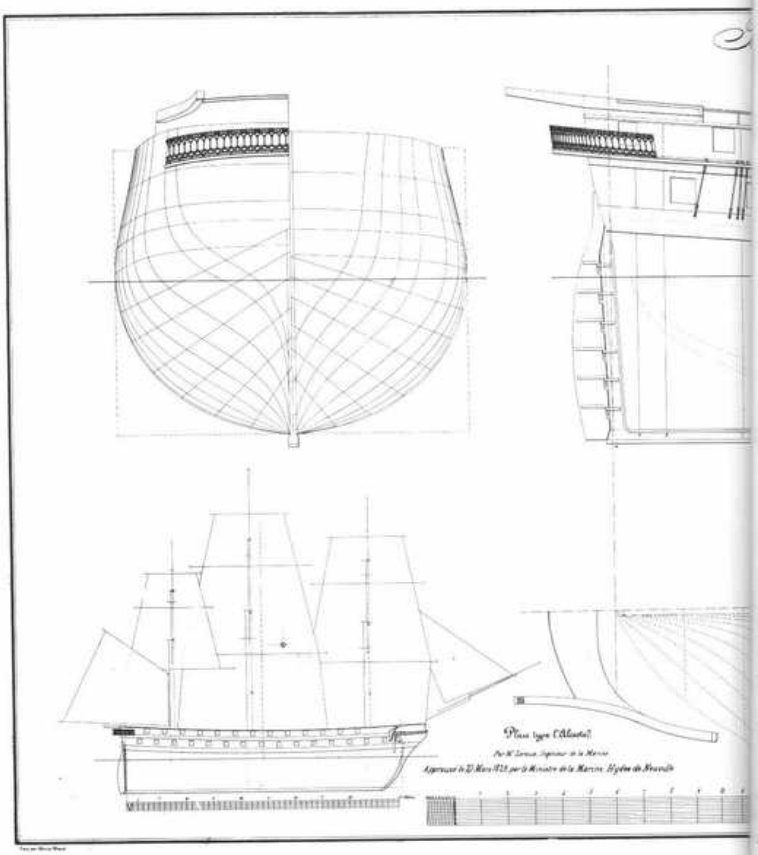


Courtesy: Danish National Archives

thirty long 24-pounders and twenty 24-pounder carronades (fifty guns only), or with thirty 36-pounder carronades on the main-deck, and with twenty-eight similar and two long 18-pounders on the upper-deck, which would bring their armament to sixty guns."
The draught shown above is dated 1829, but this is a copy done from a draught used to illustrate the Establishment for guns of 1819, with twenty-six 36-pdr carronades on the forecastle and quarterdeck, with the addition of two 12-pdr long guns as chase-guns, placed at the second gunport from the bow. Later, these 12-pdrs were replaced by 18-pdrs.
We have already mentioned the fact that in 1828 24-pdr carronades were substituted for the 36-pdr calibre. In 1837, Tupinier's suggestion to reduce the armament was carried out on the two surviving frigates from the 1817 competition still in active service (*Calypso* and *Atalante*). The number of carronades was restricted to 20, still of 24-pdr calibre, with two long 18-pdrs, making a total of 52 guns.
Visible in the plan is the absence of difference in the draught of water fore and aft (a detail which was sharply criticised by Tupinier), and the very fine underwater lines; the ratio of these to the circumscribed parallelopipedon gives a block coefficient of 0.507. The tumblehome is almost non-existent, as is shown on the right-hand side of the body plan where a superimposed shape for the midship bend shows the tumblehome according to earlier practice.

*Once again, the English text is taken from the Jones translation. [Trans.]

LA REINE BLANCHE



This frigate was built to the class design of the *Alceste*, drawn up by *Pierre Leroux* in 1829.
The *Reine Blanche* was laid down at Cherbourg in 1830, and was launched in 1837. Originally designed to carry twenty-eight 24-pdrs on the main-deck and twenty-two 24-pdr carronades and two short-pattern 18-pdr long guns on the forecastle and quarter-deck, changes were made in 1837 with a new Establishment for guns: the 24-pdr calibre was replaced by short-pattern 30-pdrs on the main-deck, and the number of carronades was reduced to eighteen, but also of 30-pdr calibre; in addition, she carried four 30-pdr shell guns, bringing the total number of guns to 50, all of the same calibre. It is apparent that this increased the broadside firepower by a quarter (ignoring the two 18-pdrs which were abandoned). Note however that there were no shell guns on the main-deck, and their use remained discreet on the quarterdeck.
In accordance with the general arrangement of vessels of the post-Napoleonic Navy, the forecastle and quarterdeck are joined so as to form a true upper deck, providing an extra gundeck, which, although it is fully exposed, is nevertheless armed with an unbroken tier of guns. The great length of the frigates of the second rank makes it possible to cut fifteen gunports on the main-deck, the foremost port at the bow serving as a chase-port but preceded by a further gunport cut in the hawsepieces and better situated for bowchasers.
The upper deck is pierced for thirteen guns, but only eleven of the ports are armed (the original armament of 52 guns would have armed twelve). The breadth of the ports on the main-deck is 97.5 centimetres, and the distance between ports 2.25 metres, which are very close to the dimensions laid down in the 1762 Establishment. The hull is timbered in accordance with the requirements of the gunports, with single filling-frames inserted between the bends.
The *Reine Blanche* has a round stern, a new arrangement which became more widespread following the competition of 1831 (see Chapter XII). The stern is very modestly decorated with a balcony and an iron handrail, giving off a stern-cabin containing the officers' latrines (see the section on the internal arrangements in Chapter XII). Large davits support the quarter-boat.
The rails and the wales have only a shallow sheer parallel to that of the decks, and the tumblehome on either side is approximately $1/16^{th}$ of the main breadth. This gives the upper works a block-like air which makes no claims to elegance, or "grace", as they used to say in the pre-Revolutionary Navy.
The channels are all placed along the same strake, and the main- and mizen-channels are merged into one. Small stanchions linked by ropes surmount the bulwarks, designed to receive the crew's hammocks. The head is entirely berthed up with thin boards, thus forming a continuity with the vessel's sides. A few details: the bumpkin, the conduit for the crew's latrines, then the steeply-raked cathead with its supporter, finally the rudder with its offset rudder-head and curved blade, both features being borrowed from English practice.

Here is a transcription of part of the text on the right-hand side of the draught:

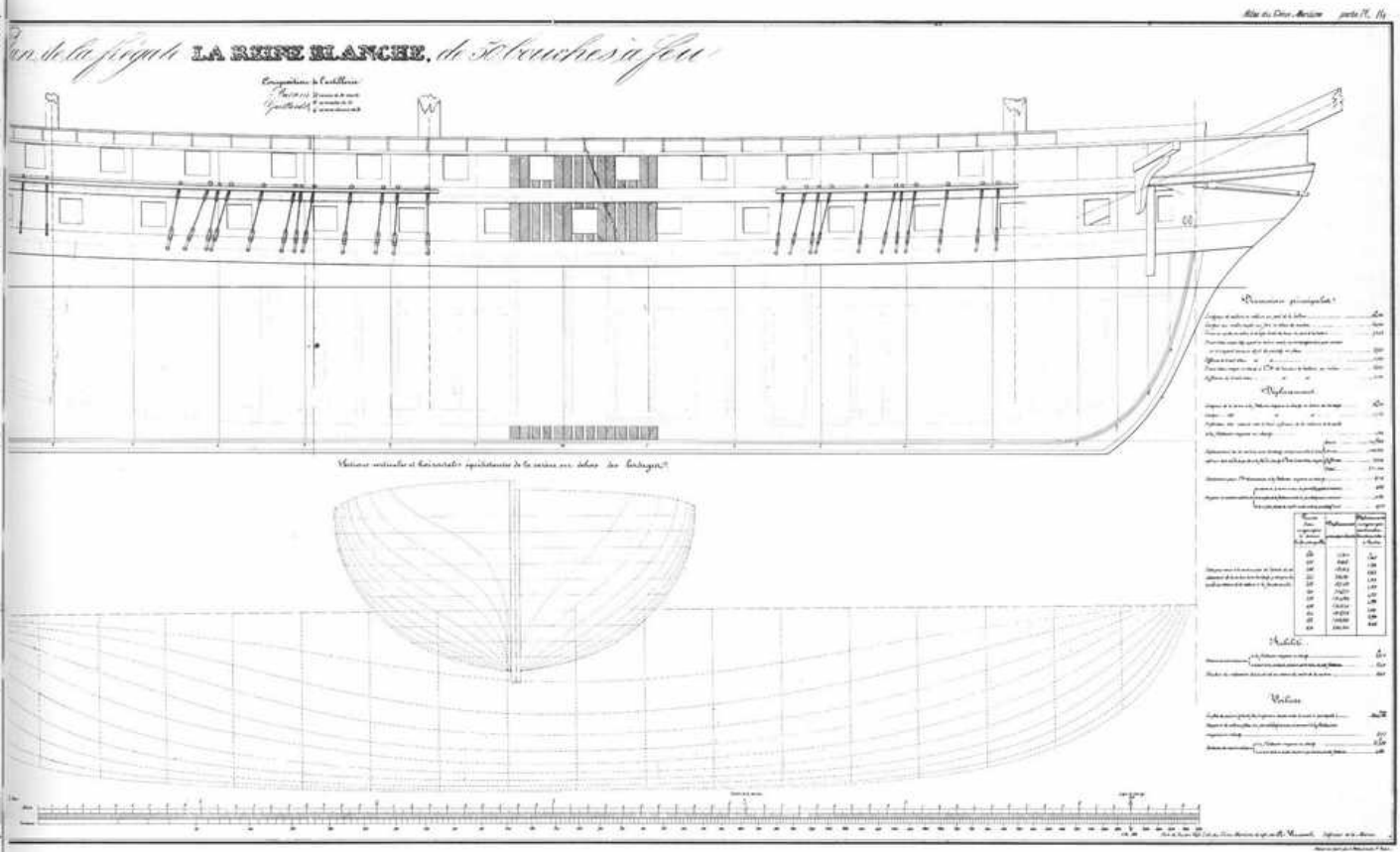
Principal dimensions

Length from rabbet to rabbet at the horizontal of deck	52.460 m
Breadth at the midship bend to inside of plank	13.400 m
Depth in hold amidships, to the horizontal line of beam of the deck	7.048 m
Draught of water laden at 2 m height of gundeck sill amidships	6.300 m
Difference in draught fore and aft	0.400 m

Displacement

Length on the average load waterline to outside of plank		52.100 m
Breadth ditto		13.780 m
Depth in hold ditto, measured from under side of rabbet of the keel to average load waterline		5.900 m
Displacement of planked hull at 6.30 m average draught	Forward	1,247 t. 668 kgs
	Aft	1,055 t. 852 kgs
	Difference	193 t. 836 kgs
	Total	2,301 t. 500 kgs
Displacement for 1 cm immersion at the load waterline		6 t. 129 kgs

Ratios	Block coefficient (volume)	0.533
	Block coefficient (area)	0.831
	Immersed area of midship bend to parallelogram circumscribed	0.758



Stability

Distance from centre of underwater hull	to the load waterline forward of a vertical line passing through the middle of the load waterline	2.210 m 1.240 m
Height of lateral metacentre above centre of hull		3.548 m

Sail plan

Sail area (standing jib, driver, courses, topsails & topgallants)	2,244,300 m^2
Ratio of this area to the circumscribed parallelopipedon at the load waterline	3.173

Distance of the centre of effort	to the average load waterline forward of the perpendicular passing through the middle of this waterline	21.286 m 4.080 m

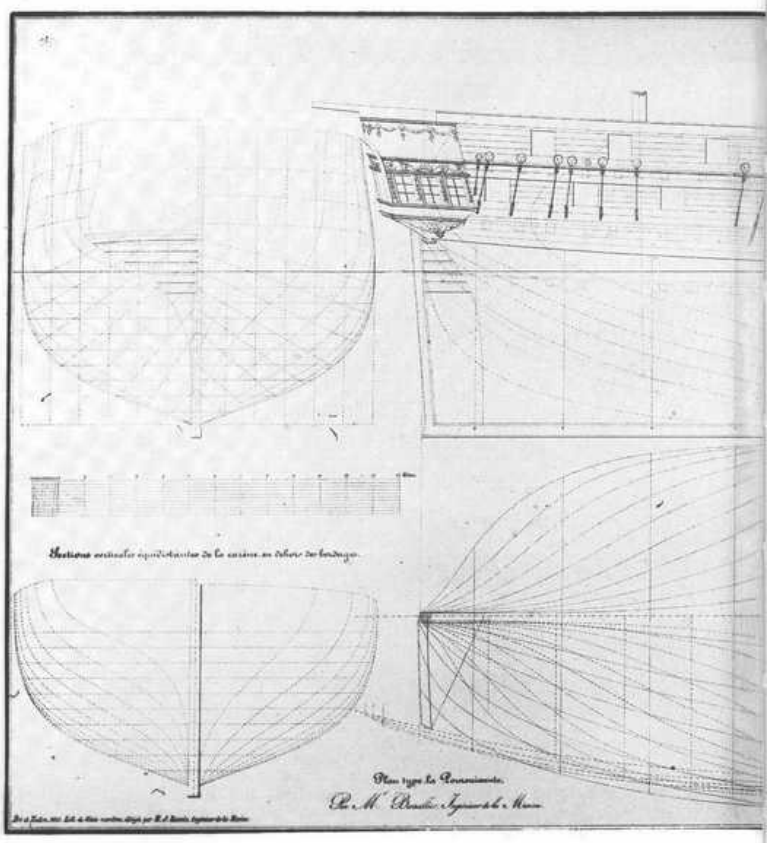
Armament

Main-deck	28x short-pattern 30-pdrs
Quarterdeck & Forecastle	18x 30-pdr carronades 4x 30-pdr shell guns.

*This Plate was engraved in 1849.
The metacentre (see *74-G.S.*, vols. I & IV) as defined in the 18th century, came to be called the lateral metacentre in order to distinguish it from the longitudinal metacentre corresponding to a line passing fore-and-aft rather than athwartships; this was a 19th century innovation.

LA ZÉNOBIE

This frigate was built to the class design of the *Poursuivante*, drawn up in 1827 by *Louis Barallier* at Toulon. The *Zénobie* was laid down in the same Dockyard in 1828, but was not launched until 1847, three years after the *Poursuivante*. The comments made above regarding the draughts of the *Reine Blanche* apply to this draught also, save that the frigate has a square stern, with rather ugly upper finishings to her quarter-galleries. The hull lines are significantly different from those of the *Alceste* draught by Leroux, but the displacement of the latter was 2,301 tons, compared with 2,344 tons for the *Zénobie*, and their principal dimensions are identical. The armament is indicated in the form originally specified, with twenty-eight long 24-pdrs on the main-deck and a secondary armament composed of twenty-two 24-pdr carronades and two long 18-pdrs. Launched very late, the *Zénobie* in fact never carried this armament, but was armed in accordance with the 1837 Establishment for guns, thus in the same way as we have noted for the *Reine Blanche*. Note however that the *Zénobie* had only fourteen gunports on the main-deck plus one chase-port, or one less gunport on either side than Leroux' design. The Regulations of July 1848 remedied the lack of shell guns on the main-deck by substituting four N° 2 pattern 80-pdr shell guns for the same number of short-pattern 30-pdr long guns.
As with the draughts of the *Reine Blanche* we have transcribed part of the text which appears on the *Zénobie*'s draughts, as we will do for the other draughts from the *Atlas du Génie Maritime* in this and the following Chapter.



Principal Dimensions:

Length from rabbet to rabbet at the horizontal line of deck	52.500 m
Breadth at the midship bend to inside of plank	13.400 m
Depth in hold amidships, to the horizontal line of beam of the deck	7.050 m
Draught of water laden at 2 m height of gundeck sill amidships	6.300 m
Difference in draught fore and aft	0.400 m

Displacement

Length on the average load waterline to outside of plank		52.100 m
Breadth ditto		13.780 m
Depth in hold ditto, measured from under side of rabbet of the keel to average load waterline		5.900 m
Displacement of planked hull at 6.30 m average draught	Forward	1,242 t. 705 kgs
	Aft	1,101 t. 774 kgs
	Difference	140 t. 931 kgs
	Total	2,344 t. 479 kgs

Displacement for 1 cm immersion at the load waterline	6 t. 426 kgs

Ratios	Block coefficient (volume)	0.539
	Block coefficient (area)	0.872
	Immersed area of midship bend to parallelogram circumscribed	0.743

Stability

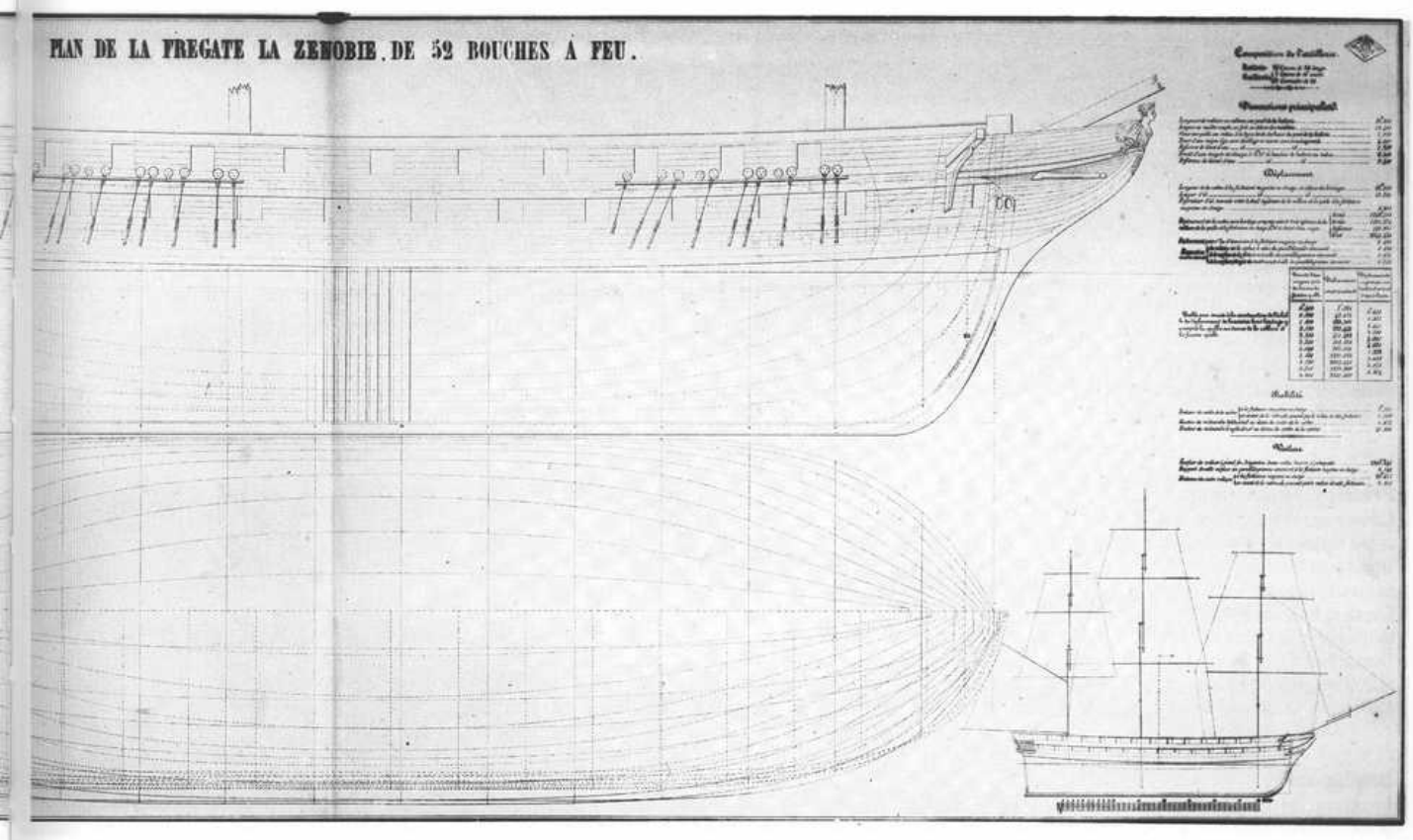
Distance from centre of underwater hull	to the load waterline	2.161 m
	forward of a vertical line passing through the middle of the load waterline	0.909 m
Height of lateral metacentre above centre of hull		3.877 m
Height of longitudinal metacentre above centre of hull		48.869 m

Sail plan

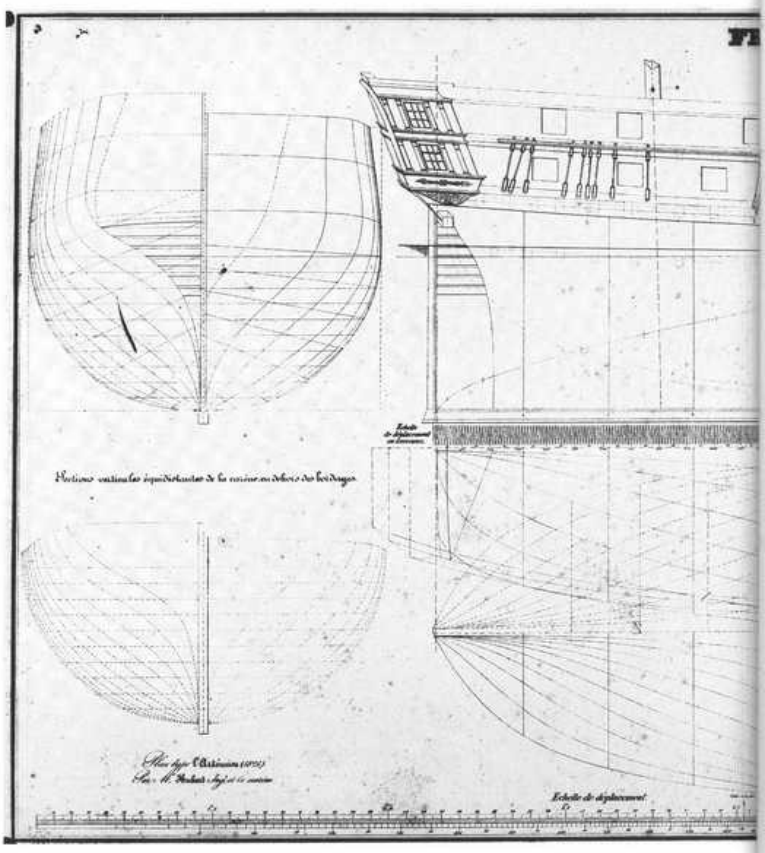
Sail area (standing jib, driver, courses, topsails & topgallants		2,260.346 m^2
Ratio of this area to the circumscribed parallelopipedon at the load waterline		3.148
Distance of the centre of effort	to the average load waterline	20.877 m
	forward of the perpendicular passing through the middle of this waterline	2.516 m

Armament

Main-deck	28x long-pattern 24-pdrs
Quarterdeck & Forecastle	22x 24-pdr carronades
	2x short-pattern 18-pdrs.


PLAN DE LA FREGATE LA ZENOBIE, DE 52 BOUCHES À FEU.

L'ARTÉMISE



This is another class design, this time by *Jean-Baptiste Hubert.* Thus there were no less than three class designs developed for a class of vessel of which less than 30 were laid down over a period of less than five years! The notion of a class design is thus extremely relative.
The comments made on the preceding pages also apply to Hubert's draught. The body plan is similar to that of Leroux' design, with no inflexion to the floors where they meet the keel. The main-deck is pierced for fourteen gunports and there is no chase-port. The stern is square, and the quarter-galleries are on two levels, as the carved-work shows. Note, in the original gun establishment, the by then unusual provision for two *brass* guns among the secondary armament.

Principal Dimensions:

Length from rabbet to rabbet at the horizontal line of deck	52.800 m
Breadth at the midship bend to inside of plank	13.400 m
Depth in hold amidships, to the horizontal line of beam of the deck	7.050 m
Draught of water laden at 2 m height of gundeck sill amidships	6.300 m
Difference in draught fore and aft	0.800 m

Displacement

Length on the average load waterline to outside of plank		52.100 m
Breadth ditto		13.780 m
Depth in hold ditto, measured from under side of rabbet of the keel to average load waterline		5.900 m
Displacement of planked hull at 6.30 m average draught	Forward	1,247 t. 507 kgs
	Aft	1,141 t. 990 kgs
	Difference	205 t. 417 kgs
	Total	2,289 t. 497 kgs

Displacement for 1 cm immersion at the load waterline 6 t. 189 kgs

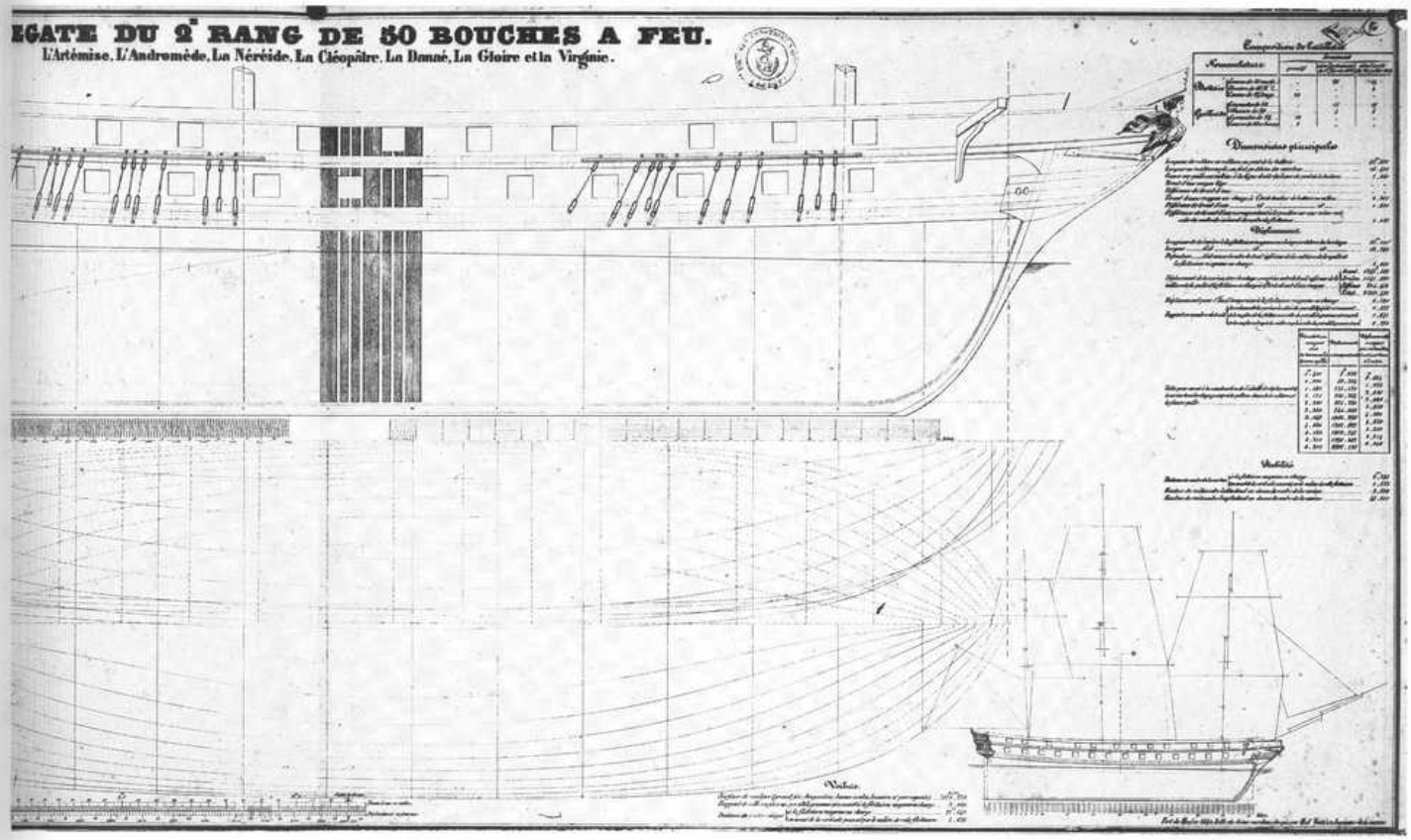
Ratios	Block coefficient (volume)	0.527
	Block coefficient (area)	0.841
	Immersed area of midship bend to parallelogram circumscribed	0.763

Stability

Distance from centre of underwater hull	to the load waterline	2.246 m
	forward of a vertical line passing through the middle of the load waterline	1.223 m
Height of lateral metacentre above centre of hull		3.600 m
Height of longitudinal metacentre above centre of hull		47.000 m

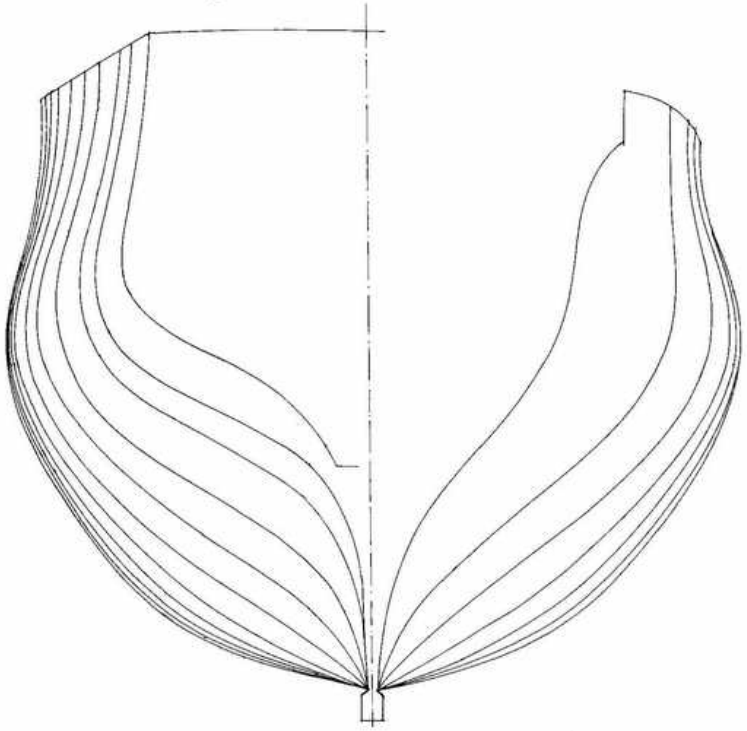
Armament

		original	Est. 01.02.1837	Order 20.07.1848
	Short-pattern 30-pdrs		28	24
Main-deck	N° 2 pattern 80-pdr shell guns			4
	Long-pattern 24-pdrs	28		
	30-pdr carronades		18	18
	30-pdr shell guns		4	4
Spar deck	24-pdr carronades	22		
	18-dr long guns (brass)	2		

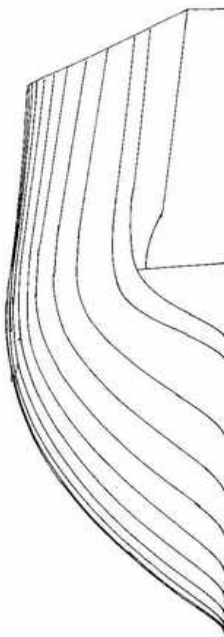

ÉGATE DU 2e RANG DE 50 BOUCHES A FEU.
L'Artémise, L'Andromède, La Néréide, La Cléopâtre, La Danaé, La Gloire et la Virginie.

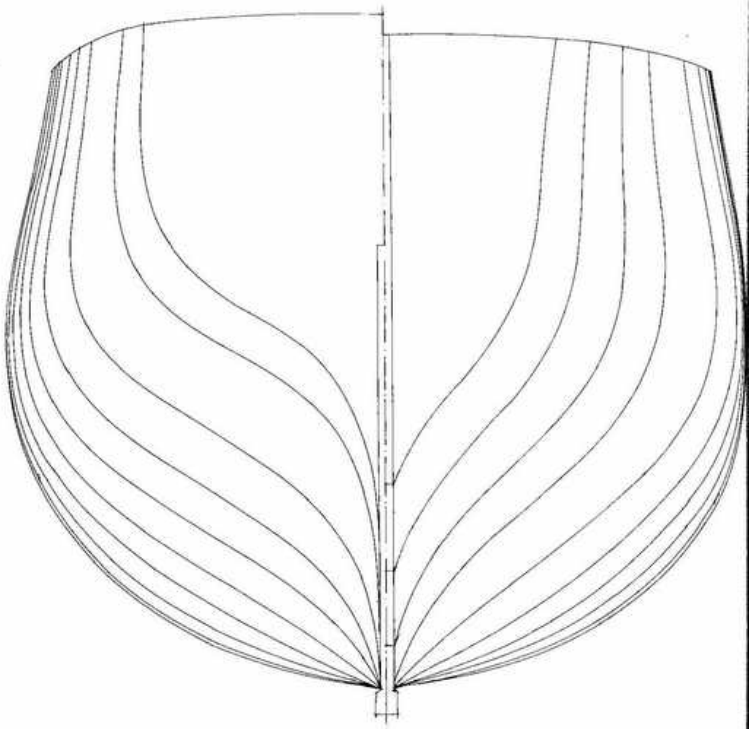
VARIOUS EXAMPLES OF BODY PLANS OF 24-pdr FRIGATES (scale 1:120)

The dimensions are given in metres. The length is taken on the gundeck from the inside of the rabbet.

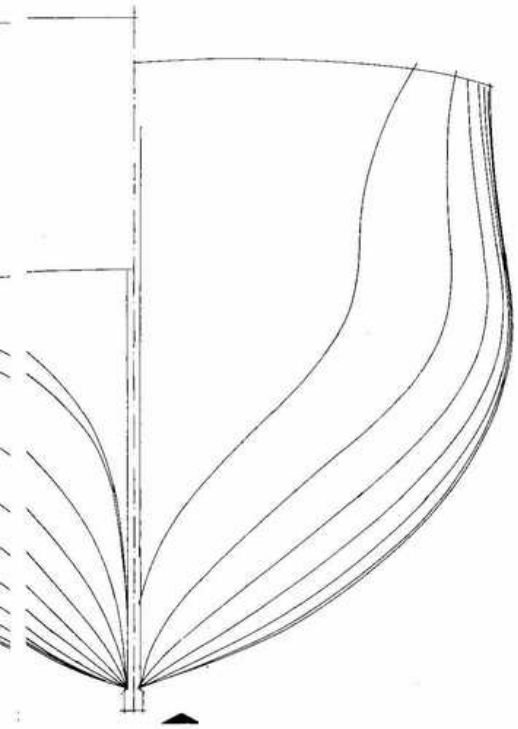


La Forte 1794. *François Caro*. The lines differ somewhat from the very classic shape of the Sané frigates, but are equally far removed from that of Forfait, used for the first time in 1793 for the *Seine*. Dimensions: length 51.26 m (from rabbet to rabbet at the horizontal line of the main-deck) – breadth 13.00 m – depth in hold 7.00.

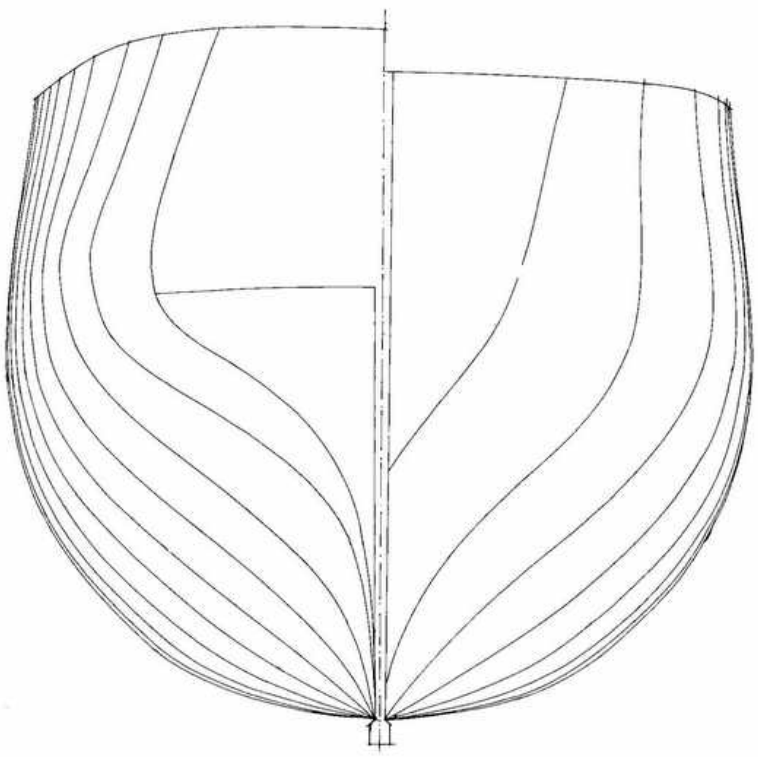




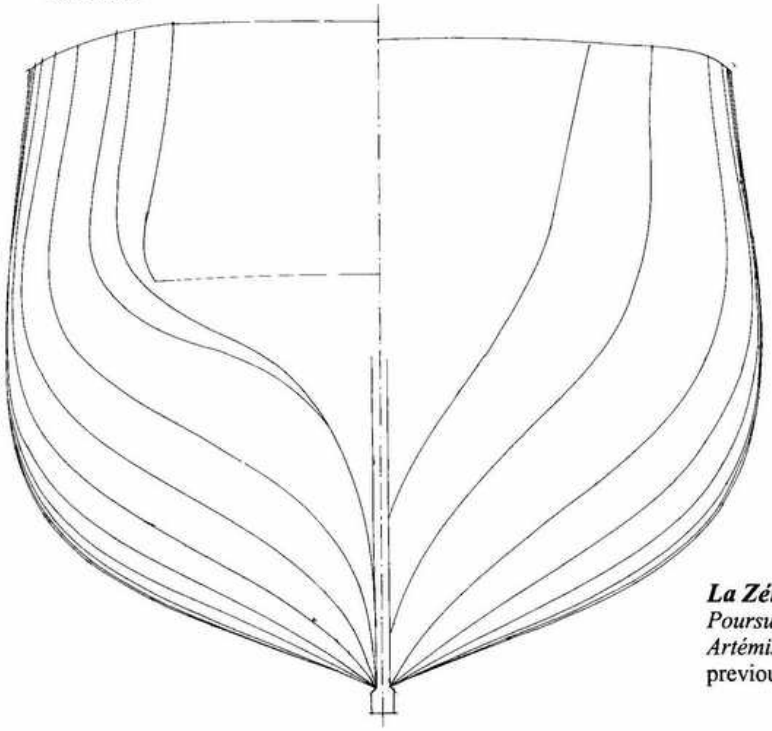
La Reine Blanche 1830. *Pierre Leroux*. The lines are based on those of the class design of the *Alceste* from the same designer. The draughts have the same dimensional characteristics as the *Artémise*, but the underwater lines differ in that they are less full and the upper works have a greater tumblehome.



La Vestale 1817. *Paul Filhon*. This is an example of one of the 1817 competition designs. The lines are not dissimilar to those of the *Forte*. The tumblehome has been reduced significantly, so that the sides are to all intents and purposes vertical in the upper works. Dimensions: length 51.96 m – breadth 13.15 m – depth in hold 7.04.



L'Artémise 1826. *Jean-Baptiste Hubert*. This is the class design from this shipwright. Note the fullness in the bottom and the almost circular shape of the midship bend, with a tumblehome which is significantly reduced. Dimensions: length 52.50 m – breadth 13.40 m – depth in hold 7.05.



La Zénobie 1828. *Louis Barallier*. Lines based on those of the *Poursuivante*. The upper works are similar to those of the *Artémise*. The underwater lines are finer than those of the two previous examples and are more like those of the *Vestale*.

SAILING QUALITIES OF 24-pdr FRIGATES

No Sailing Reports have survived for either the *Pourvoyeuse* or the *Consolante*; however, there is one for the *Égyptienne*, and it fully confirms the superior qualities of the two frigates designed by François Caro: *Responsiveness to the helm:* very responsive. *Carries her sail:* perfectly. *Pitching and rolling:* very gentle. *Speed of sailing:* close-hauled, superior; large and before the wind, superior. She holds a very slight weather helm, is never slack, and tacks and veers very well. Such a report is quite exceptional, one might almost say unique, but then perhaps her commander fell in love with his command during his commission to Corsica in 1801! No information has come down to us regarding the sailing qualities of the frigates designed by Pierre Degay.

As far as the 1817 competition frigates are concerned, we possess a report for Paul Filhon's *Vestale*. It appears that she answered her helm well and carried her sail likewise. Her pitching and rolling motions, while not being the best, were usually gentle. She was not a fast sailer, being very ordinary sailing large, mediocre close-hauled and poor with the wind astern. The *Vestale* tried well without straining, was quick in stays, and held neither a weather nor a slack helm. A note informs us that in a stiff gale she managed 8 knots sailing six points off the wind (1829-1832 commission).

There is another report for the *Amazone*, designed by Charles Simon. This frigate answered her helm well, and carried her sail perfectly. Her pitching motions were gentle although she tended to bury her head (sailing 8 knots in a fair sea she was taking water onto the forecastle). She rolled considerably, although slowly and gently. She steered well with a difference of draught fore and aft of 18 to 21 inches, holding neither a weather nor a slack helm. Her speed of sailing close-hauled was very ordinary in anything like a head sea. Sailing large at between two and six points off the wind she was fast, but very ordinary with the wind astern. She tried well, and was quick in stays (1821 commission).

Finally, there is a report on the *Cérès* (renamed the *Calypso* in 1830), by H. Garnier Saint-Maurice, drawn up after her commission of 1842-4: we learn that this vessel steered very well on all points of sailing, carried her sail well, despite a tendency to heel. Her pitching motions were very sweet even hove-to, and she rolled gently and slowly. Close-hauled she performed fairly well, with speeds which at times were remarkable, logging 10½ knots when sailing as close to the wind as possible under courses, topsails and topgallants, with no reefs. Sailing large, with the wind on the beam or the quarter, the *Cérès* performed very well, logging at times more than 13 knots with the wind one point abaft the beam, under courses, single-reefed topsails, and topgallants. With the wind astern, however, her performance was very mediocre. She tried well under a variety of storm canvas, neither griped nor was slack, steered very well, tacked and veered perfectly in all conditions.

The frigates of the 1822 programme are represented in particular by a report on the *Andromède* by Jean-Baptiste Hubert, this design being adopted for seven frigates of the 24-pdr class. The *Andromède* answered her helm very well under all circumstances, and carried her sail very well despite tending to heel rather easily once most of her stores were consumed. Her pitching motions were very gentle, and while she rolled considerably in a heavy sea, she came back gently without jerking. Close-hauled she easily sailed 9 to 9½ knots, and frequently reached 12 knots sailing large. With the wind on the quarter, under courses and single-reefed topsails, her best speed exceeded 13 knots. She also sailed well with the wind astern. She tried perfectly, tended to gripe with the wind on the starboard quarter but less so on the port quarter, was never slack, tacked very well but veered slowly, and generally tended to be slow in stays (1843 commission).

Another example of Hubert's designs is provided by the *Cléopâtre*. Her 1843 report indicates that she answered her helm and carried her sail well, but heeled easily five degrees in a stiff breeze after two months' stores had been consumed. She sailed well close-hauled, 8 to 9 knots in a fresh breeze and fair sea with topgallants spread; she was better still sailing large, logging 10 to 11 knots with single-reefed topsails; her best speed, 12½ to 13 knots, was reached with the wind abeam, while her performance before the wind was ordinary. She griped when sailing close-hauled in a stiff gale, needing one turn of weather helm and the driver taken in, but in lighter winds she steered well. She carried a lee helm in a head sea, but tacked well as soon as the wind freshened with no hesitation in stays and very little lee helm needed, so that she made to windward well; in light airs and a calm sea she was very sensitive to her helm, but always required great precision in order not to miss stays whenever there was a head sea. When making sail, with the yards braced well over, she could "turn on a sixpence".

Another frigate from the same 1822 programme was the *Alceste*, built to the draughts of Pierre Leroux. A report dating from 1854 (she was not launched until 1846), tells us something about this design: she steered very well in all conditions and in a heavy sea, and carried her sail well. Both pitching and rolling motions were very gentle. She was a fast sailer close-hauled in all winds and sea states, but seems to have been in her element as soon as she had to take a reef in her courses. Sailing large she performed very well. With the wind astern she responded like all fine-lined vessels, needing to be pushed. She tried well in all conditions. She consistently carried a weather helm, never being slack. She tacked and veered very well, but it was very rare for her to manage on less than twelve points on both tacks, which is the only reproach which could be made of her. In the opinion of the Commission, she was "an excellent vessel, carrying her sail well, with easy motions and a good speed on all points of sailing".

To conclude this section, here is the report on the *Poursuivante*, built to the designs of Louis Barallier. This frigate was launched in 1844, and her report dates from ten years later. She both steered and carried her sail very well. She pitched sharply with all sail on her foremast, but this was corrected by reducing sail and by trimming her more by the stern. Her rolling motions were gentle and of reasonable amplitude. Close-hauled she sailed satisfactorily under topsails and single-reefed topgallants, easily logging 7 knots and 9 to 10 in the best conditions. Her best point of sailing was large, reaching 11 to 12 knots under topgallants and single-reefed topsails; in a fair breeze allowing the studdingsails to be set she averaged 9 knots. She performed least well with the wind astern, but nevertheless reached 8 to 9 knots in a fresh gale, 10 knots with studdingsails set on both sides. She carried a neutral helm and tacked and veered perfectly.

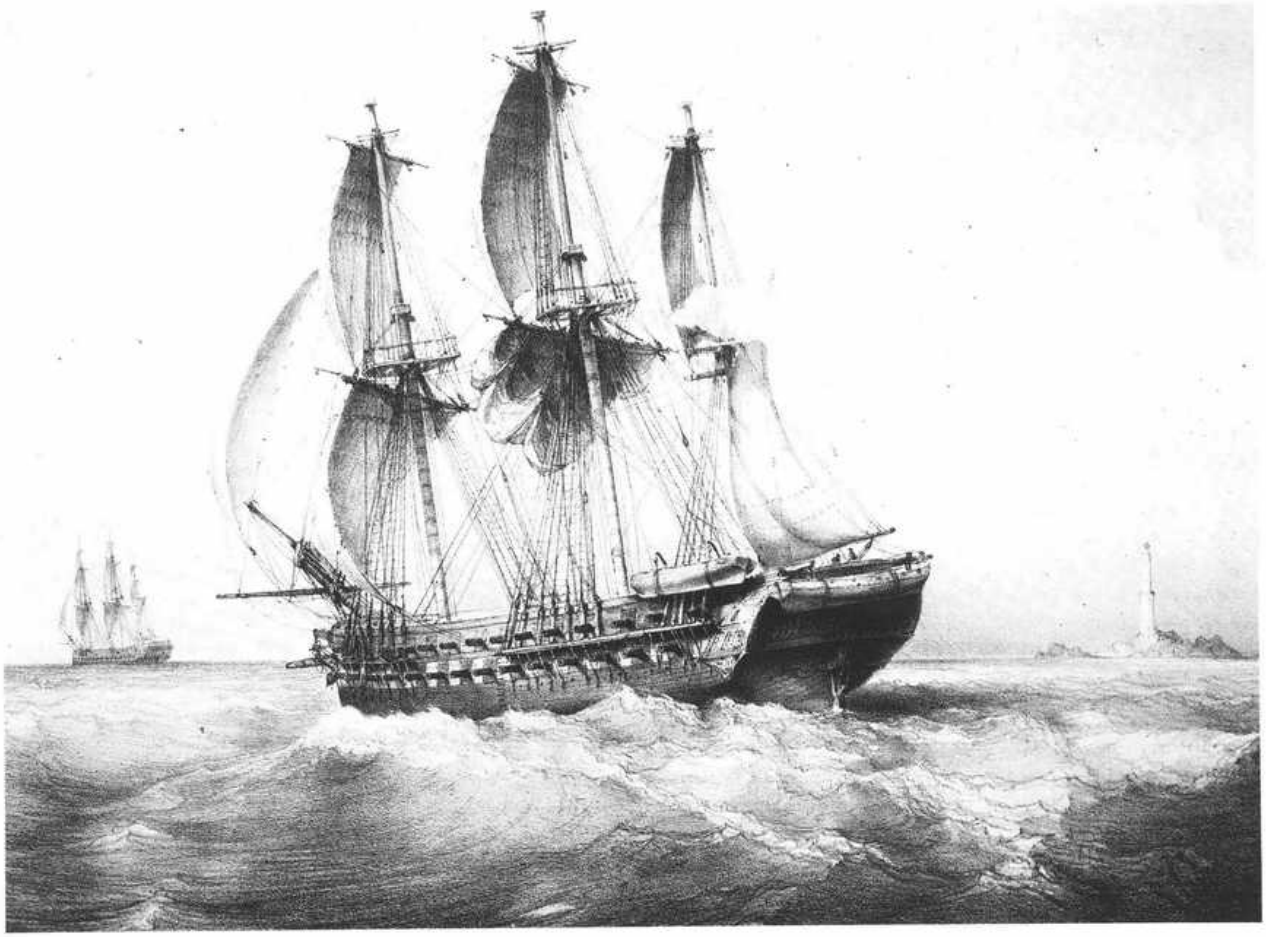
Reading these sailing reports, we may conclude that some of the 1817 frigates did not have the performance close-hauled of the *Forte* or the *Égyptienne*. The 1822 vessels, however, appear to have performed well close-hauled, even in a seaway. By this period the sailing reports are more detailed and complete, giving information on speeds, sea state, wind strength and sail carried, all details which are often missing from the 18th or early 19th century reports. It would seem that the frigates designed by Hubert and Leroux have perhaps a slight edge on those by Barallier. In short, the 24-pdr frigate can generally be regarded as successful, despite a few reservations in certain areas; we shall see in the next chapter that the same reservations might be expressed for the 30-pdr class.

List of 24-pdr frigates in the French Navy (1781-1813)

Laid down	Name	Builder	Place of building	Length	Breadth	Depth in hold	Upper deck	Fo'csle/ Q'deck	Total	Struck from lists	Notes
1772	***Pourvoyeuse***	Boux	Lorient	154'0"	38'0"	16'6"	26x 24	12x 8	38	1794	Dr. SHM
1772	***Consolante***	Boux	Lorient	154'0"	38'0"	16'6"	26x 24	12x 8	38	1784	
1793	***Résistance***	P. Degay	Nantes	150'0"	39'0"	19'10"	30x 24	29x 12	50	1797	Dr. NMM – rep. SHM
1794	***Vengeance***	P. Degay	Nantes	150'0"	39'0"	19'10"	30x 24	20x 12	50	1800	Captured
1794	***Forte***	F. Caro	Lorient	160'0"	40'0"	21'7"	30x 24	20x 8	50	1800	Captured – Dr. SHM – GM
1799	***Égyptienne***	F. Caro	Toulon	160'0"	40'0"	21'7"	30x 24	20x 8	50	1801	Captured – Dr. NMM – models MM
								1817			
1819	***Jeanne d'Arc***	C. Simon	Brest	160'0"	40'6"	21'6"	30x 24 l.p.	18x 36 carr. 2x 12 sh.p.	50	1833	Launched '33
								1819			
1819	***Clorinde***	L. Bretocq	Cherbourg	160'0"	40'6"	21'6"	30x 24 l.p.	26x 36 carr. 2x 12 sh.p.	58	1833	Launched '21
1820*	***Amazone***	C. Simon	Brest	160'0"	40'6"	21'6"	30x 24 l.p.	26x 36 carr.	58	1841	Launched '21
								1828			
1820*	***Vestale***	P. Filhon	Rochefort	160'0"	40'6"	21'6"	30x 24 l.p.	26x 24 carr. 2x 12 sh.p.	58	1834	Launched '21
1820	***Vénus***	P. Filhon	Lorient	160'0"	40'6"	21'6"			58	1846	Launched '22
								1837			
1820*	***Cérès***	H. Garnier St-Maurice	Toulon	160'0"	40'6"	21'6"	30x 24 l.p.	20x 24 carr. 2x 18 l.p.	52	1856	Launched '23 *Marie-Thérèse* '23 – *Calypso* '30
1821	***Atalante***	P. Filhon	Lorient	51.97	13.16	7.05			58	1850	Launched '25
								1824			
1826	***Artémise***	J.-B. Hubert	Lorient	52.80	13.40	7.05	28x 24 l.p.	22x 24 carr. 2x 18 l.p.	52	1887	Class design – launched '28
1827*	***Andromède***	J.-B. Hubert	Lorient	52.80	13.40	7.05			52	1887	Launched '33
1827	***Gloire***	J.-B. Hubert	Rochefort	52.80	13.40	7.05			52	1847	Launched '37 – lost
1827	***Poursuivante***	L. Barallier	Toulon	52.50	13.40	7.05			52	1865	Class design – launched '44
1827	***Virginie***	J.-B. Hubert	Rochefort	52.80	13.40	7.05			52	1881	Ren. *Niobé* '39 – launched '42
								1837			
1827	***Cléopâtre***	J.-B. Hubert	St-Servan	52.80	13.40	7.05	28x 30 sh.p.	18x 30 carr. 4x 30 shell	50	1869	Launched '38
1827	***Danäé***	J.-B. Hubert	St-Servan	52.80	13.40	7.05			50	1878	Launched '38 – steam aux. '56
1828	***Néréïde***	J.-B. Hubert	Lorient	52.80	13.40	7.05			50	1887	Launched '36
1828	***Némésis***	J.-B. Perroy	Brest	52.00	13.40	7.11			50	1866	Launched '47
1828	***Zénobie***	L. Barallier	Toulon	52.50	13.40	7.05			50	1868	Launched '47
1828*	***Alceste***	P. Leroux	Cherbourg	52.46	13.40	7.05			50	1886	Class design – launched '46
								1848			
1829	***Pandore***	J.-B. Perroy	Brest	52.00	13.40	7.05	24x 30 sh.p. 4x 80 n° 2 shell	18x 30 carr. 4x 30 shell	50	1893	Launched '46 – steam aux. '56
1829	***Sibylle***	L. Barallier	Toulon	52.50	13.40	7.05			50	1883	Launched '47
1830	***Reine Blanche***	P. Leroux	Cherbourg	52.46	13.40	7.05			50	1859	Launched '37
1837	***Clorinde***	J.-B. Perroy	Brest	52.00	13.40	7.05			50	1838	Cancelled
1843	***Bellone***	A. Chédeville	Cherbourg	52.00	14.07	7.19			50	1895	Launched '53 – steam aux. '56

Dimensions in [French] feet and inches up until 1820, thereafter metric. Length taken from rabbet to rabbet on the gundeck. The mentions *l.p.* and *sh.p.* refer to short-pattern and long-pattern guns.

- The two frigates designed by Boux are shown in this table, despite the fact that they were rated as storeships and their main-deck armament was reduced in calibre to 18-pdrs.
- Four frigates by P.-A. Forfait (*Seine, Révolutionnaire, Spartiate, Indienne*) were originally intended to be armed with 24-pdrs, but in the event were armed with 18-pdrs.
- Not shown in the table are five "frigate-sloops" armed with twenty 24-pdrs and a 12-inch sea mortar; these vessels (*Romaine, Libre, Incorruptible, Revanche, Comète*), were designed by Forfait. They are covered in detail in J. Boudriot: *Corvette La Créole*, Paris, 1990, pp. 31-2. Available only in French at the time of going to press, but an English translation will be available in due course from Jean Boudriot Publications. A further "frigate-sloop", the *Poursuivante*, was also armed with 24-pdrs, but no details have been found as to her dimensions. All these vessels were built between 1793 and 1795 at Le Havre and Dieppe.
- The armament of the 1817 frigates is as envisaged by the programme. However, changes were made in 1819, 1828 and 1837.
- There were originally supposed to be two more 1817-type frigates, in addition to the eight listed above: the *Melpomène*, laid down at Cherbourg, and the *Didon* at Toulon. Laid down in 1822, their building was stopped in 1823; they were re-started in 1825, but modified as frigates of the first rank (see the next chapter).
- Nine other frigates of the 2nd rank were also built, but they were all altered on the stocks and launched as steam auxiliaries. Since these changes were made before they were launched, I will merely list their names: *Amazone, Astrée, Magicienne, Thémis, Dryade, Circé, Hermione, Junon, Flore*. They were all laid down in 1846-7 and completed between 1861 and 1869, the modifications for steam being undertaken in 1858.
- The dates indicating when many of the frigates were struck from the lists suggest an exceptional longevity, but this is misleading, since most of them finished their careers as service vessels such as floating storehouses, prison hulks, etc.



Frigate of the 2nd rank. This is a somewhat curious representation by F. Perrot of a frigate of this type: the absence of topgallant-masts give her a rather strange aspect, and the short masts have an ugly appearance. As a rule, *stump topgallants* were rigged in anticipation of foul weather, often using the spars from the boats, for æsthetic reasons, and also to allow pendants to be flown. They were certainly more attractive to look at. The artist is however conscientious, and while his pen does not have the talent of Morel-Fatio, he nevertheless brings an interesting view and a number of details which have been carefully observed, such as the sheet anchor in the fore-channels, the half-lids over the gunports of both tiers of guns, the stowage of the boats, the leathering of the deadeye laniards, and so on.

Chapter X
THIRTY-POUNDER FRIGATES

30-Pdr FRIGATES

Let us start by saying that the 30-pdr calibre was a new one, adopted by the French Navy in 1820. It was added to the long-established series of calibres which went back to the first decades of the 17th century. It is the use of this calibre which distinguishes the so-called frigates of the 1st rank from the post-1822 24-pdr frigates which we examined in the previous chapter.

In 1821, the Director of Naval Construction, Jean-Margueritte Tupinier, took advantage of the rebuilding of a "large" 74-gun ship[1], the *Romulus*, to obtain permission for her to be cut down by a deck and converted to a *rasée*, a powerful frigate armed with twenty-eight 36-pdrs on her main-deck and thirty carronades of the same calibre on the upper deck. This frigate, thus armed with 58 guns, was renamed the *Guerrière*. This was not a new idea: in 1794, five 74s were cut down because they were unstable, but they then became so stiff that they proved to be unserviceable[2]. According to Tupinier, this was due to the fact that the original load waterline was kept to all intents and purposes unchanged. However, for the *Guerrière* ex-*Romulus* the height of gundeck sill was raised from 1.73 m to 2.10 m; this significant difference reduced the displacement by 260 tons. The sail area (courses, and topsails) was increased from 1,962 m^2 to 2,158 m^2, this being made possible by the increase in stability and greater height of gundeck sill. The crew totalled 500 men, with victuals for 10 months and water for 4.

According to Tupinier, thanks to the reduction in displacement and in the immersed area of the midship bend (–5.20 m^2), and to the increase in sail area, the modified *Romulus* became an excellent frigate, "remarkable for her sea-going qualities". With this experience behind him, Tupinier proposed that all 74s requiring a rebuild should be converted into frigates of the 1st Rank. Four "large" 74s were thus converted. However disguised, the exercise was, however, no more than "making a silk purse out of a sow's ear": the principal merit of the cut-down vessels[3] consisted in the fact that they allowed Tupinier to develop his ideas for the future frigates of the 1st rank.

We have already spoken of the introduction, in 1820, of the new calibre of guns of 30 pounds weight of ball[4]. The patterns for two versions, a long and a short, were established in 1821, followed later the same year by a carronade of the same calibre. Production started in 1822. It is this calibre which is the essential characteristic of the frigates of the 1st rank.

In an Appendix to the work from which we have already quoted, Tupinier gives a table of the principal dimensions of the future ships and frigates of the French Navy. For the latter, he proposes two "ranks" each armed with 60 guns. In the first case the main-deck is to be armed with thirty 30-pdrs, and in the second, with the same number of 24-pdrs; the secondary armament of the upper deck was to consist of carronades of the same calibre as the main armament. However, as we saw in the previous chapter, the plans which were finally adopted differed somewhat from these proposals, as far as the 24-pdr vessels were concerned; but the 30-pdr frigates remained faithful to Tupinier's proposal, both in their dimensions and in their armament.

For the sake of completeness, I should add that the same table provided for a third rank of frigates of 50 guns. These were the old 18-pdr vessels, which were to have their entire armament replaced by fifty 30-pdr carronades; this proposal was in fact never taken up.

The first draughts for the new frigates of the 1st Rank were drawn up by Pierre Leroux in 1822, and these were used for five vessels laid down between 1822 and 1826. In 1823, another design by Mathurin Boucher[6] was prepared, serving as the class design for eight frigates laid down between 1823 and 1829. In that year he prepared a new class design to which two vessels were built. Finally, two other frigates were built, one to the draughts of Louis Barallier[6], the other to draughts prepared by Charles Simon[6]. In total, therefore, 17 frigates were built, most of them to the draughts of two designers. In addition to these there were two more vessels which were converted to steam auxiliaries while still on the stocks, which we have not counted, and two more which were laid down but subsequently cancelled in 1831, prior to completion. Finally, there were six more vessels planned in 1847, but of these, two were converted to steam while on the stocks and the remainder were cancelled. If we ignore the frigates converted to steam prior to launch, we find that the seventeen vessels were laid down between 1822 and 1829, but that their launch was spread out between 1825 and 1848[7].

The table opposite shows the great similarities between the characteristics of the first class design prepared by Leroux and those as proposed by Baron Tupinier and based on the formula of the cut-down 74, of which he was an ardent proponent, with its 36-pdrs replaced by 30-pdrs.

In February 1831 a competition was opened for the design of a round stern[8] for both ships and frigates, an innovation which had already been adopted for the frigates which were then building. While on the subject of innovation, we should mention also the competition held in 1820[8] to discover a means of reducing the consumption of timber of large scantling in shipbuilding, and likewise the new Regulations of 1825, 1826 and 1838 concerning the internal arrangements of ships and frigates.

The last date which we should retain is 1837, which marked the introduction of the Paixhans shell gun, limited initially to two 80-pdrs on the main-deck and four 30-pdrs on the quarterdeck, which replaced the same number of long guns in the previous Establishment for guns.

These new arrangements were to affect the design of French frigates, both of the 24-pdr[9] and the 30-pdr class, as did all the other technological advances of the period 1820 to 1840: chain-cables, fresh-water tanks, galley fire, ovens of cast iron burning coal, etc.

To conclude this presentation of the 30-pdr frigate, I will devote a few lines to the so-called 40-gun frigates or frigates of the 3rd Rank. For some strange reason the old 18-pdr calibre had been retained, but it was intended to be replaced directly by the new 30-pdr calibre, which justifies the inclusion of the class of small frigates in this chapter.

Of dimensions slightly greater than the old 18-pdr class, they were nevertheless only pierced for thirteen guns each side on the main-deck. The first vessels were not laid down until 1830, and they were launched between 1839 and 1851; they would be armed in accordance with the 1837 Regulations, with twenty-two short-pattern 30-pdrs and four 30-pdr shell guns. On the upper deck, which by now was a complete gundeck on all three ranks of frigates, the armament was limited to fourteen carronades, also 30-pdrs.

Ten frigates of the 3rd Rank were built, to the draughts of three designers. Four more were converted to steam while still on the stocks, and a further seven were cancelled.

The 1837 Regulations, which laid down the characteristics of the French Navy of the so-called July Monarchy, envisaged a harmonious classification with ships rated at 120, 100, 90 and 80 guns, and frigates of 60, 50 and 40 guns, followed by sloops of war armed with 30 guns. The armament was composed essentially of

Frigates of the 1st Rank

	Tupinier's Proposals (1822) Armament	Leroux' Class Design (1822) Armament
	30x 30-pdrs long-pattern 30x 30-pdr carronades	30x 30-pdrs long-pattern 30x 30-pdr carronades 4x 18-pdrs
	Principal Dimensions	**Principal Dimensions**
Length on the waterline	54.00 m	54.40 m
Breadth at the midship bend	14.10	14.10
Depth of the hull amidships	5.76	5.89
Height of gundeck sill ditto	2.00	2.00
Depth in hold ditto	6.98	7.05
Total draught ditto	6.32	6.04
Displacement	2,500 t	2,557 t
Victuals for 10 months		
Water for 4 months		

long- and short-pattern 30-pdrs, supplemented by shell guns and carronades of the same calibre. The frigates of the 1st Rank used 80-pdr shell guns, with four on the main-deck (the same as for ships of the line), so that their use can best be described as limited. There was in this provision a real attempt at homogeneity of armament, with the frigates of the 2nd Rank, from 1837 onwards, being armed with short-pattern 30-pdrs on the main-deck and carronades and shell guns of the same calibre on the upper deck. In some respects the 30-pdr frigate in this form can be seen as the ultimate development of the type, since henceforward *the frigate was to be armed with guns of the same calibre as ships of the line*. However, all the navies of the period were under deferred sentence, ever since the somewhat reticent adoption of the Paixhans shell-gun, which was capable of causing such horrific damage that the ships of the wooden navy were virtually condemned. But the absence of maritime wars enabled them to survive for a few decades more, and the frigate marked their final and most beautiful apogee.

1. An alternative draught for a 74-gun ship drawing less water had been specially prepared, for the benefit of ships building in the Dockyards of Antwerp, Genoa, and Venice. The displacement of these "small" 74s was 2,781 tons instead of 3,010, the height of gundeck sill remaining unchanged at 5 feet 3 inches. The length, breadth and depth in hold were all reduced, resulting in a draught forward of 19 feet instead of 19 feet 9 inches, and a draught aft of 20 feet 8 inches instead of 22 feet 5 inches.

2. See J. Boudriot: *Constructeurs et Constructions Navales à Rochefort, Neptunia*, vol. 157-1 (March 1985), in which I reproduced the report of the Inspector General of Shipbuilding (J.-N. Sané) on the *razées* of 1794.
While on the subject of cut-down ships, it is worth mentioning that in 1794-5 the Royal Navy had three 64s (*Anson, Magnanime, Indefatigable*), cut down to powerful frigates, the latter being particularly successful under the command of Sir Edward Pellew. Later, in 1813, an old *Arrogant*-class 74, the *Saturn*, was cut down to a 58-gun frigate armed with 24-pdrs. [Trans.]
3. As early as 1820, Sir Robert Seppings (Surveyor of the Navy) had introduced in the Royal Navy a form of round stern which offered considerable advantages "both militarily and in terms of strength".
4. According to contemporary tables, the long-pattern 30-pdr weighed 6,200 French pounds (3,032 kgs), and the short-pattern 5,318 pounds (2,600 kgs). A 1786 pattern 36-pdr weighed 7,174 pounds (3,508 kgs). The 30-pdr carronade weighed 2,066 pounds (1,010 kgs), and the modified 36-pdr 2,341 pounds (1,144 kgs).
In 1747 Toulon Dockyard had already proposed the adoption of a 30-pdr gun in place of the 36-pdr, but the plan was not followed up. The French 30-pdr was roughly equivalent to the English 32-pdr in terms of weight of ball, the 32-pdr being effectively the largest calibre in use in the Royal Navy, despite the retention of the 42-pdr (the old cannon of 7) in some First Rates as late as 1807, and indeed its sporadic use as a naval weapon right up until the Crimean War.
5. Pierre Leroux (1786-1853). Graduated from the École Polytechnique in 1808, *élève* shipwright 1810, *sous-ingénieur* 2nd class 1811, 1st class 1818, *ingénieur* 3rd class 1826, 2nd class 1830, 1st class 1834, *directeur des constructions* 2nd class 1842, 1st class 1846, *Inspecteur Général du Génie Maritime* 1850. Leroux was Sané's son-in-law.
6. Mathurin Boucher (1778-1851), retired 1850
Louis Barallier (1780-1855), retired 1843
Charles Simon (1776- ?), retired 1840.
7. See Chapter XII.
8. One frigate, the *Entreprenante*, was not in fact launched until 1858!
9. The former 24-pdr vessels were not originally intended to carry any shell-guns on the main-deck. However, in 1848 the decision was taken to replace four of the 30-pdr long guns with the same number of 80-pdr (22-cm) shell-guns.

30-pdr FRIGATES **Names & Designers**	Length on the waterline	Breadth	Depth in hold	Draught	Height of gundeck sill	Displacement	Block coefficient	Distance of c. of g. forward of mid-point of length	Distance below waterline	Distance of metacentre from c. of g. of underwater hull
Dryade 1822 P. Leroux	54.11	14.50	7.05	5.89	2.00	2,557	0.539	0.95	2.23	4.06
Surveillante 1823 M. Boucher	54.00	14.50	7.00	5.94	2.00	2,501	0.568		2.03	3.82
Uranie 1826 L. Barallier	54.11	14.52	7.10	6.02	2.00	2,707	0.591	0.98	2.26	4.14

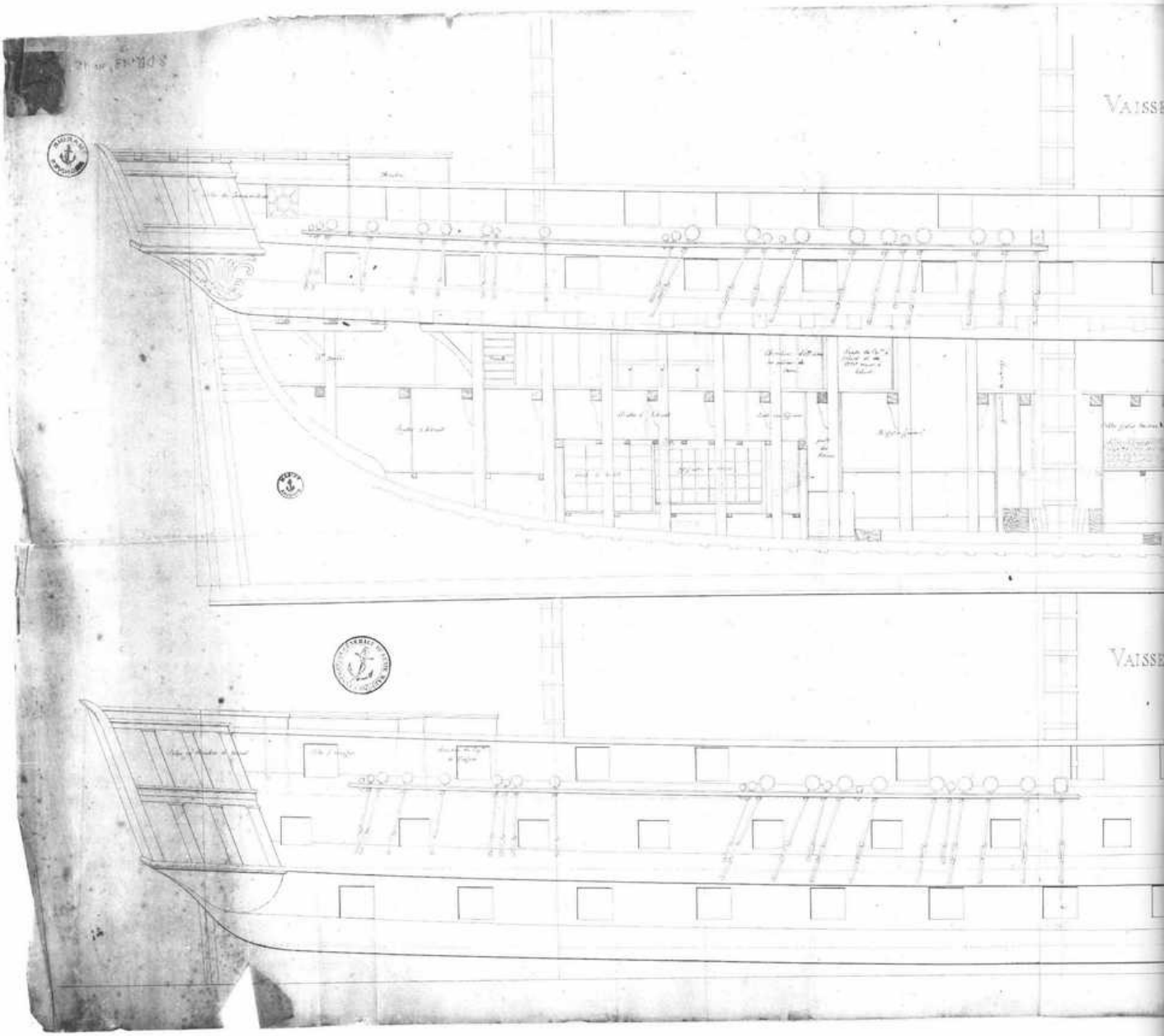
Length on the waterline from rabbet to rabbet, to outside of plank.
Breadth to outside of plank at the height of breadth.
Metric dimensions. Displacement in metric tonnes.
The designs are less uniform than for the frigates of the 2nd Rank. Although the three principal dimensions are almost identical, the draughts and displacements vary. Note in particular the Barallier design where the block coefficient is significantly larger than for Leroux' design, while the displacement is 8% greater than for Boucher's design.

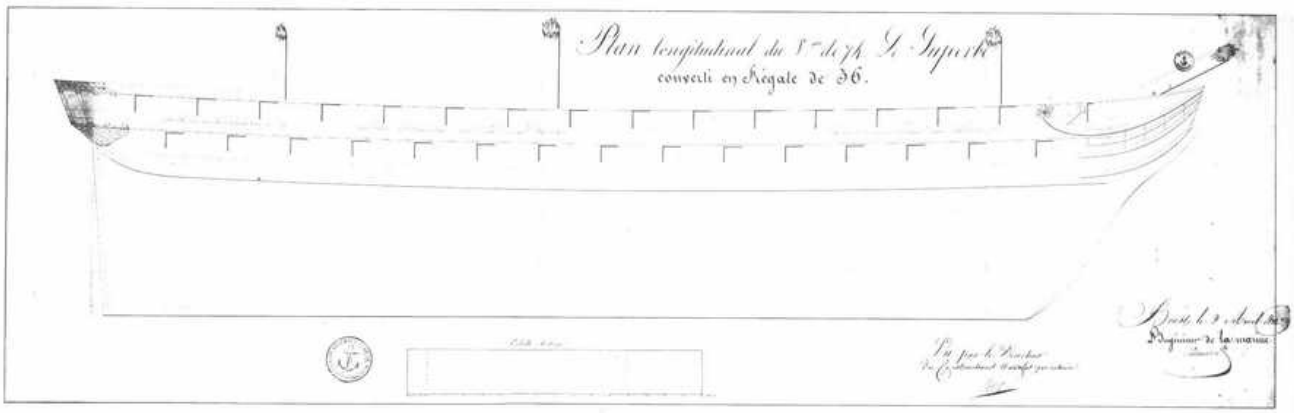
RASÉE 74-GUN SHIP

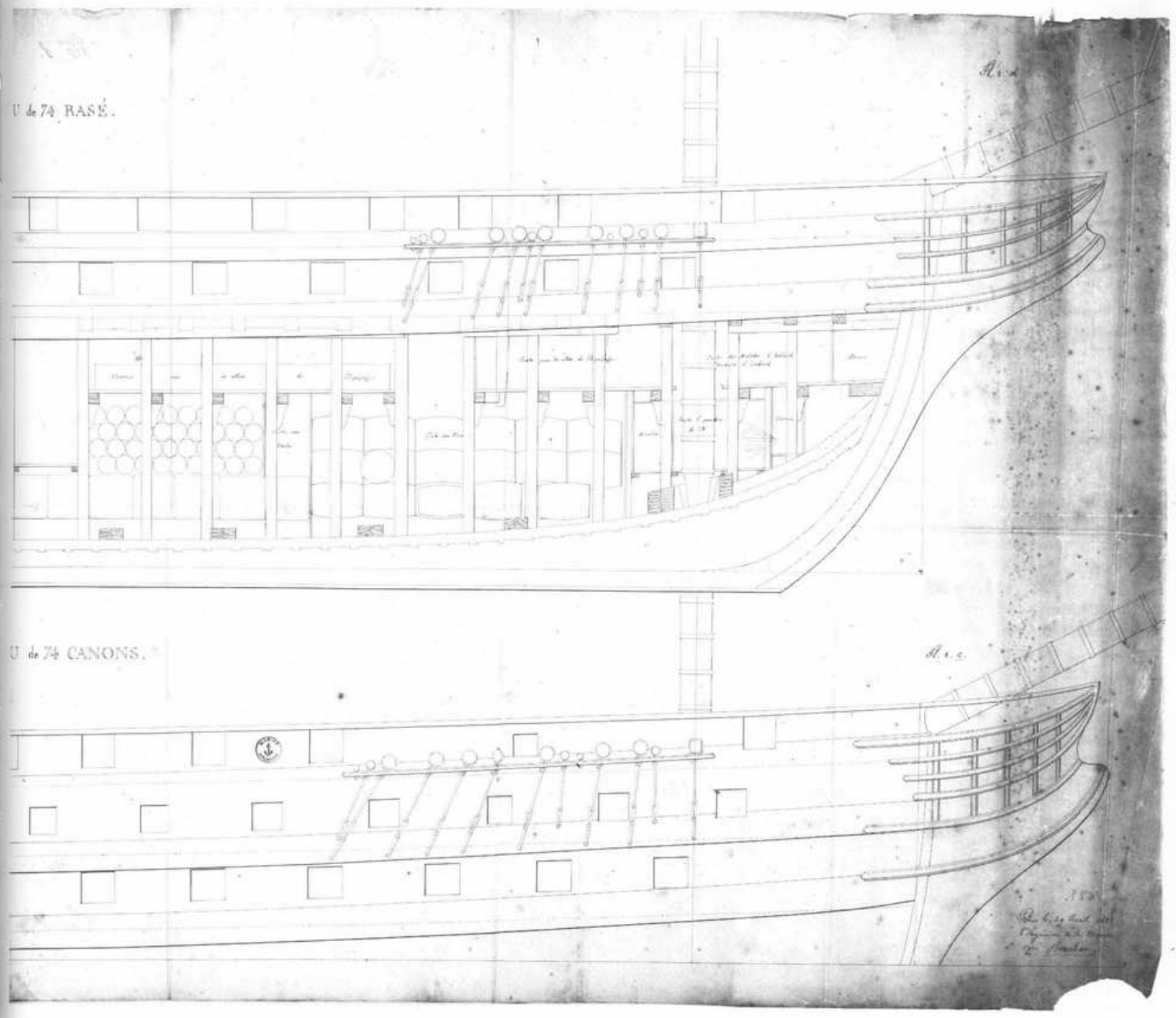
This document, of which unfortunately the reproduction is at best mediocre, is preserved at the *Service Historique de la Marine* (Ref. 8 DD[1] 13 N° 15). In the lower part of the draught can be seen the sheer plan of a 74-gun ship, fitted out in accordance with normal practice under the Restoration. The gundeck is armed with twenty-eight 36-pdrs, with thirty long-pattern 18-pdrs on the upper deck and a secondary armament composed of twenty-two 36-pdr carronades, the large number explained by the disappearance of the gangways so that the quarterdeck and forecastle are joined to form one continuous extra deck. In addition to the carronade ports, there appears also to be a port for one long gun, evidently an 8-pdr. It should be noted that this arrangement conforms neither to the 1807 Establishment, nor to that of 1819*.

The upper part of the draught shows the same vessel cut down by a deck and with changes made in the waist of what was previously the upper deck, no changes having been made to the gundeck. The new arrangement of gunports allows the vessel to carry thirty 36-pdr carronades. In this guise, she becomes a frigate of the 1st Rank and 58 guns, all of 36-pdr calibre. Note that the quarter-galleries now only have a single stool, aligned with the poop. The channels have been raised to the height of the quarterdeck and forecastle, and the head has also been altered.
For the internal arrangements, I would refer you to Chapter XII.

*A ministerial decision dated July 1819 proposed that the armament of 74-gun ships should be increased to 94 guns (28 36-pdrs, 32 24-pdrs, 36 36-pdr carronades)! However, reason prevailed in 1828, when the armament was reduced to 28 36-pdrs, 30 18-pdrs, and a secondary armament composed of 20 36-pdr carronades and 4 18-pdr long guns.




Plan longitudinal du 3e de 74 L. Inspecte
converti en Frégate de 36.


U de 74 RASÉ.
U de 74 CANONS.

LA DIDON

The *Didon* was laid down at Toulon in 1825, to the class design of the *Dryade* by Leroux. Contrary to usual practice of the period, she remained a relatively short time on the stocks, being launched in 1828. An innovative feature for the French Navy was the incorporation of a round stern, copied from British practice, and the subject of a design competition in France in 1831.

This form of stern construction made it possible to continue the line of gunports unbroken from stem to sternpost, so that there are seventeen in all, plus a bowchase port; of these, only fifteen are armed, and the two aftermost ports on either side at the stern are armed only when required by shifting guns from the main battery. Thus the "blind" sector which was such a weakness on the quarter of square-sterned ships was almost entirely removed whenever danger threatened, and the risk of raking fire greatly reduced through the strengthening of the stern structures.

The overall lines are characterised by the very limited sheer, which follows that of the decks, and the length is exaggerated by the round stern and the disappearance of the external quarter-galleries; furthermore, the head rails are berthed up*. This makes it possible to extend the wales and the black strake, which are painted black for the full length of the vessel. The carved-work is limited to a strict minimum; the full-length figure has been replaced, in accordance with new Regulations introduced in the 1820s, by a simple bust; aft, an iron balustrade and a few discreet figures form the sole decoration of the round stern.

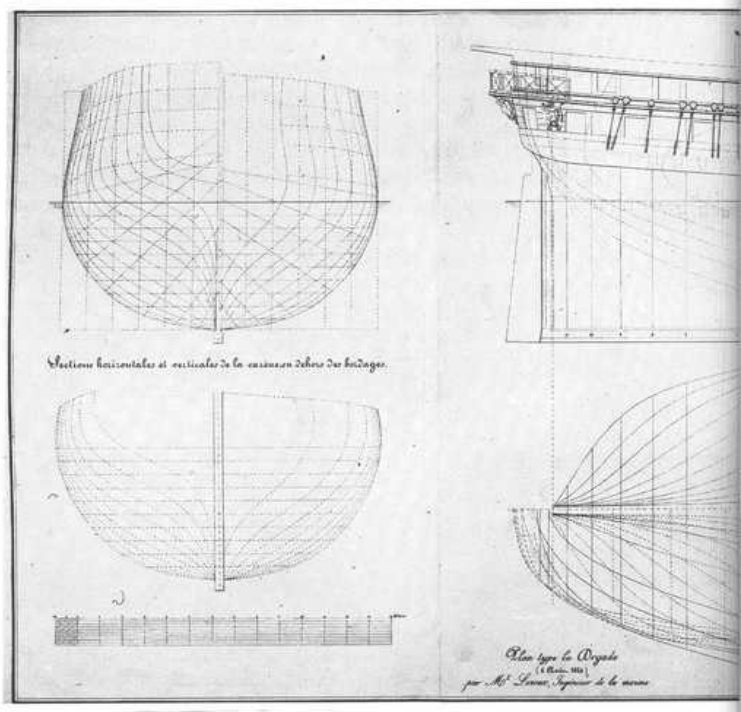
A number of irregularly spaced gunports, fifteen in all, are opened in the bulwarks. They form a continuous tier of guns, as we have seen for the frigates of the 2nd rank. The linking of the quarterdeck and forecastle thus constitutes a true upper deck, albeit exposed to enemy fire except at the bow and the stern, where there are small deck structures (see the pages devoted to the internal arrangements in Chapter XII).

All fifteen of the "upper deck" ports are armed. Originally the main-deck was armed with thirty long-pattern 30-pdrs, with secondary armament of twenty-six 30-pdr carronades and four long-pattern 18-pdrs, but in 1837 there was a timid attempt to introduce the Paixhans shell-gun, with two N° 1 pattern 80-pdrs on the main-deck and four 30-pdrs on the spar-deck, taking the place of the same number of long guns (see the *Uranie*). In 1848, a ministerial order increased to four the number of shell-guns on the main-deck.

The body plan gives a clear view of the "style" of Pierre Leroux, recognisable in other vessels by the same designer: the midship bend is almost semi-circular below the waterline, with no inflexion at the keel, the lines are relatively full at the bow and the stern at the waterline, and the upper works are almost vertical, with scarcely any tumblehome; the latter feature is however common to all the new designs of this period. The upper works are thus rather square, and by the same token unæsthetic, and they are described by some observers as being "box-like"; this feature is even more marked in ships of the line, because of the considerable elevation of their upper works.

In the next column is a transcription of the texts to be found in the margins of the Plate taken from the *Atlas du Génie Maritime*, which is largely illegible in this reproduction.

*The disadvantage of this cladding is that it gives greater purchase to breaking seas than the earlier open rails, despite the slope given to the boards.



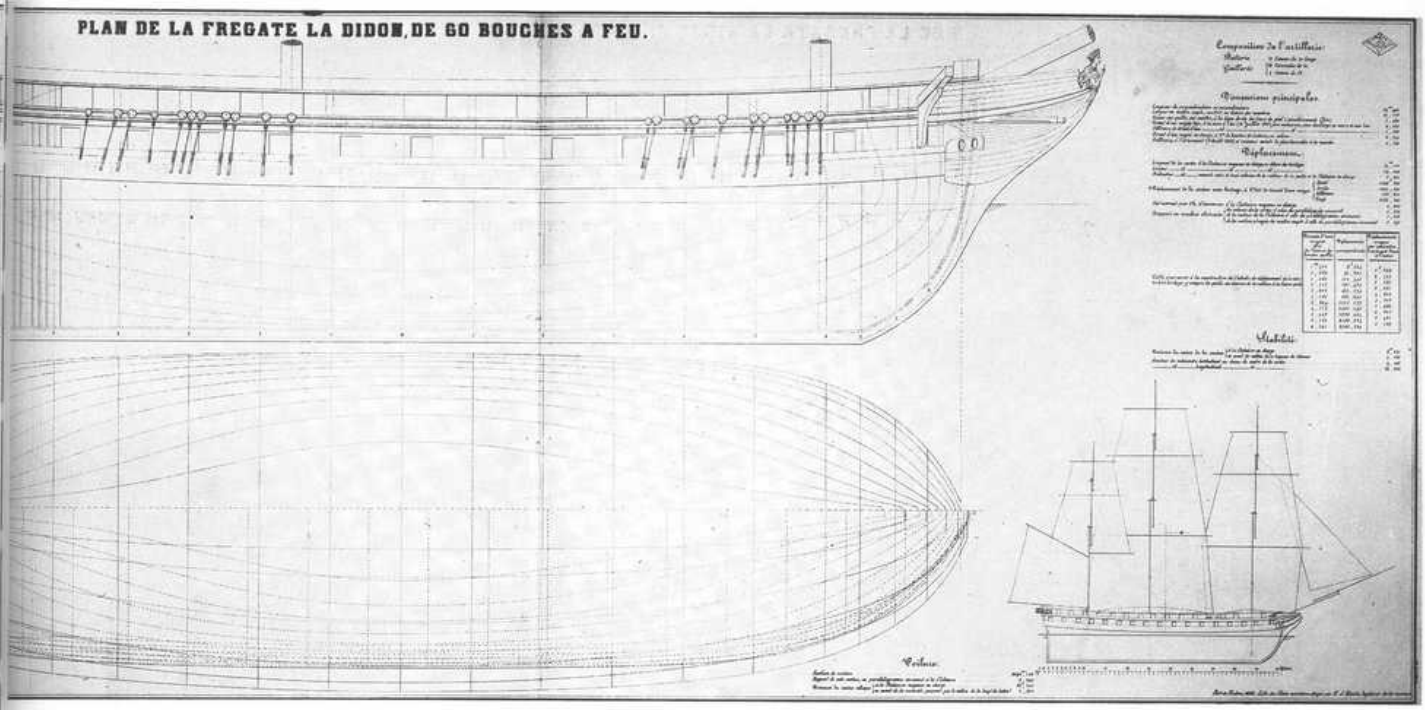
Principal Dimensions:

Length from rabbet to rabbet on the main-deck	54.400 m
Breadth at the midship bend to inside of plank	14.100 m
Depth in hold amidships, to the horizontal line of beam of the deck	7.050 m
Draught of water laden at 2.00 m height of gundeck sill amidships	6.340 m
Difference in draught fore and aft	0.76 m

Displacement

Length on the average load waterline to outside of plank		54.110 m
Breadth ditto		14.500 m
Depth from under side of rabbet of the keel to load waterline		5.890 m
Displacement of planked hull at 6.34 m average draught	Forward	1,356 t. 781 kgs
	Aft	1,200 t. 580 kgs
	Difference	156 t. 200 kgs
	Total	2,557 t. 360 kgs
Displacement for 1 cm immersion at the load waterline		6 t. 890 kgs

Ratios:	Block coefficient (volume)	0.539
	Block coefficient (area)	0.856
	Immersed area of midship bend to parallelogram circumscribed	0.769

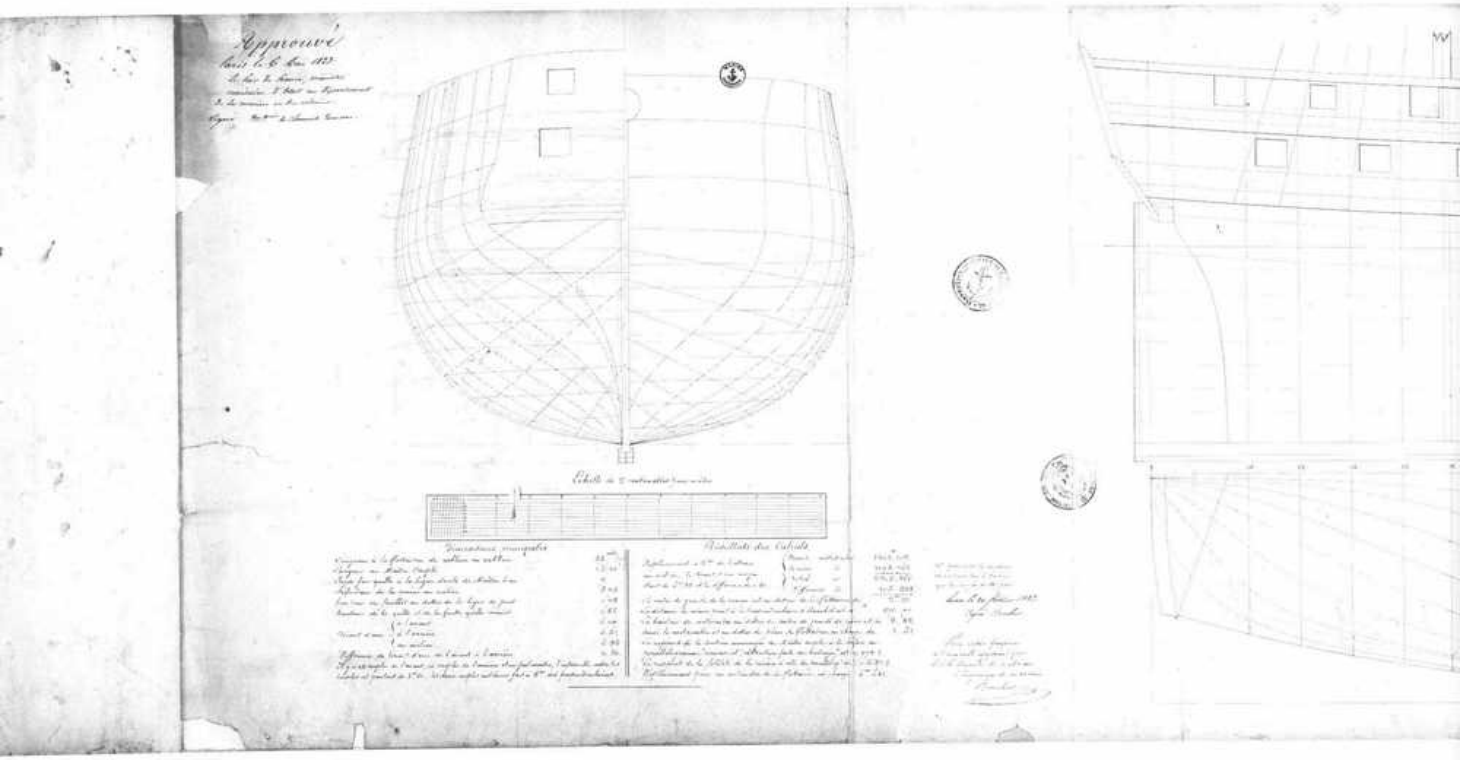


Stability

Distance from centre of underwater hull	to the load waterline	2.231 m
	forward of a vertical line passing through the middle of the load waterline	0.952 m
Height of lateral metacentre above centre of hull		4.062 m
Height of longitudinal metacentre above centre of hull		52.936 m

Armament

Main-deck	30x long-pattern 30-pdrs
Spar-deck	26x 30-pdr carronades
	4x long-pattern 18-pdrs.



LA SURVEILLANTE

This draught, by Mathurin Boucher, was used as a class design for ten or so frigates. It does not, however, appear in the collection of lithograph draughts of the *Génie Maritime*, and the document reproduced here is preserved at the *Service Historique de la Marine* at Vincennes (ref. 8 DD[1]7 nº 25-26).
Boucher's frigate is very similar to Leroux' design (cf. *Dryade*). The principal difference is that the stern is square instead of being round, resulting in a different arrangement of the gunports. The decoration of the head is also different, but this is a minor point. Only a detailed examination of the hull volumes would reveal the differences between the two class designs, and a similar analysis might be done with those of Louis Barallier and Charles Simon, although it should be remembered that the two latter draughts were only in fact used for one vessel each. This is the text which appears on the draught.

Principal Dimensions:

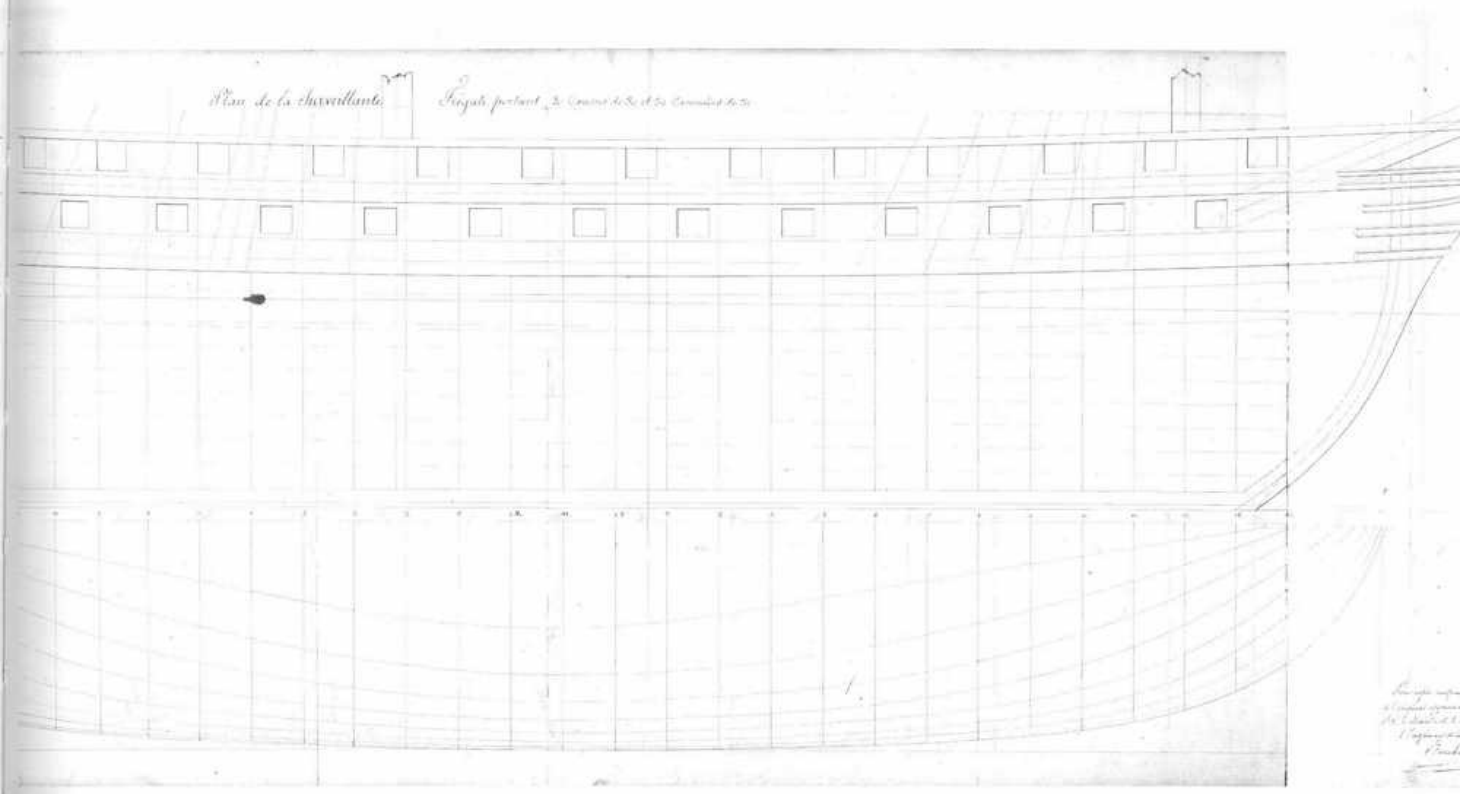
Length from rabbet to rabbet at the waterline		54.400 m
Breadth at the midship bend to inside of plank		14.100 m
Depth in hold amidships, to the horizontal line of beam of the deck		7.000 m
Draught	forward	6.090 m
	aft	6.590 m
	amidships	6.340 m
Difference in draught fore and aft		0.50 m

There are fourteen bends in the fore-body, plus a midship bend; the space between each bend is 1.60 m and the foremost and aftermost bends are 3.00 m from the perpendiculars of stem and post.

Calculations

Displacement with 2.00 height	forward (m^3)	1,304.102
of gundeck sill amidships	aft	1,198.764
at average draught 6.315 m	total	2,502.866
and trimmed 0.50 by the stern	difference	105.338
The centre of gravity of the underwater hull is below the load waterline by		2.210 m
The distance from the same point to the perpendicular of the sternpost		27.720 m
The height of the metacentre above the centre of gravity of the underwater hull		3.820 m
Thus the metacentre is above the load waterline by		1.610 m
The ratio of the submerged portion of the midship bend to the surface of the circumscribed parallelogram at the waterline, less the thickness of plank		0.778%
The block coefficient		0.568%
Displacement for 1 cm immersion at the load waterline		0.681 t.

This draught was approved by the Minister on May 6th 1823, and it appears that it is a copy of the original draught approved by Boucher.



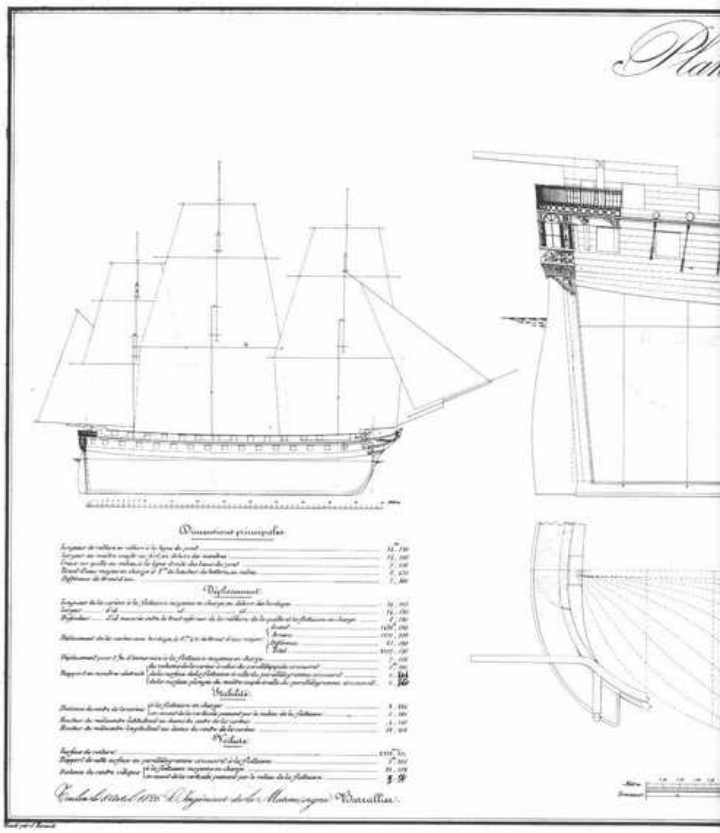
L'URANIE

The original draughts were drawn up by Louis Barallier in 1826; however, the reproduction opposite is taken from the *Atlas du Génie Maritime*, and date from 1844. They show the frigate as she was at that date.

The principal dimensions are almost identical to those of the Leroux design, but this is not true of the hull lines: the vessel is trimmed less by the stern, and her displacement is greater.

The general arrangements are the same, and I will not go over them again, restricting my comments to the minor differences: the lower part of the stem is expanded, a practice borrowed from English example, and the same applies to the shape of the rudder; the cathead is steeply steeved and it rests at its after end on a small supporter; there is a davit at the stern which also serves as a lead for the mainbraces, with an outrigger placed athwart the quarter-boat.

These are the manuscript annotations which feature on the draught, and it is worth comparing them in detail with the similar details given on the Leroux draught.



Principal Dimensions:

Length from rabbet to rabbet on the main-deck	54.520 m
Breadth at the midship bend to inside of plank	14.100 m
Depth in hold amidships, to the horizontal line of beam of the deck	7.100 m
Draught of water laden at 2.00 m height of gundeck sill amidships	6.470 m
Difference in draught fore and aft	0.500 m

Displacement

Length on the average load waterline to outside of plank		54.110 m
Breadth ditto		14.520 m
Depth from under side of rabbet of the keel to load waterline	6.020 m	
Displacement of planked hull at 6.470 m average draught	Forward	1,436 t. 038 kgs
	Aft	1,370 t. 999 kgs
	Difference	65 t. 059 kgs
	Total	2,707 t. 037 kgs
Displacement for 1 cm immersion at the load waterline		7 t. 118 kgs

Ratios:	Block coefficient (volume)	0.591
	Block coefficient (area)	0.894
	Immersed area of midship bend to parallelogram circumscribed	0.760

Stability

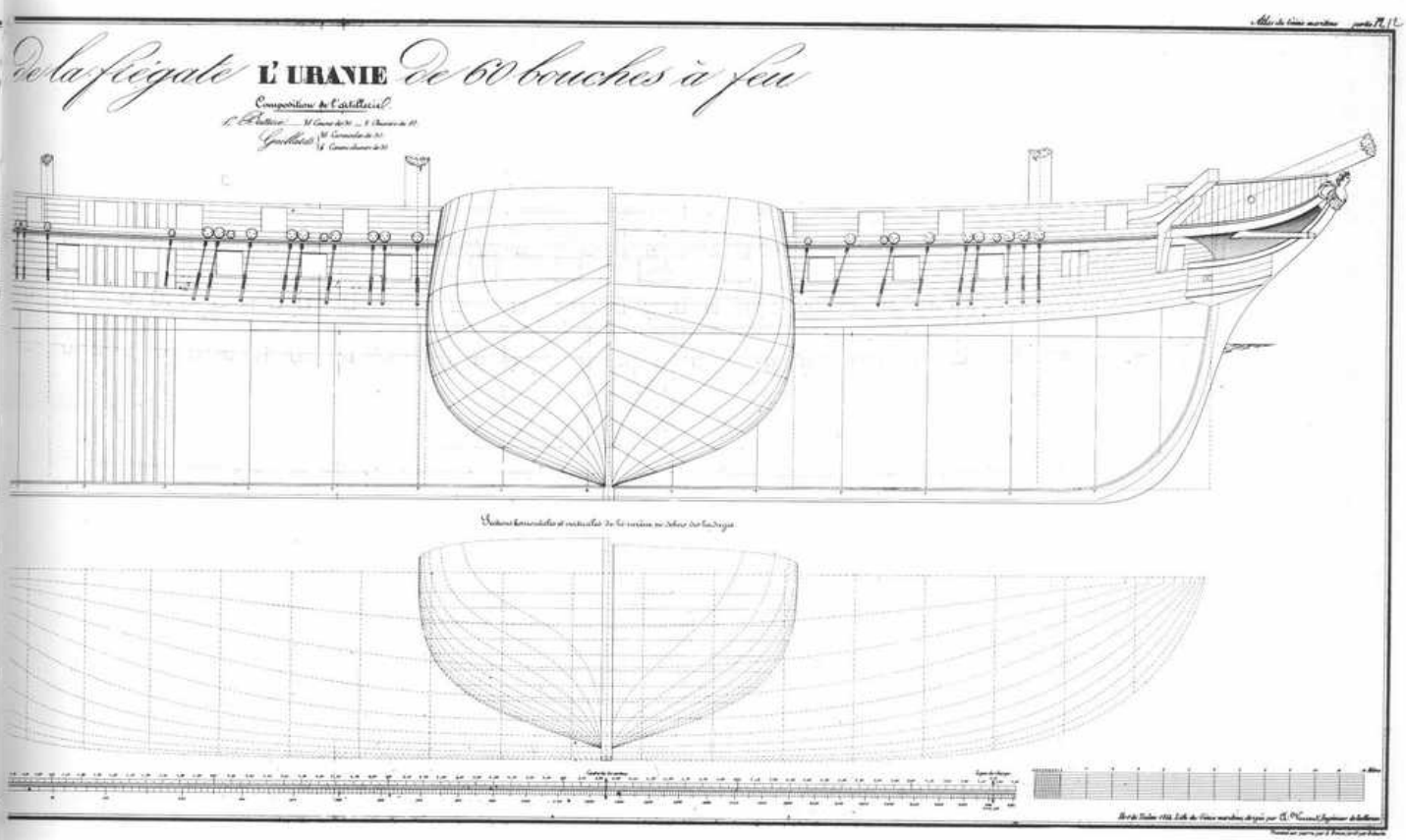
Distance from centre of underwater hull	to the load waterline	2.226 m
	forward of a vertical line passing through the middle of the load waterline	0.981 m
Height of lateral metacentre above centre of hull		4.141 m
Height of longitudinal metacentre above centre of hull		52.206 m

Sail plan

Surface area		2,593.657 m^2
Ratio of sail area to the circumscribed parallelogram at the load waterline		3.305
Distance from the centre of effort:	to the average load waterline	22.192 m
	forward of the vertical passing through the middle of the load waterline	3.547 m

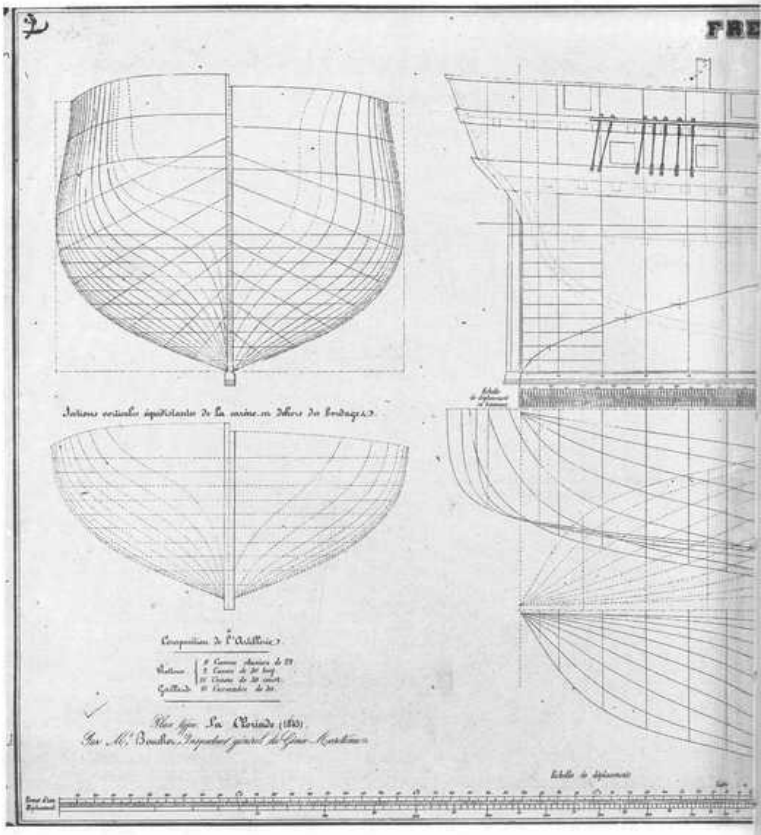
Armament

Main-deck	28x long-pattern 30-pdrs – 2 80-pdr shell-guns
Spar-deck	26x 30-pdr carronades – 4x 30-pdr shell guns.


de la frégate L'URANIE de 60 bouches à feu

LA CLORINDE

This draught, which may be considered as a class design, was the one followed for the frigates built in the 1840s at Brest and Cherbourg. Laid down in 1842, the *Clorinde* was launched in 1845, the date being marked on the draught which bears the signature of Mathurin Boucher, who by then was *Inspecteur Général du Génie Maritime*. As far as her armament goes, the vessel is already a far cry from the original arrangement for frigates of the 3rd Rank, which envisaged 46 guns in 1824, reduced to 40 in 1837. The ultimate modification was the reduction to 36 guns, but eight of these were constituted by 80-pdr shell-guns on the main-deck (only four for frigates of the 1st Rank!), and 18 30-pdr long guns. With secondary armament made up of ten 30-pdr carronades, the total came to 36.
In other respects, the general arrangements are similar to those of frigates of the 1st and 2nd Ranks. However, the underwater lines are sharper, giving a block coefficient of 0.502, which is less than those of the larger frigates whose draughts we have already examined.
The frigates of the 3rd Rank, less well-known than those of the 2nd and above all those of the 1st (epitomised by the Prince de Joinville's *Belle-Poule*), are, for all that, no less representative of the last creations of a navy already under sentence from steam propulsion and the development of the shell-gun.



Principal Dimensions:

Length from rabbet to rabbet on the main-deck	48.290 m
Breadth at the midship bend to inside of plank	13.000 m
Depth in hold amidships, to the horizontal line of beam of the deck	6.620 m
Draught of water laden at 2.10 m height of gundeck sill amidships	5.710 m
Difference in draught fore and aft	0.500 m

Displacement

Length on the average load waterline to outside of plank		48.000 m
Breadth ditto		13.300 m
Depth from under side of rabbet of the keel to load waterline		5.300 m
Displacement of planked hull at 6.300 m average draught	Forward	947.3843 t
	Aft	796.1003 t
	Difference	151.2840 t
	Total	1,743.4877 t
Displacement for 1 cm immersion at the load waterline		5.5073 t

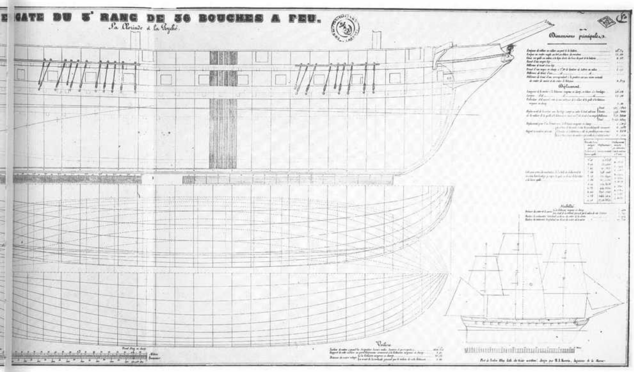
	Block coefficient (volume)	0.5022
	Block coefficient (area)	0.8408
Ratios:	Immersed area of midship bend to parallelogram circumscribed	0.7050

Stability

Distance from centre of underwater hull:	to the load waterline	1.904 m
	forward of a vertical line passing through the middle of the load waterline	1.197 m
Height of lateral metacentre above centre of hull		3.904 m
Height of longitudinal metacentre above centre of hull		47.256 m

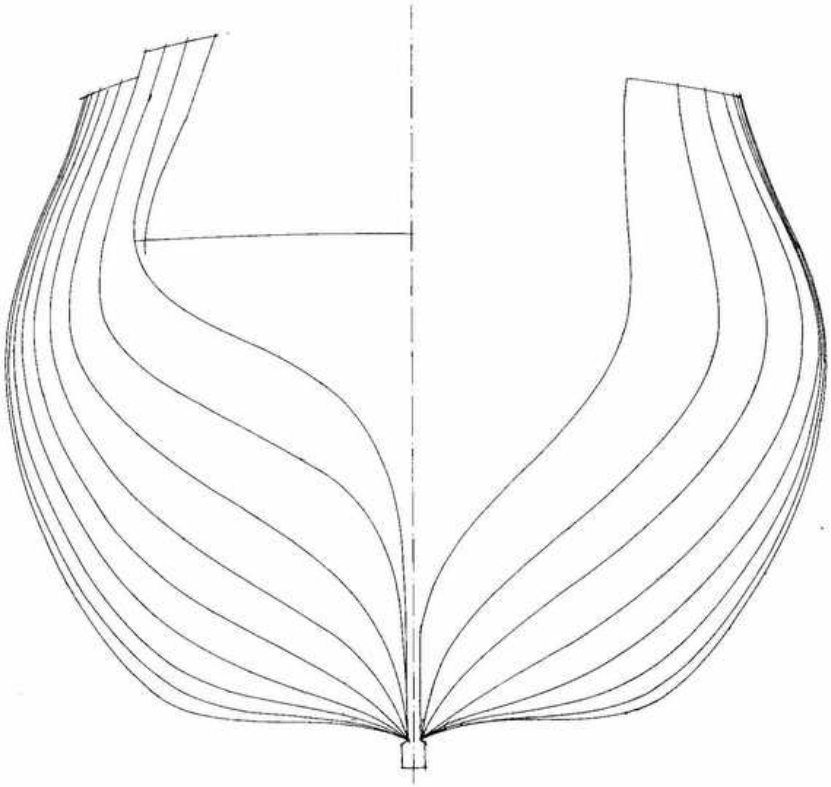
Armament

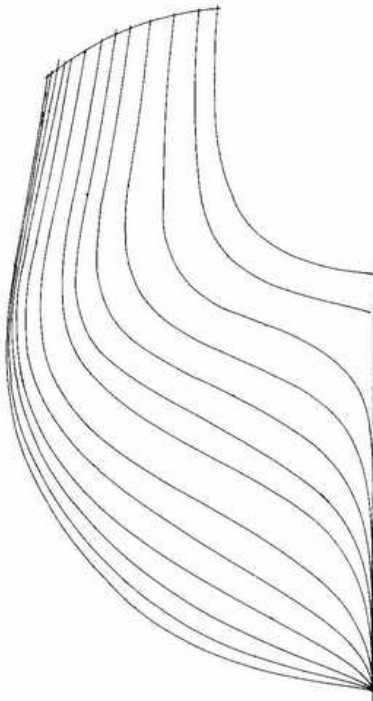
Main-deck	16x short-pattern 30-pdrs
	2x long-pattern ditto
	8x 80-pdr shell-guns
Spar-deck	10x 30-pdr carronades.


GATE DU 3e RANG DE 36 BOUCHES A FEU.
La Clorinde et la Psyché.
Dimensions principales

VARIOUS EXAMPLES OF BODY PLANS OF 30-pdr FRIGATES (scale 1:120)*

*The dimensions are given in metres. The length is taken on the upper deck from the inside of the rabbet.



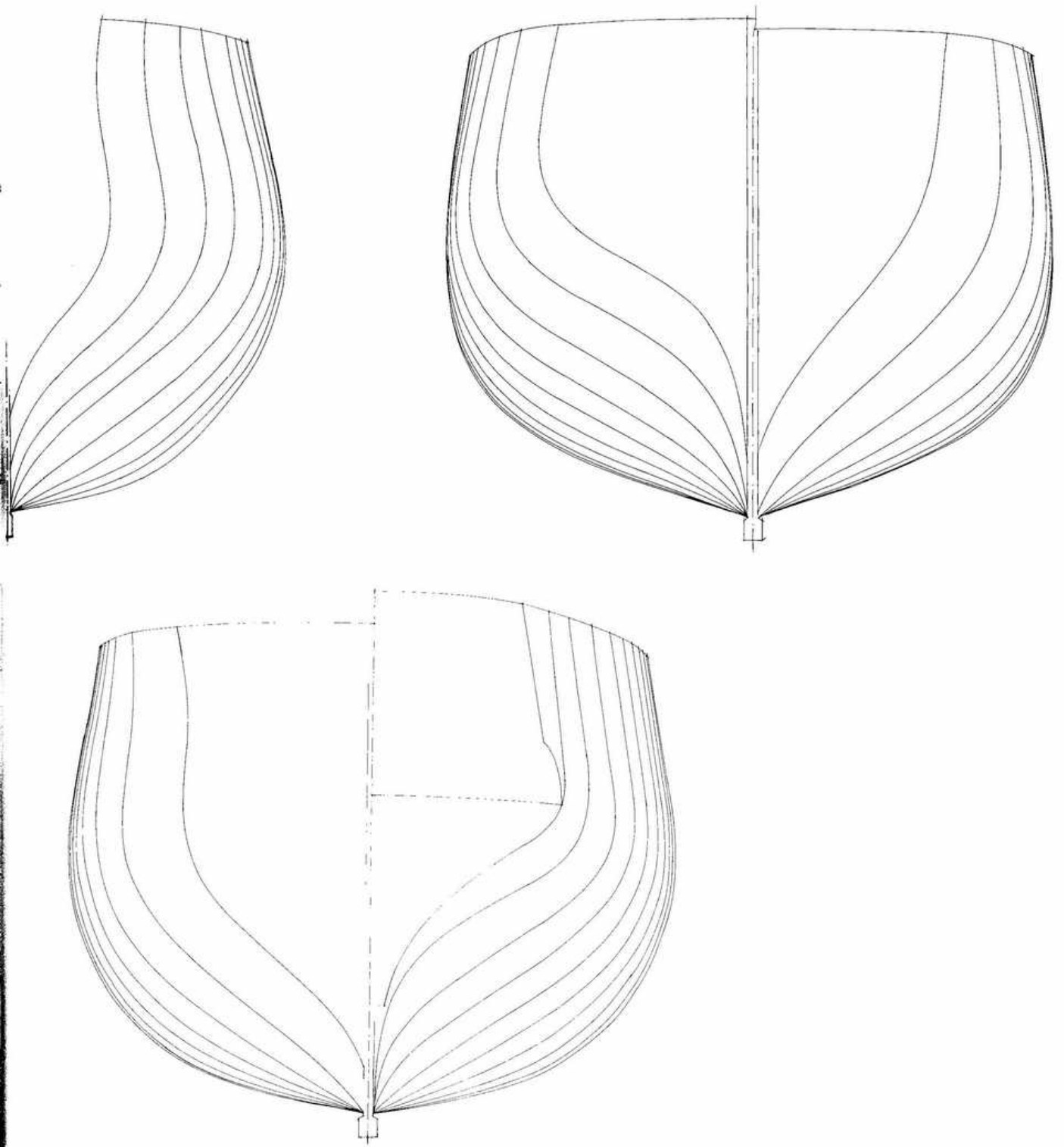


74-gun ship. *Jacques-Noël Sané.* This is the class design for ships of this rate, adopted in 1782 and which served for the 74s which were cut down as razées in 1805, 1812 and 1813, to transform them into frigates of the 1st Rank. I show this plan simply as a reminder that this was the origin of the 30-pdr frigates of the so-called 1st Rank. Length from rabbet to rabbet 58.88 m – breadth 14.48 m – depth in hold 7.14.

La Didon 1822. *Pierre Leroux.* Class design developed by Leroux and followed for the building of five frigates. The body plan is entirely typical of the lines adopted under the Restoration, characterised by a relatively full underwater body and a midship bend which is nearly semi-circular. The upper works are nearly vertical. Dimensions: length 54.40 m – breadth 14.10 m – depth in hold 7.05.

La Surveillante 1823. *Mathurin Boucher.* The class design developed by Boucher was followed for more vessels than that of Leroux. The lines are not dissimilar, with however slightly more deadrise. It should be remembered that all three of the class designs developed for the 30-pdr frigates of the 1st Rank were obliged to conform to the same dimensional characteristics, including the displacement.

L'Uranie 1826. *Louis Barallier.* This class design was relatively little used. The lines are similar to those of the 24-pdr frigate (*La Poursuivante*) by the same designer. Compared with the two other class designs, the underwater lines are less full and differ significantly in other respects.



SAILING QUALITIES OF 30-pdr FRIGATES

Information on the rasé 74s is fortunately available from the Sailing Report of the *Guerrière*. She handled perfectly on all points of sailing, being extremely stable. A heeling experiment of the Borda type (see *74-G.S.*, vol. I), with every man at the ship's side and the topgallants crossed, gave a maximum heel of 155 mm. She pitched very easily without jerking, her rolling motions were neither sudden nor quick, and without risk to the spars. Nevertheless, it was found necessary to increase the diameters of the standing rigging and to shift the ballast higher. Close-hauled she sailed well, maintaining eleven points between tacks and with almost no leeway. Her best point of sailing was large, her least favourable with the wind astern. Careful trimming of her draught and of her sails could make her keep either a weather or a lee helm. Well-handled, she never lost way when tacking and was excellent in stays since she was perfectly responsive to her helm.

The Report on the *Surveillante* provides information regarding the frigates built to Boucher's designs, of which there were ten in all. The *Surveillante* handled very well in a moderate wind, but the helm became very heavy in a gale and heavy seas, such that three men were needed at the wheel. She carried her sail well, heeling readily to begin with, but once heeled to her height of breadth she had sufficient resistance to the force of the wind. Nevertheless, her stability left something to be desired. Her pitching motions were gentle, but in a head sea and sailing fast she met the seas with shocks which were so violent that they threatened the spars. Her rolling motions were considerable, but easy, with little risk to the spars, even though the seas would sometimes come right up to the rail.

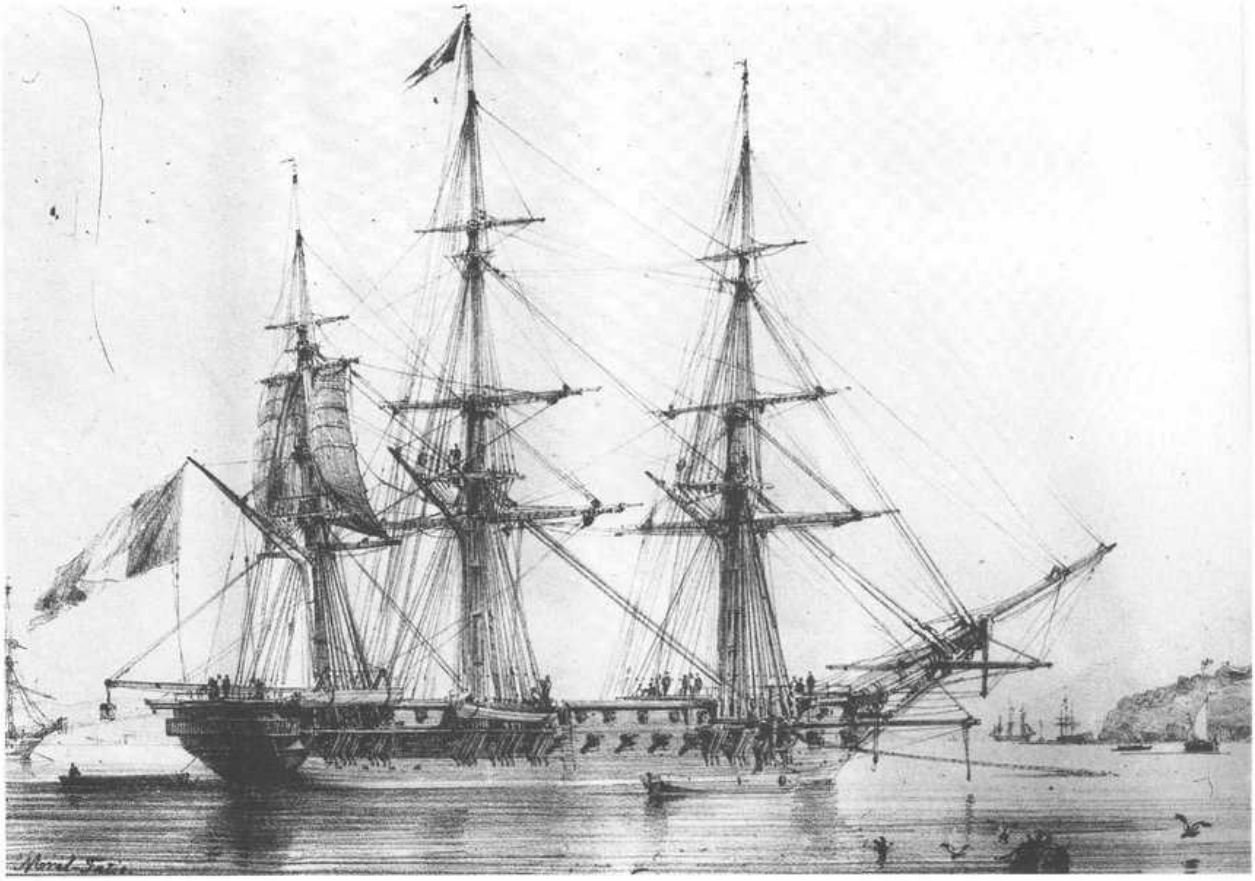
The Report on the *Belle-Gabrielle* (1829) asserts that she handled well on all points of sailing, although she was troubled somewhat be heavy seas on the bow, or in a head swell and a slack wind. With the correct amount of ballast she carried her sail well but heeled readily, which did not prevent her from sailing in a stiff gale under single-reefed courses and treble-reefed topsails. Her pitching motions were easy, although under certain sea conditions she would bury her head (coppering of the head torn off, head timbers stove or carried away). Her rolling motions were not vicious, but were very exaggerated (the gratings linking the main and mizen channels stove in, likewise the soil-pipes of the quarter-galleries). Even with a height of gundeck sill of 2.3 metres, she was unable to open her main-deck ports when sailing more than six knots with the wind astern.
Close-hauled was her best point of sailing, making 8½ nautical miles per hour in a calm sea under topgallants, dropping to 7½ as the wind and the sea got up; this speed was then maintained with the topgallants taken in and the topsails reefed. As the sea became rough and the wind strengthened further, she was able to manage six to seven miles per hour, maximum nine, with two reefs in the main topsail, three in the fore- and mizen-topsails, reefed courses, inner jib and storm mizen. (The storm mizen is a foul-weather sail as its name implies; it replaces the mizen-course, its breadth at the head being only $2/3^{rds}$ of the gaff and ½ the boom at the foot.) Her best point of sailing was large, especially quartering, making 8⅔ nautical miles an hour throughout a 24-hour period, reaching a maximum speed of 11⅘ miles. With the wind astern, her speed dropped by a quarter to a fifth compared with sailing large, and she rolled prodigiously, as she did in a beam sea. In a head sea or with the sea on the port or starboard bow and with a fresh breeze she tended to be slack. She tacked very well even in a seaway, but needed to be handled very rapidly; she had no tendency to fall off except in a heavy sea; in calm weather she made well to windward. She was slow in stays veering.

Another Boucher frigate, the *Melpomène*: a Report dated 1830 indicates that she handled very well, carried her sail extremely well, and that all her motions were sweet. Close-hauled she sailed 8 to 9 knots (there are 47½ feet between each knot: see *74-G.S.*, vol. IV).
Sailing large, "there is no better ship". Before the wind her speed was less remarkable. She tended to gripe sailing fast in a strong gale of wind, but was never slack and tacked perfectly even under single-reefed topsails alone.
Another Report dating from 1833 states that she handled and carried her sail very well, but that she had a lively and hard pitching motion, rolling however very easily. Close-hauled her speed was considered mediocre at 7 knots under courses, inner jib and double-reefed topsails. Sailing large she performed excellently, making 11½ knots in a stiff gale and calm sea under courses, topsails and topgallants. Speed with the wind astern in the same weather conditions, 10⅘ knots. She carried a neutral helm and put about easily.

Finally, a third Boucher frigate, the *Vengeance*, and a Report dated 1854 (she was not launched until 1848): the frigate handled and carried her sail very well, pitching very gently and only rolling moderately. Close-hauled she performed well, even very well under a press of sail, and under these conditions and tacking, under single-reefed topsails, courses, topgallants, outer jib, and driver, she sailed up to 10½ knots. In a heavy sea and reefed topsails and topgallants, driven hard she made 9⅘ knots. Sailing large she did well, especially quartering, 10 knots under royals and topgallant studdingsails, 11 knots under double-reefed topsails. With the wind on the beam, 10 to 11 knots under all sail except studdingsails, 12 knots in a calm sea. With the wind astern her performance was mediocre except in a stiff wind, but she nevertheless made 10 to 11 knots on occasions under all sail except studdingsails.
She held a neutral helm, tacked perfectly, veered less well.

The frigates built to the designs of Pierre Leroux can be assessed thanks to a Report on the *Dryade*. She handled well, carried her sail perfectly, pitching easily and rolling very little. Close-hauled she performed very well, 9 to 10 knots, better still "on a large" (*sic*); in anything of a seaway however, it was essential to haul the tacks firmly for the courses. Sailing large she performed well, reasonably so with the wind astern, tried excellently. Tended to gripe badly, although she could be slack in light winds and a heavy swell; she was slow in stays, attributed to her great length.

The Report on the *Terpsichore* (1835) is more complete, and we learn that she handled very well, being very stiff even unladen, very fast close-hauled and with no fears whatsoever for her stability. She pitched ordinarily, but rolled heavily with the wind astern and whenever she was not supported or very little supported by the wind, but the motions were not hard, thereby confirming the old saying "rolls well, sails well". Close-hauled she performed excellently, making 9½ knots under all plain sail and topgallants. Pinching to within less than six points of the wind and whenever the wind was fresh, except in a very heavy sea, the frigate bettered 9 knots without difficulty under double reefs. Sailing large and "under prudent sail" she exceeded 13 knots, and



11 even with the wind abeam. Sailing before the wind was not her most brilliant point of sailing, but for all that she often managed 12 knots under the forecourse and treble-reefed topsails. She kept a weather helm all the time, was never slack and she put about well.

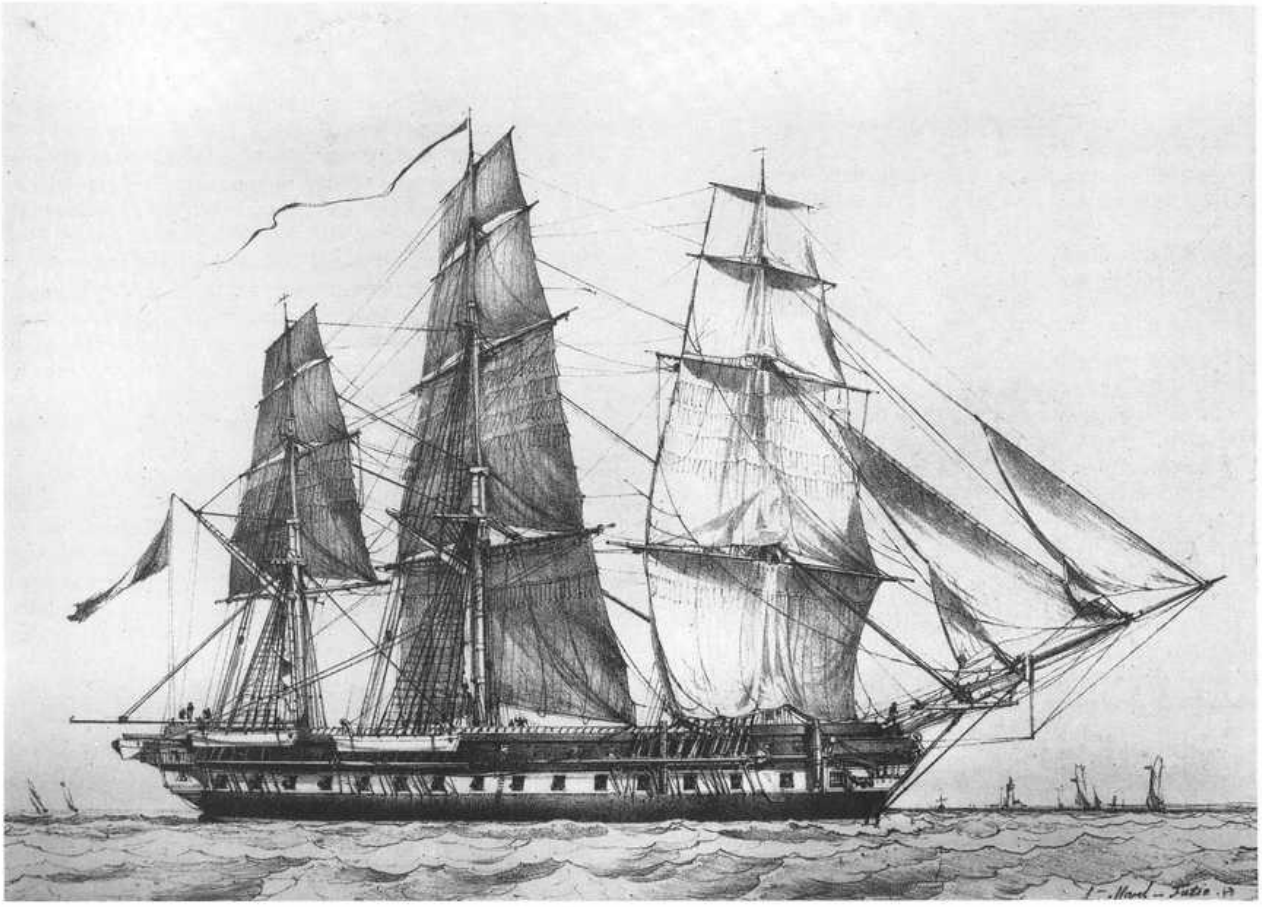
The frigates of the 1st Rank of the 1822 programme were, like those of the 2nd Rank, extremely successful designs. Close-hauled they all performed excellently, both those built to Boucher's draughts and the Leroux frigates also, and yet they managed to ally this with a more than creditable performance sailing large. As a result, and this is almost inevitable, their performance before the wind was mediocre.

In general however, all French ships of this period, ships and frigates alike, were hampered by over-sparring, too much canvas not always distributed to the best advantage, and upper works which were too high so that excessive ballast had to be carried. As stores are consumed, stability tends to suffer, and as a result, speed of sailing is reduced. The quality of French canvas and the cut of the sails were the object of frequent criticism, and the same applies to the standards of workmanship in installing and maintaining copper sheathing.

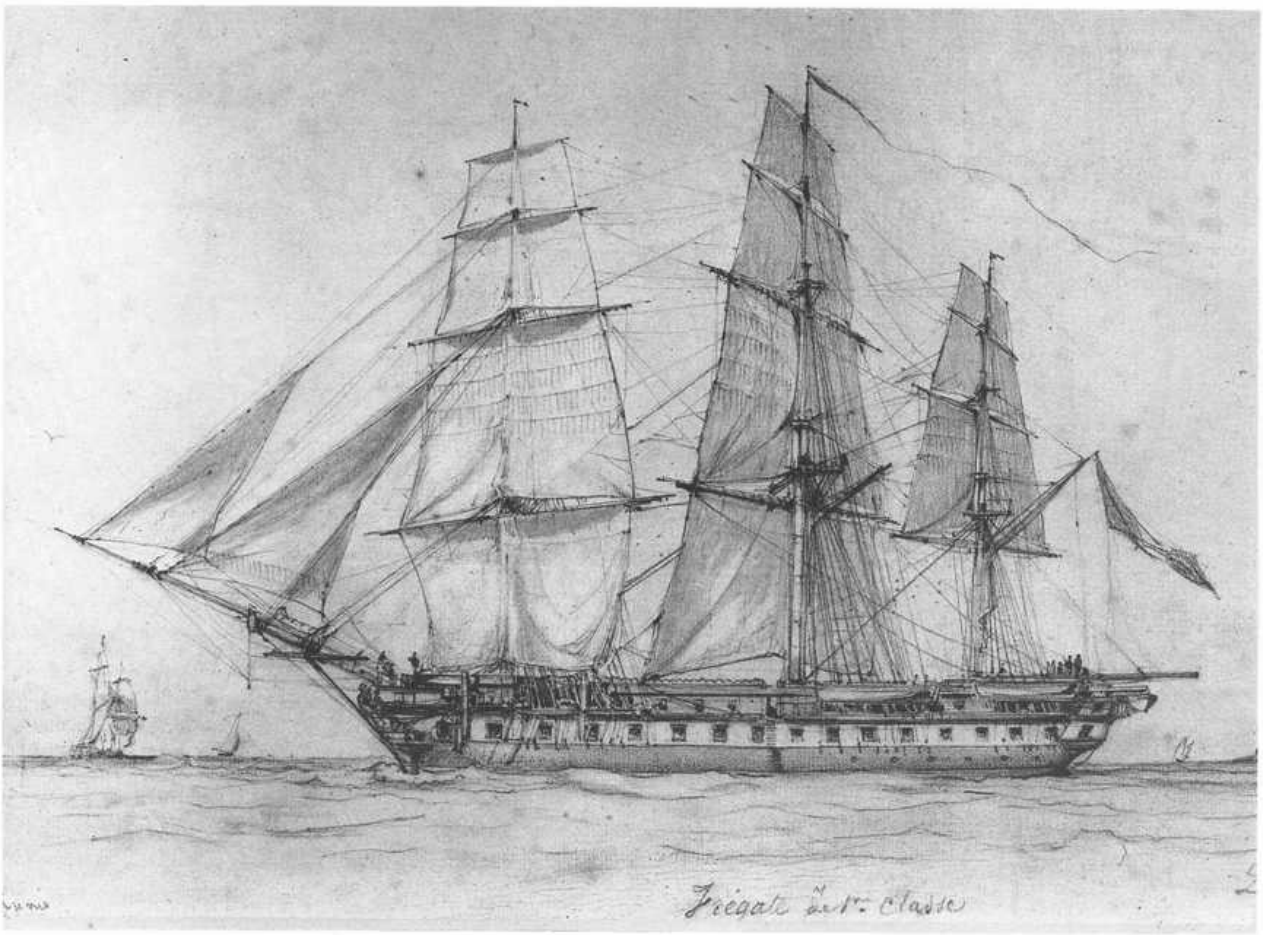
All these factors may explain why certain frigates tended to see their performance fall off in the course of a commission.

LA BELLE-POULE. This 60-gun frigate is portrayed by Morel-Fatio, moored, all sails furled apart from a backed mizen-topsail to "keep her nose to the hawse". The royal-masts have been sent down, and note that the lower staysails are bent to gaffs. There is a command-pendant flying at the mainmast, swallow-tailed like a lieutenant's pendant but differentiated from the latter by the fact that it is not bent to a yard, being simply fastened at the hoist. This is clearly visible in Morel-Fatio's lithograph. The command-pendant is the distinction flown at the mainmast by a Rear Admiral or Commodore with at least three vessels under his command. Since the *Belle-Poule* served in the Mediterranean in 1839 as the flagship of the Prince de Joinville, we can assume that the drawing relates to this period.

Note the cat-block, and the studdingsail-boom rigged for the boats to come up to; note also the way the yards are exactly parallel to each other, and the way the topgallants have been brought down to the cap.



60-gun FRIGATE. Morel-Fatio's original drawing is accompanied by a lithograph, the latter allowing a more minute appreciation of the detail. The frigate is hove-to under square sails, flying jib and standing jib. The starboard anchors are bent to their cables, the sheet anchor at the after end of the fore channels, probably because of the fact that there is a boat on davits in the main channels. The lower fore studdingsail boom is stowed in the fore channels, passing in front of the stock of the sheet anchor.
The foremost gunport has a glazed port-light providing illumination to the sick-berth, which is situated at the forward end of the main-deck. Abaft it are the fifteen gunports for the long-pattern 30-pdrs of the main battery.
The battery is highlighted by a white band which tends to exaggerate the feeling of length, and the head and the quarter-galleries are also painted white. The remainder of the upper works are painted black, giving an overall impression which is both austere and severe, owing to the lack of colour and the general rigidity of the lines. However, this is made up for by the rigging: note the attractive pyramidal effect of the four tiers of sails, which taper away gracefully. The long pendant at the mainmast head indicates that the frigate is not sailing in company.


Frégate 2de 1re classe

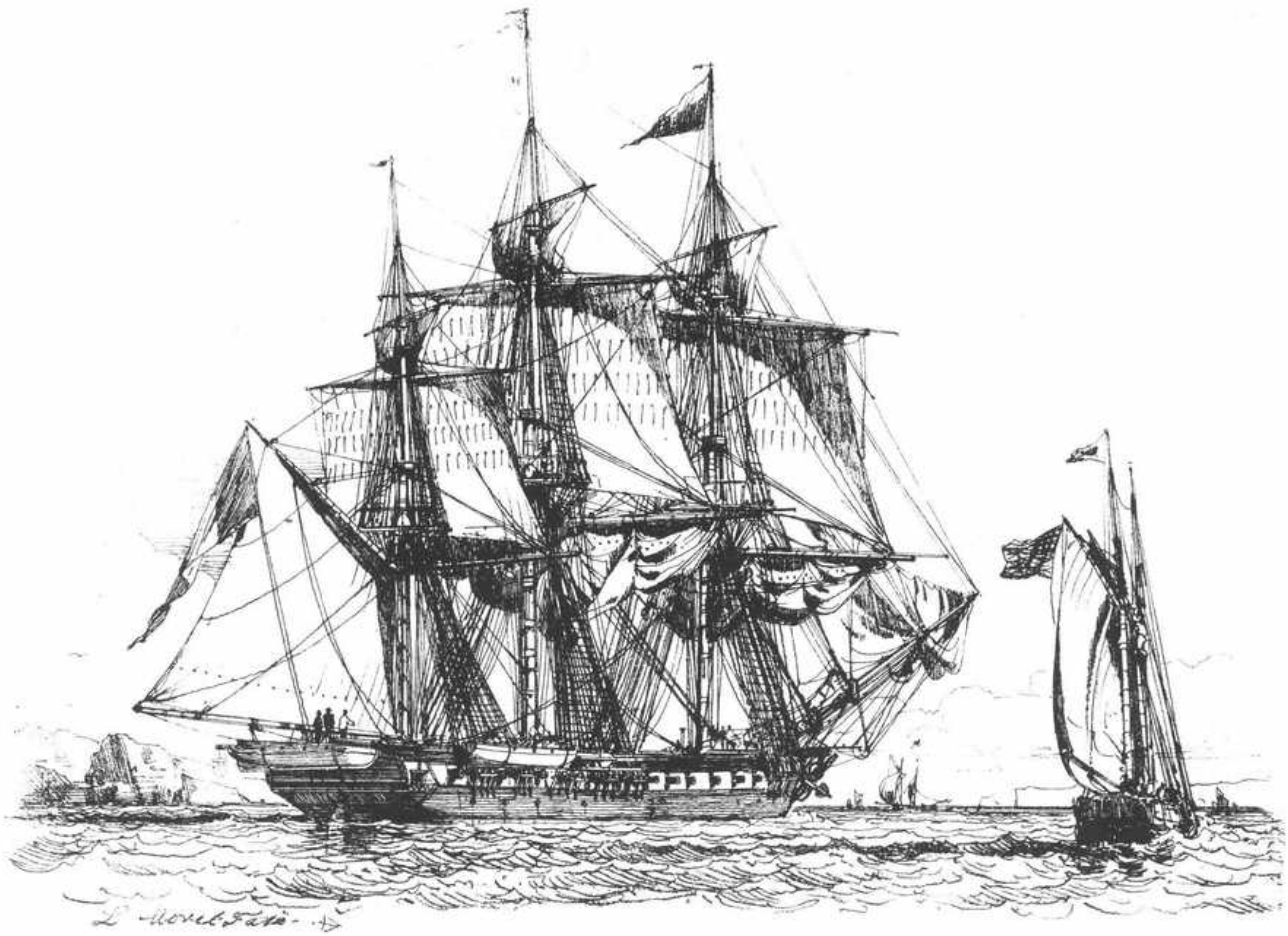
Frégate Française de 60 Canons.

FRIGATE OF THE 1st RANK.* This very attractive depiction of a 60-gun frigate before the wind is signed by Morel-Fatio, and is a variation on the well-known Ozanne engraving of a 74-gun ship on the same point of sailing (see *74-G.S.*, vol. I).
The maincourse has been brailed up, allowing the forecourse to fill. The main-topsail, however, is stealing the wind from the fore-topsail, while both the fore-topgallant and the fore-royal appear unaffected by the the fact that the main-topgallant and main-royal are bent. All three starboard studdingsails are rigged on the foremast, while on the mainmast only the port topmast- and topgallant-studdingsails are in evidence. The rigging of the studdingsails is minutely represented: note, in the case of the lower fore studdingsail, the presence of the half-yard at the head, whereas the others are bent to full yards. The driver has been taken in, but there is a mizen-topgallant instead, which appears not to be masking the main-topsail. The flying jib is hanging loose, and presumably serves only to correct any tendency to luff.
The anchors are fished at the cathead, and careful examination reveals that the port anchor is bent to a hemp cable while the starboard anchor is bent to a chain-cable, which was a transitional arrangement in the 1830s. Note also the bowchase ports. The spritsail-yard serves only to spread the jibboom shrouds correctly, and there is no evidence of a flying jibboom. The dolphin-striker is single, and for some reason neither the sheet anchor nor the stream anchor are shown in the main channels. The boats and the yawl are shown hanging from davits.
This energetic drawing evokes very well the grandiose sail-plan of these magnificent frigates.

*According to Morel-Fatio, the frigate is the *Didon*.

60-GUN FRIGATE.* The vessel is shown being allowed to fall off to starboard under topsails alone. The topgallants have been lowered on the caps, the courses are brailed up, the flying jib has been run down; the outer jib and the driver are scarcely pulling, like the topsails. The frigate is preparing to drop anchor. The scene is presumably taking place in the United States, if we are to judge by the stars and stripes flying from the small schooner, but this may just be a chance encounter elsewhere.
The triangular flag at the foremast-head is not a command pendant but a signal flag, of two colours.

*According to Morel-Fatio, the frigate is the *Forte*.



Frégate Française de 60.

List of 30-pdr frigates in the French Navy (1st Rank)

Laid down	Name	Builder	Place of building	Length	Breadth	Depth in hold	Upper deck	Fo'csle/ Q'deck	Total	Struck from lists	Notes
1805	***Minerve***	J.-N. Sané	Rochefort	55.55	14.48	7.14	28x 36	30x 36 carr.	58	1857	ex-*Glorieux* (74) – razée '32
1812	***Guerrière***	J.-N. Sané	Toulon	55.55	14.48	7.14				1840	ex-*Romulus* (74) – razée '21
1812	***Amphitrite***	J.-N. Sané	Genoa	55.55	14.48	7.14				1836	ex-*Agamemnon* (74) – razée '24
1813	***Pallas***	J.-N. Sané	Toulon	55.55	14.48	7.14				1840	ex-*Colosse* (74) – razée '26
								1822			
1822	***Iphygénie***	P. Leroux	Toulon	54.40	14.10	7.05	30x 30	28x 30 carr. 2x 18	60	1872	Launched '27
1822	***Terpsichore***	P. Leroux	Brest	54.40	14.10	7.05				1839	Launched '27
1822	***Dryade***	P. Leroux	Rochefort	54.40	14.10	7.05				1838	*Class design* – launched '27 – ex-*Caroline* '28
1823	***Surveillante***	M. Boucher	Lorient	54.00	14.10	7.25				1844	*Class design* – launched '25
1824	***Belle-Gabrielle***	M. Boucher	Cherbourg	54.00	14.10	7.25				1860	Launched '28 – *Indépendante* '30
								1837			
1824	***Herminie***	M. Boucher	Lorient	54.00	14.10	7.25	28x 30 2x 80 shell	26x 30 carr. 4x 30 shell	60	1838	Launched '28 – lost
1825	***Melpomène***	M. Boucher	Cherbourg	54.00	14.10	7.25				1845	Launched '28
1825	***Didon***	P. Leroux	Toulon	54.40	14.10	7.05				1867	Launched '28
1826	***Uranie***	L. Barallier	Toulon	54.52	14.10	7.10				1865	Launched '32
1826	***Renommée***	P. Leroux	Rochefort	54.40	14.10	7.05				1878	Launched '47 – steam aux. '56
1827	***Sémillante***	M. Boucher	Lorient	54.00	14.10	7.25				1855	Launched '41 – lost
1827	***Andromaque***	M. Boucher	Lorient	54.00	14.10	7.25				1869	Launched '41
1827	***Belle-Poule***	M. Boucher	Cherbourg	54.00	14.10	7.25				1861	Launched '34
								1848			
1829	***Forte***	M. Boucher	Cherbourg	54.00	14.10	7.25	26x 30 4x 80 shell	26x 30 carr. 4x 30 shell	60	1868	Launched '41
1829	***Persévérante***	C. Simon	Brest	54.00	14.00	7.25				1867	Launched '47
1829	***Entreprenante***	M. Boucher	Lorient	53.64	14.00	7.25				1885	Launched '58
1829	***Vengeance***	M. Boucher	Lorient	53.64	14.00	7.25				1866	Launched '48

List of 30-pdr frigates in the French Navy (3rd Rank)

Laid down	Name	Builder	Place of building	Length	Breadth	Depth in hold	Upper deck	Fo'csle/ Q'deck	Total	Struck from lists	Notes
1830	***Pénélope***	J.-F. Guillemard	Lorient	48.00	12.40	6.50	22x 30 sh.p. 4x 30 shell	14x 30 carr.	40	1864	Launched '40
1830	***Héliopolis***	J.-B. Hubert	Rochefort	48.25	13.00	6.60				1880	Launched '47
1830	***Érigone***	J.-B. Hubert	St-Servan	48.25	13.00	6.60				1865	Ex-*Oriflamme* '31 – launched '36
1830	***Chartre***	J.-B. Hubert	Brest	48.25	13.00	6.60				1879	Ex-*Douze Avril* '30 – launched '42 – *Constitution* '48
1835	***Africaine***	J.-B. Hubert	St-Servan	48.25	13.00	6.60				1867	Launched '39
1835	***Jeanne d'Arc***	J.-F. Guillemard	Lorient	48.00	12.40	6.50			40	1864	Launched '39
1842	***Psyché***	M. Boucher	Brest	48.29	13.00	6.62	16x 30 sh.p. 8x 80 shell 2x 30 l.p.	10x 30 carr.	36	1867	Launched '44
1842	***Clorinde***	M. Boucher	Cherbourg	48.29	13.00	6.62				1888	Launched '45 – steam aux. '56
1843	***Algérie***	J.-B. Hubert	Rochefort	48.25	13.00	6.60				1867	Launched '48
1846	***Isis***	M. Boucher	Brest	48.29	13.00	6.62				1886	Launched '51

• Metric measurements. Length from rabbet to rabbet on the gundeck, except for the Boucher frigates where the length is taken from rabbet to rabbet at the waterline.
• One might also add to this list the following vessels converted to steam while still on the stocks: *Sémiramis* (1829-1861), *Guerrière* (1847-1860), *Pallas* (1847-1860). The first date corresponds to when the vessel was laid down, the second to the date of launch. The conversions all took place in 1858.
It is worth quoting also the vessels laid down but never completed: *Valentine* (1830-1), *Jeanne d'Albert* (1830-1), *Amphitrite* (1847-9), *Melpomène* (1848-9), *Impérieuse* (1848-9), *Vénus* (1848-9).
• The list begins somewhat artificially with the four frigates cut down between 1821 and 1832 from former 74s.
• The frigates laid down between 1822 and 1824 were originally intended to carry 24-pdrs on the main-deck.
• The 3rd Rank frigates have been included after the 1st Rank vessels because they were also armed with 30-pdrs. When originally proposed in 1824, they were intended to be armed with 18-pdrs and to replace the Sané-class frigates; however, they were delayed and not laid down until 1830, being launched in the 1840s, so that they were finally armed in accordance with the 1837 Establishment which standardised with the 30-pdr calibre. Seven frigates of this type were laid down but never completed: *Bouvines* (1830-1), *Psyché* (1830-1), *Pomone* (1835-6), *Nymphe* (1836), *Thémis* (1836), *Psyché* (1836-7), *Antigone* (1836-7).
The following vessels, not included in the List, were converted to steam while still on the stocks: *Pomone* (1842-1845), *Cérès* (1846-1857), *Résolue* (1846-1863), *Armorique* (1850-1862).

Chapter XI
COMPARATIVE TABLES

COMPARATIVE TABLES

The following pages group together and supplement the information given in the earlier chapters of this book. This is so that we can differentiate between all the various classes of frigate, and also place them in their context compared with ships of the line. The "ship-frigates", a typically 17th century formula, survived until the 1740s despite their mediocre qualities, and despite attempts to remedy these by reducing in certain cases the lower deck armament in order to improve their height of gundeck sill*, which made it difficult for them to fight their lower deck guns in a seaway. By the same token, the small ships of the line of 50 and 56 guns, which were only slightly more powerful than the largest frigates, were also found to be deficient; they were judged much more harshly in the 18th century than in the 17th, and at the same time more objectively, largely due to the progress made in naval architecture and to changing requirements. The role played by the famous shipwright Blaise Ollivier was to be determinant in the middle of the 18th century, resulting in the final abandonment both of the smaller ships of the line armed with 18-pdrs on their gundeck, and of the "ship-frigates"; they were to be replaced by a very modest little vessel, the light frigate, which built to new arrangements defined by Ollivier, inaugurated a formula which would later be adopted in all the European navies.

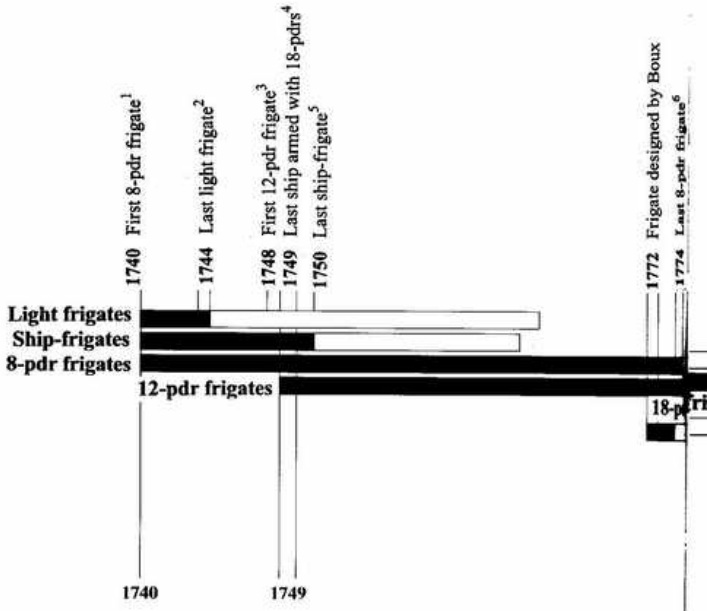
The frigate thus acquired its own personality, so that there was no longer any confusion possible with ships of the line. The so-called "modern" frigate could finally lay claim to individual characteristics, of which the most important was the ability to sail well close-hauled. But it was in wartime that this role came to be defined.

The abandonment of the ship-frigates provided the justification for the adoption of a more powerful class of frigate than those derived from the earlier light frigates, armed with 8-pdrs. It was logical therefore to think in terms of a 12-pdr class, of which the first were built in the middle of the century, but which were developed further following the Seven Years' War. The class was to play an important role during the American War of Independence, which at the same time signalled the demise of the 8-pdr class. However, the employment by the English Royal Navy during the same War of frigates armed with 18-pdr guns forced the French Navy to follow suit.

The new frigates ultimately supplanted the 12-pdrs, of which the last examples were built at the end of the 18th century, leaving the 18-pdr class as the only type used by Napoleon's Imperial Navy; they were to survive until the 1840s, with the last vessels laid down in 1813.

Although the 18-pdr frigates continued in service until long after the fall of the Empire, this could not hide the fact that they were by now obsolete, overtaken by the new 24-pdr class: some of these had already been built during the Revolutionary period, but general recognition had to wait until the war of 1813, when the success of the American frigates of this type against the smaller frigates of the Royal Navy set a spectacular example.

The 24-pdr frigate is thus typical of the Restoration period, but it was quickly followed by the 30-pdr class, which emphasised the excellent qualities developed over the previous decades, but at the same time marked the end of the "progression of calibres". Henceforth frigates would be armed with the same calibre of guns as ships of the line, the latter marking their superiority only by means of the greater numbers of guns carried. The chronological table on these pages illustrates the progression which I have just described, and it is followed by a number of other tables relating



to the increase in displacement and firepower.

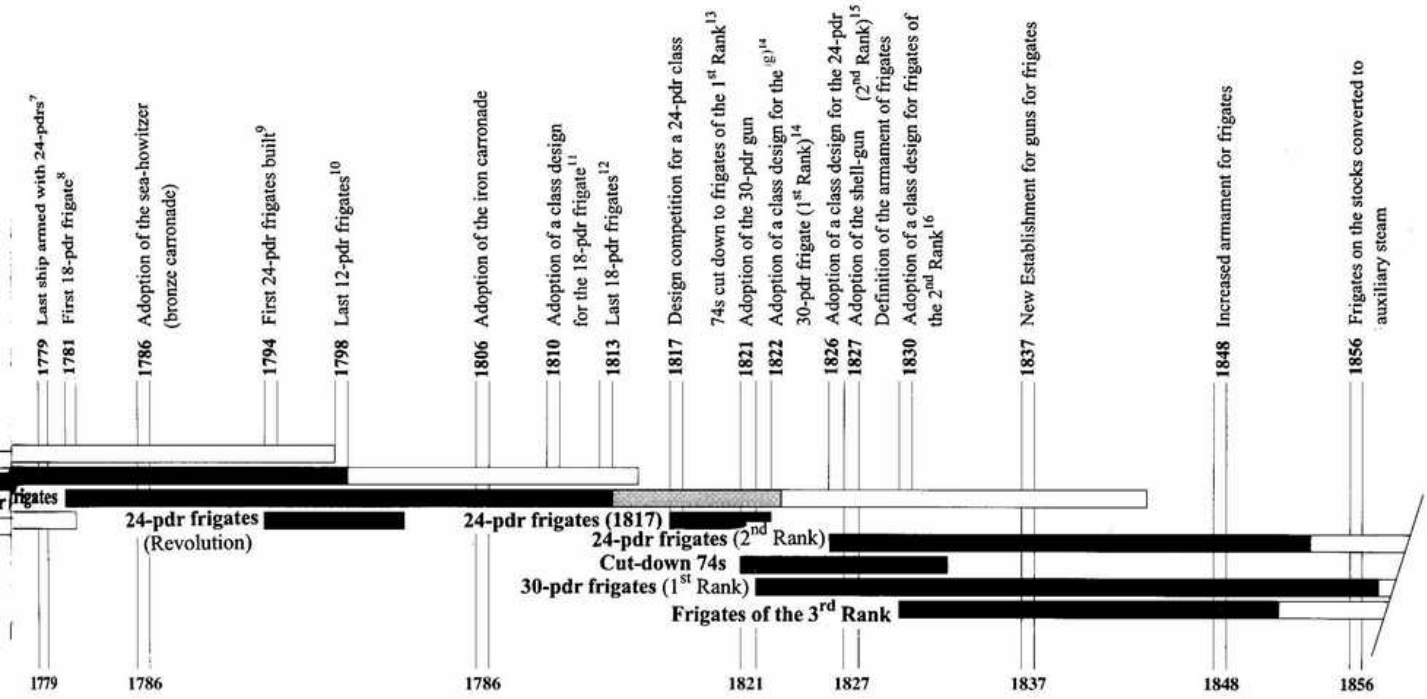
Included in the same tables are details concerning ships of the line, enabling the progression of the two main types of vessel in the French Navy to be followed in parallel.

I have also drawn all the classes of frigates at small scale, in order to give a clear picture of the way their hulls evolved; these profiles are then followed by waterline plans, sheer plans and body plans (midship bend only) for each of the various classes, from the 8-pdr to the 30-pdr.

Other tables cover the principal dimensions and statistics, the materials employed and their cost of building. A graph shows the numbers of vessels, both ships and frigates, laid down year by year for the period 1650 to 1850. Finally, I have appended (at the end of the book) a complete alphabetical list of all the frigates which served in the French Navy, cross-referenced to the relevant chapters of this book, covering some 600 frigates in total.

*As a rule less than 4 feet.

Chronological Table of the Evolution of the Frigate



Comments

The black bars correspond to the period from the first to the last vessel of the type being laid down. For the frigates of the 1st and 2nd Ranks laid down under the Restoration, their prolonged period of building seemed to justify indicating the date that the last one was *launched*, so that the black bar is extended to take that into account.

Some of the 18-pdr frigates laid down under the Empire were not in fact launched until the Restoration; this is indicated by the grey bar.

This chronological table makes it possible to follow the evolution of the French frigate, characterised by the calibre of guns carried as their main armament. For each class, I have indicated with a black bar the period over which new building was carried out, and this is extended by a white bar to indicate their respective periods of active service*. The key dates corresponding to the laying down of the first and last vessels of each class are highlighted.

To avoid having to reduce the scale of this table excessively, it does not start until 1740, with the adoption of the 8-pdr class, although the earlier classes of vessel were not yet extinct. As far as the ship-frigates are concerned, I have made no distinction between those of the 1st and the 2nd Orders, and nor have I shown separately the vessels with one and a half tiers of guns.

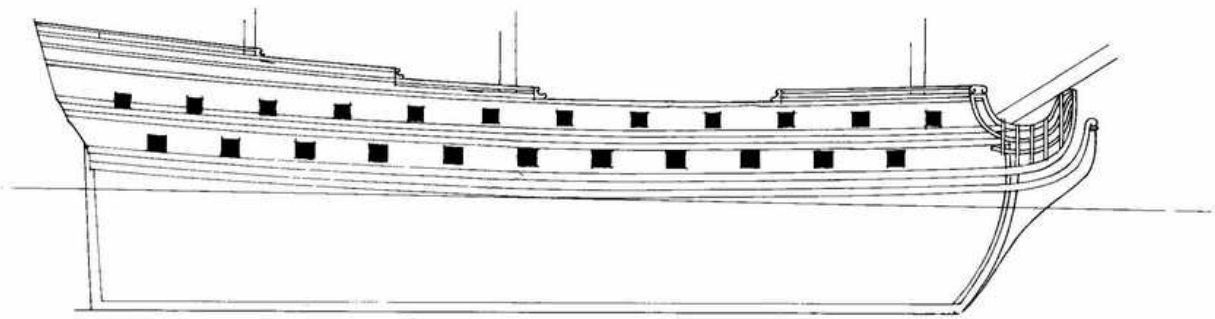
While it is true that there were frigates in the 17th century, as we have seen, the frigate did not in fact acquire its own "personality" or its significance until the middle of the 18th, which seemed to justify starting the table in 1740. The table ends in 1856, since this was the date when those frigates still building were modified for auxiliary steam propulsion, thus bringing to an end the great age of the sailing frigate.

*This can be misleading, since the survival of a single example prolongs the life of an entire class.

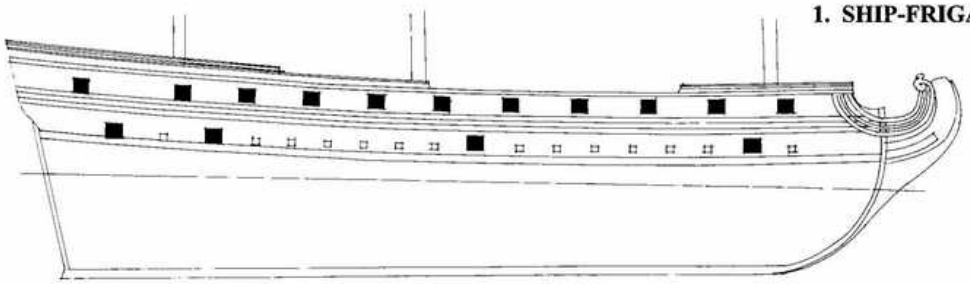
1. This was the *Médée*, designed by Blaise Ollivier.
2. The *Panthère*. The last light frigate in service was the *Subtile* (1763). From about 1740 onwards, light frigates tended to be classified as sloops-of-war.
3. The *Hermione*, by Pierre Morineau.
4. The *Hippopotame* (50), laid down in Toulon to the draughts of François Coulomb, Jr.; this was the last ship to be built to carry 18-pdrs on the gundeck.
5. The *Rose*, laid down at Toulon to the draughts of J.-A. Chapelle.
6. The *Alcmène* and the *Aimable*, built at Toulon to the draughts of Antoine Groignard.
7. The *Jason* (64), built to the draughts of J.-M.-B. Coulomb; this was the last ship to be built to carry 24-pdrs on the gundeck.
8. The *Vénus*, to the draughts of Jacques-Noël Sané.
9. Four frigates only: the *Forte*, *Égyptienne*, *Revanche*, *Résistance*.
10. *Franchise*, *Thémis*, *Psyché*.
11. The draught of the *Justice*, by Sané.
12. Eight frigates were laid down in this one year.
13. Four 74s were cut down by a deck while undergoing major repairs and transformed into frigates.
14. The *Surveillante*, laid down in 1823.
15. The *Artémise*, laid down in 1826.
16. The *Pénélope*, laid down in 1830.

SUMMARY OF THE VARIOUS CLASSES OF FRIGATE, 1650-1850

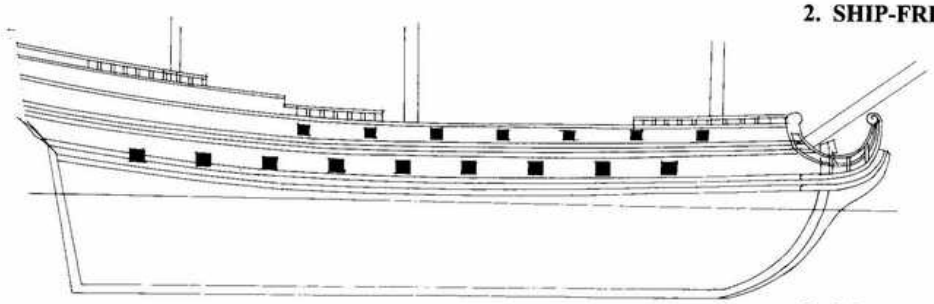
	Length	Breadth	Depth in hold	Height of g'deck sill	Draught	Displace-ment	Lower deck	Upper deck	F'c'sle/ Q'deck	Total	Crew
SHIP-FRIGATE 1st Order	128'5"	33'10"	16'2"	4' 0"	15'0"	1,200	22x 12	24x 8		46	250
SHIP-FRIGATE (1 1/2 tiers of guns)	114'0"	30'4"	14'0"	4' 0"	13'0"	750	8x 8	22x 4		30	220
SHIP-FRIGATE 2nd Order	110'0"	27'6"	14'0"	3'10"	13'0"	850	18x 8	14x 6		32	180
LIGHT FRIGATE	90'0"	23'0"	10'0"	4' 8"	8'2"	290	18x 6			18	110
8-pdr FRIGATE	128'0"	32'6"	16'6"	5' 4"	13'6"	900	26x 8		4x 4	30	236
12-pdr FRIGATE	135'0"	34'6"	17'3"	6' 0"	14'6"	1,100	26x 12		6x 6 12x 8	32	271
18-pdr FRIGATE	144'6"	37'0"	19'0"	6' 0"	16'0"	1,300	28x 18		6x 24 carr. 2x 18	46	325
24-pdr FRIGATE	164'0"	41'4"	21'8"	6' 2"	20'10"	2,350	28x 24		22x 24 carr. 2x 18	52	450
30-pdr FRIGATE	169'0"	43'4"	21'10"	6' 2"	20'9"	2,770	30x 30		28x 30 carr.	60	500



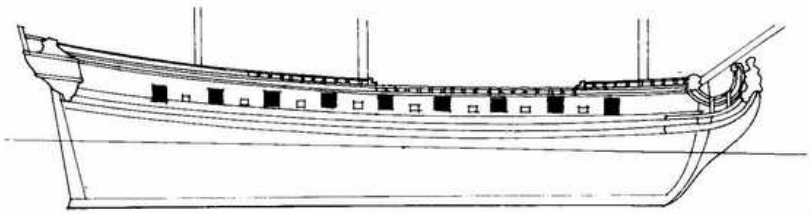
1. SHIP-FRIGATE 1st Order



2. SHIP-FRIGATE (1 1/2 tiers)

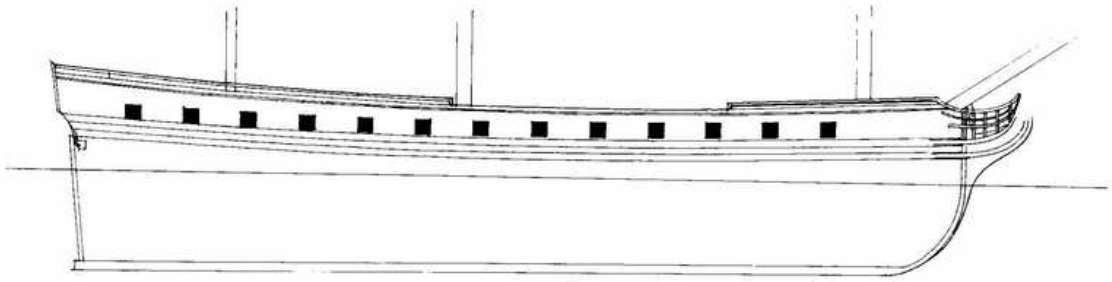


3. SHIP-FRIGATE 2nd Order

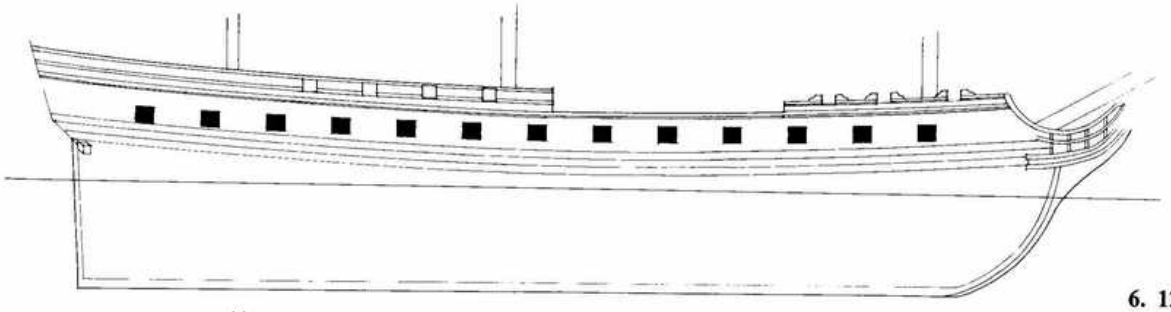


4. LIGHT FRIGATE

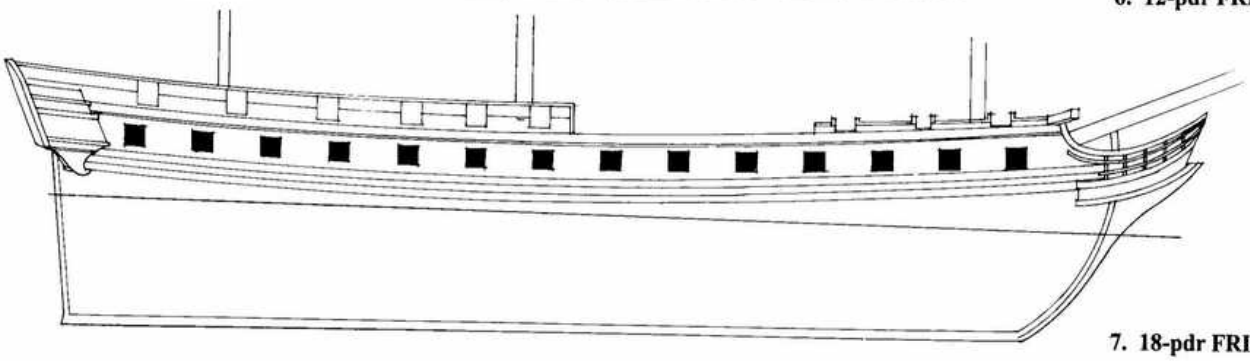
Scale 1:300



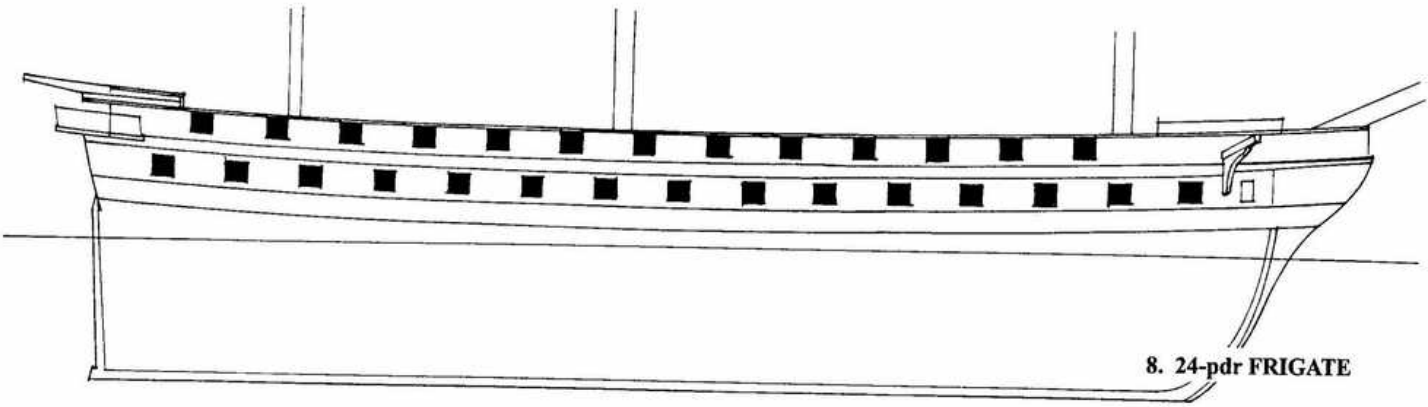
5. 8-pdr FRIGATE



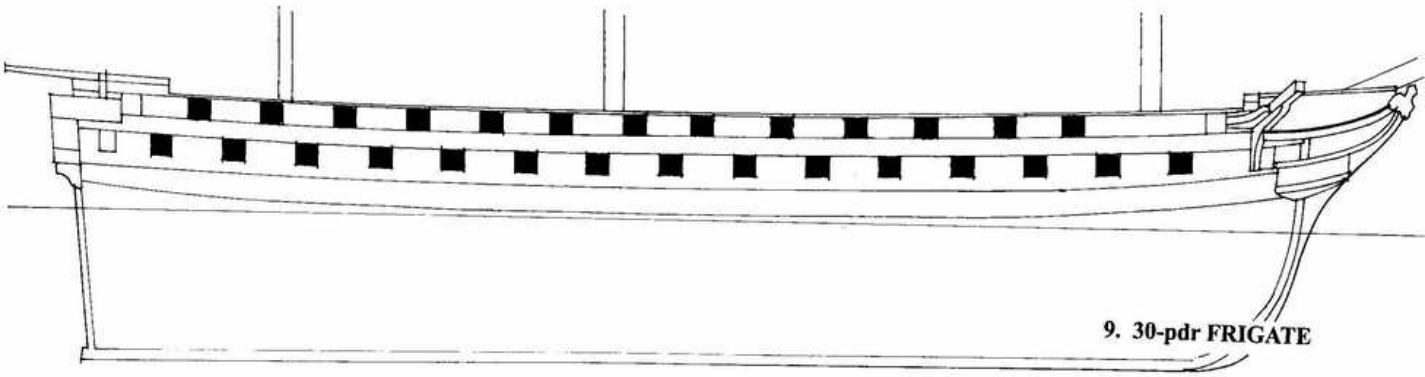
6. 12-pdr FRIGATE



7. 18-pdr FRIGATE



8. 24-pdr FRIGATE

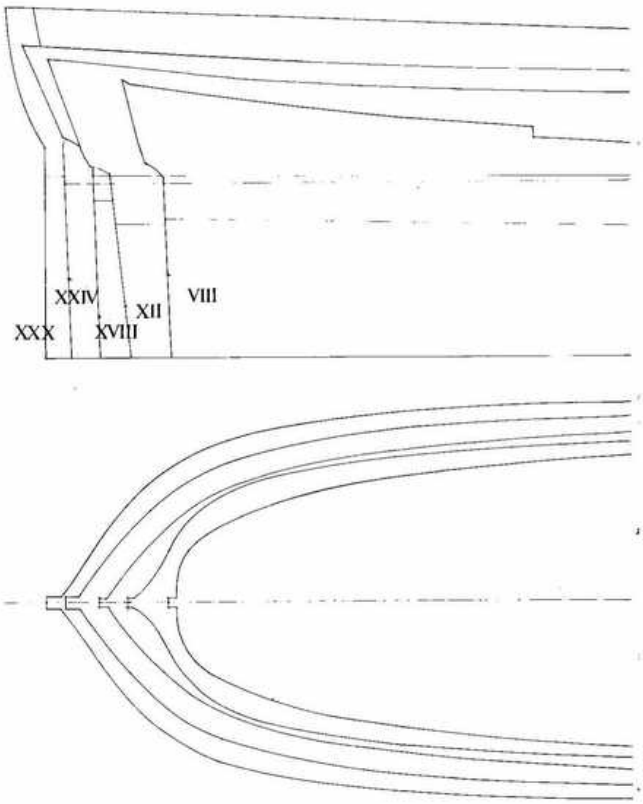


9. 30-pdr FRIGATE

Summary data concerning the various classes of frigate in the 18th and 19th centuries

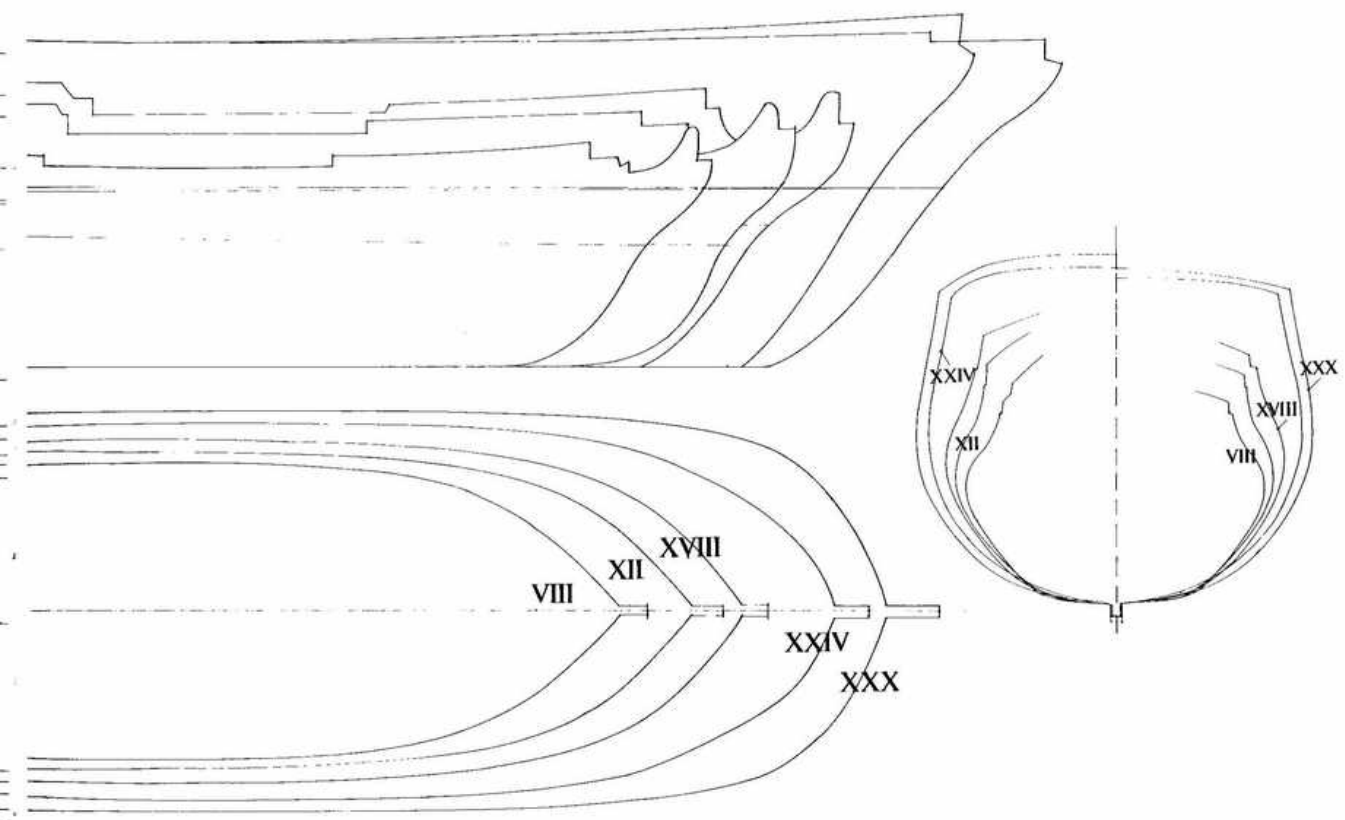
Dimensions in French feet and inches, volumes in tons of 2,000 French pounds (978 kgs). Fractions of inches (lines) and of tons (pounds) have been ignored.
The dimensions given for breadth and depth in hold are measured in the usual way. All the data is taken from the table drawn up by the shipwright Chaumont, with the exception of those for the *Reine Blanche* and the *Uranie*, which are copied from the draughts in the *Atlas du Génie Maritime*.

Vessel and class	Laid down	Designer
8-pdr class: *Améthyste*	1753	J. Geffroy
12-pdr class: *Vénus*	1779	J.-N. Sané
18-pdr class: *Virginie*	1793	J.-N. Sané
24-pdr class: *Égyptienne*	1799	F. Caro
24-pdr class: *Reine Blanche*	1830	P. Leroux
30-pdr class: *Uranie*	1826	L. Barallier



The sketches show the silhouettes of each of the five classes of frigate: sheer, waterline and midship bend, at a scale of 1:240. This allows a visual appreciation of the evolution in size, remembering that their displacements were of the order of 2,600 – 2,530 – 1,350 – 1,100 – 900 tons. This emphasises the impressive development which took place from the original formula of the light frigate, which had a displacement of no more than about 500 tons.

Length on the water-line (ft/ins)	Depth in hold (ft/ins)	Breadth (ft/ins)	Draught (ft/ins)	Height of gundeck sill (ft/ins)	Total displacement (tons)	Fore-body (tons)	Afterbody (tons)	Difference (tons)	Ratio hull volume to circumscribed paral-lelopipedon	Ratio underwater sur-face of midship bend to circumscribed par-allelogram	Block coefficient	Distance of c. of g. of the plane of the load waterline forward of the mid-point(ft/ins)	Distance of c. of g. of underwater hull for-ward of the mid-point (ft/ins)	Distance above load waterline (ft/ins)	Height of metacentre above c. of g. of under-water hull (ft/ins)
119′2″	32′0″	16′6″	12′11″	5′4″	868	458	410	48	0.493	0.751	0.815	1′9″	1′10″	4′10″	9′9″
134′6″	34′8″	17′9″	13′6″	6′0″	1,082	591	491	100	0.478	0.748	0.800	2′2″	3′8″	5′0″	10′10″
144′0″	36′8″	19′0″	15′0″	6′0″	1,350	747	603	144	0.484	0.744	0.815	2′1″	4′5″	5′5″	11′10″
157′6″	40′3″	21′9″	17′4″	6′9″	1,931	1,045	886	159	0.494	0.701	0.842	0′9″	3′9″	6′3″	11′11″
163′0″	41′4″	21′8″	18′2″	6′2″	2,352	1,275	1,077	198	0.533	0.758	0.831	3′10″	3′10″	6′10″	10′10″
169′0″	43′4″	21′10″	18′2″	6′2″	2,768	1,468	1,300	168	0.591	0.769	0.894	3′0″	3′0″	6′10″	12′9″



COMPARATIVE DISPLACEMENTS OF SHIPS AND FRIGATES

SHIPS OF THE LINE

120-gun ship (*Commission de Paris* 1824 design)

118-gun ship (Sané-Borda 1784 type)

110-gun ship (American War)

100-gun ship (*Commission de Paris* 1824 design)

90-gun ship (*Commission de Paris* 1824 design)

80-gun ship (Sané-Borda 1786 type)

80-gun ship (24-pdrs on upper deck)

74-gun ship (Sané-Borda 1782 type)

74-gun ship (14 gunports on gundeck either side)

80-gun ship (18-pdrs on upper deck)

74-gun ship (13 gunports on gundeck either side)

64-gun ship (13 gunports on gundeck either side)

64-gun ship (12 gunports on gundeck either side)

56-gun ship (12 gunports on gundeck either side)

50-gun ship (11 gunports on gundeck either side)

FRIGATES

Ship-frigate 1st Order (17th century)

Ship-frigate 2nd Order (17th century)

Light frigate

Ship-frigate (2 tiers of guns)

Ship-frigate (1 1/2 tiers)

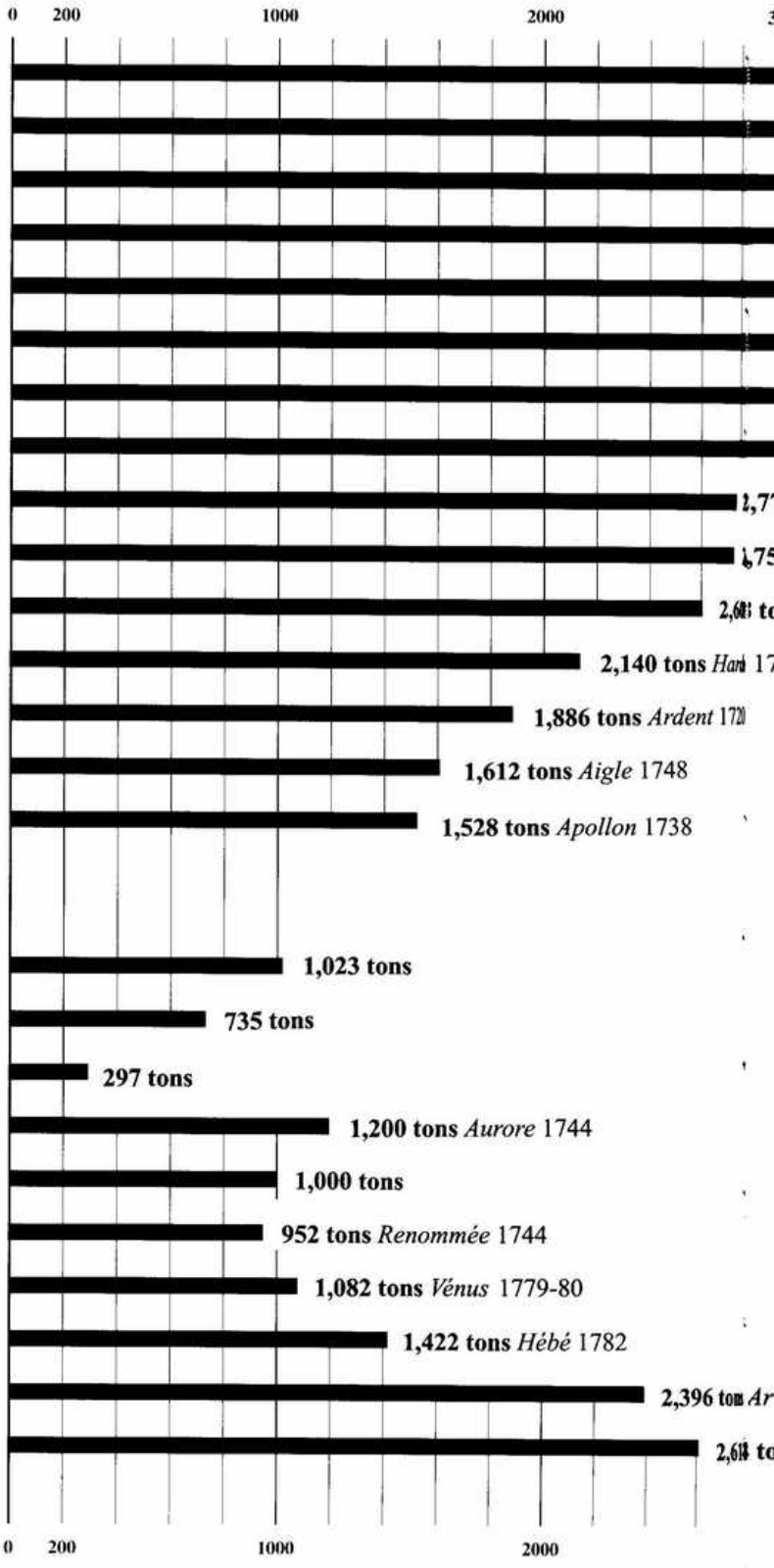
8-pdr frigate

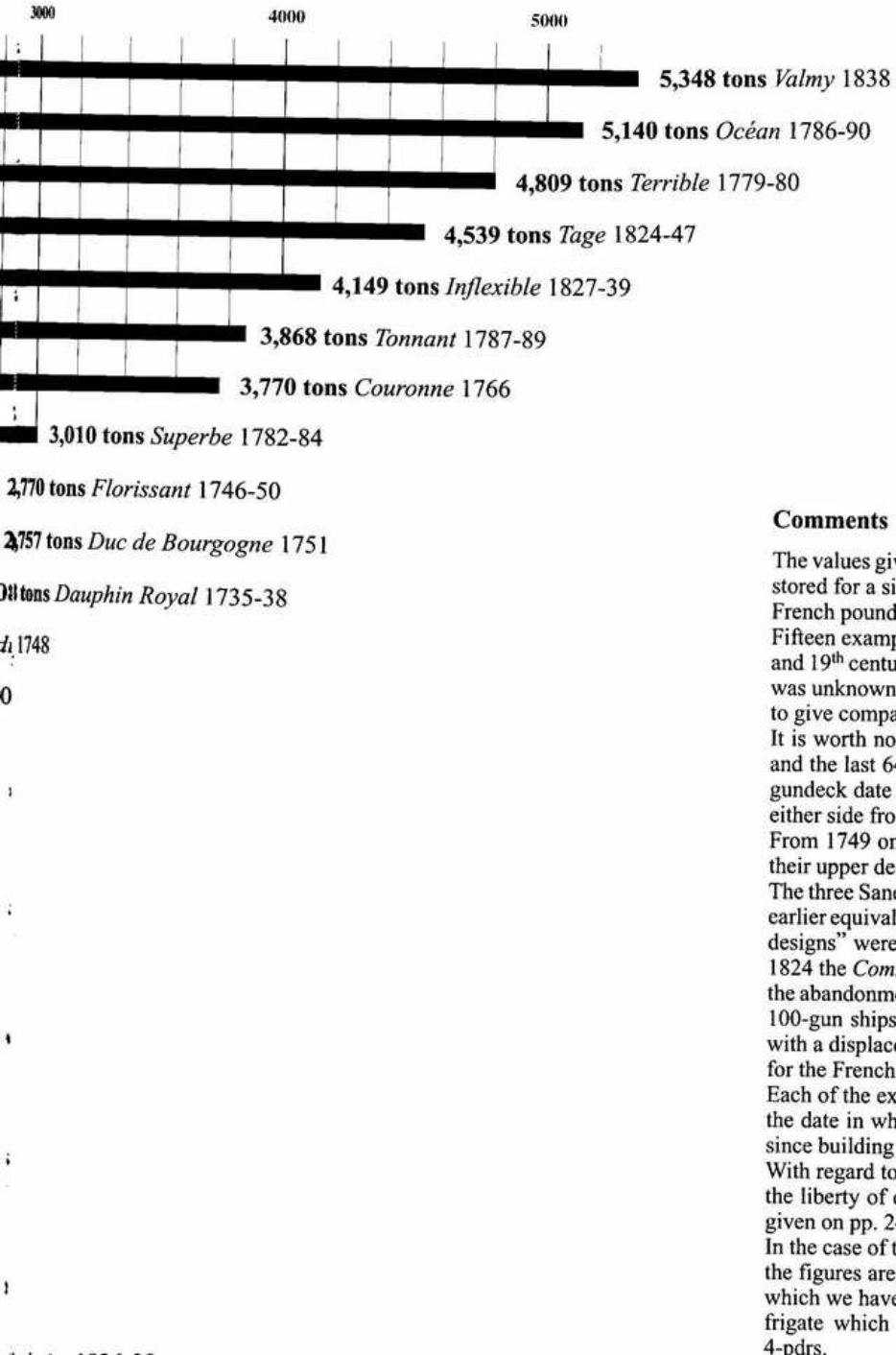
12-pdr frigate

18-pdr frigate

24-pdr frigate (2nd Rank)

30-pdr frigate (1st Rank)





Comments

The values given for the displacement assume that the vessels are stored for a six-month commission. Tons are calculated at 2,000 French pounds (978 kgs) in every case.

Fifteen examples of ships of the line are listed, covering the 18th and 19th centuries. Since the concept of calculating displacement was unknown in the 17th century, it is unfortunately not possible to give comparable figures for this earlier period.

It is worth noting that the last 50-gun ships were built in 1750, and the last 64s in 1776. The last 64s with only 12 ports on the gundeck date from 1730, and the last 74s with only 13 ports on either side from 1735.

From 1749 onwards, 80-gun ships were armed with 24-pdrs on their upper deck, having previously carried 18-pdrs.

The three Sané-Borda types have a larger displacement than their earlier equivalents. The last ships to be built according to "general designs" were laid down at the end of the First Empire, and in 1824 the *Commission de Paris* developed new designs, marking the abandonment of the 74- and 80-gun ships in favour of 90- and 100-gun ships*. The *Valmy* was a single, exceptional ship, and with a displacement of 5,348 tons was the largest ship ever built for the French sailing Navy.

Each of the examples given quotes a named vessel, followed by the date in which it was laid down and also the date of launch, since building was sometimes spread out over several years.

With regard to the ship-frigates of the 17th century, I have taken the liberty of calculating their displacement from the examples given on pp. 24-25, based on a block coefficient of 0.58.

In the case of the frigate armed with one and a half tiers of guns, the figures are taken from the Pierre Morineau manuscript from which we have already quoted, and the same applies to the light frigate which was designed to be armed with fourteen 6- or 4-pdrs.

*With the adoption of brass sea-howitzers in 1786 and iron carronades in 1807, the numbers of guns indicated for a vessel become theoretical; thus, the 74 was in fact armed with 82 pieces, and should correctly be called an 82. By the same token, the 80-gun ship carried 86 pieces and the 118-gun ship 124. Despite this anomaly, they retained their original designations, however misleading.

FIREPOWER OF SHIPS OF THE LINE AND FRIGATES

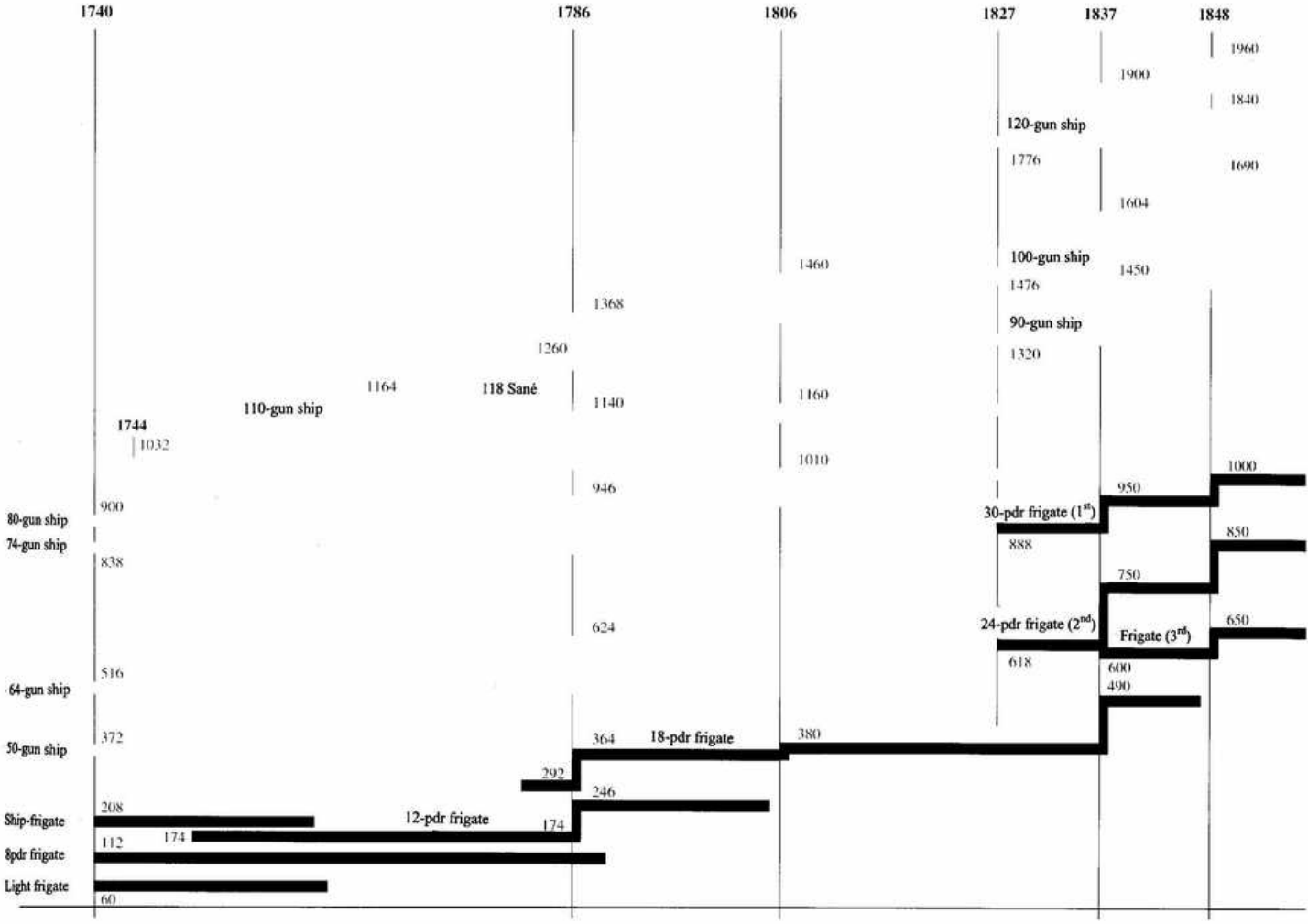
The table opposite shows the broadside weight in French pounds of the various classes of frigate (black bars), and, by way of comparison, of ships of the line (in grey).
The timescale indicated starts in 1740, the year in which the *Médée* was built, but I have also included the earlier types inherited from the 17th century, by now obsolescent.
The following comments should be made with respect to the ships of the line: in 1744, the broadside weight of the 80-gun ship was significantly increased with the adoption of the 24-pdr calibre on the upper deck (previously 18-pdrs). The 50-gun ship disappeared from the French Navy in the 1770s, and the 64-gun ship at the beginning of the Revolution. As we have seen, the use of the 18-pdr calibre on the gundeck was envisaged for the last time in 1749, and the 24-pdr calibre was discontinued in its turn in 1779*.
The end of the American War signalled the adoption of the Sané-Borda system for 74-, 80- and 118-gun ships, its distinguishing characteristic being the adoption of the 36-pdr as the only calibre used on the lower deck of ships of the line. In 1814, these general designs, originally adopted between 1782 and 1786, were abandoned in favour of new and more powerful class designs for 90-, 100- and 120-gun ships, which entered service from 1824 onwards.
As far as the frigates are concerned, the so-called "ship-frigates" so typical of the 17th century disappeared in the 1750s, as did the light frigates, "demoted" to sloops-of-war. The year 1740 marked the birth of the 8-pdr frigate, which lasted until the end of the century, but in 1748 the first 12-pdrs had made their appearance, to disappear in their turn in the first years of the Empire. The 18-pdr frigate, adopted during the American War of Independence, had a long career, since it remained in service until just before the middle of the 19th century. Following the fall of Napoleon, the entire matériel of the French Navy was in need of renewal, as we have already indicated for the ships; the new frigates were however developed along much more innovative lines, as large and powerful vessels divided initially into two ranks, with a third added later.
The table shows the progression of the firepower of each of the types, and above all it highlights the narrowing gap between the firepower of ships and frigates.
The evolution of a Navy is dictated, and thus explained, by the increase in the power of its guns. The year 1786 marked an important increase in broadside weight with the adoption of the brass sea-howitzer, the forerunner of the explosive-projectile artillery which was later to condemn the wooden fighting ship to extinction, but at this time its significance was not yet recognised and its presence can best be described as token. 1806 was the year in which the iron carronade was adopted; proving to be a redoubtable weapon at close range, the result was another significant increase in firepower. 1827 marked the beginnings of the post-Napoleonic Navy and the adoption of a new calibre of 30 pounds weight of ball, which gradually assumed predominance. In 1837, there was a further major increase in firepower for both ships and frigates, but in fact this went far beyond a simple increase in broadside weight, since it included the adoption of the Paixhans-type shell-gun, discreetly heralded in 1786. These new weapons employed hollow sho·, both explosive and incendiary. In 1848 the number of shell-guns was increased, and the 30-pdr calibre, in four different versions, was universally adopted throughout the French Navy. The wooden sides of ships, however thick, offered no resistance to explosive projectiles, and armour-plating became essential; this in turn called for a different form of propulsion: steam. In short, 1848 marked the end of the old sailing navy.

*The *Hippopotame* built in 1749 to the draughts of François Coulomb junior, so-called to distinguish him from his father, also called François.
The *Jason*, built in 1779 to the draughts of J.M.B. Coulomb.

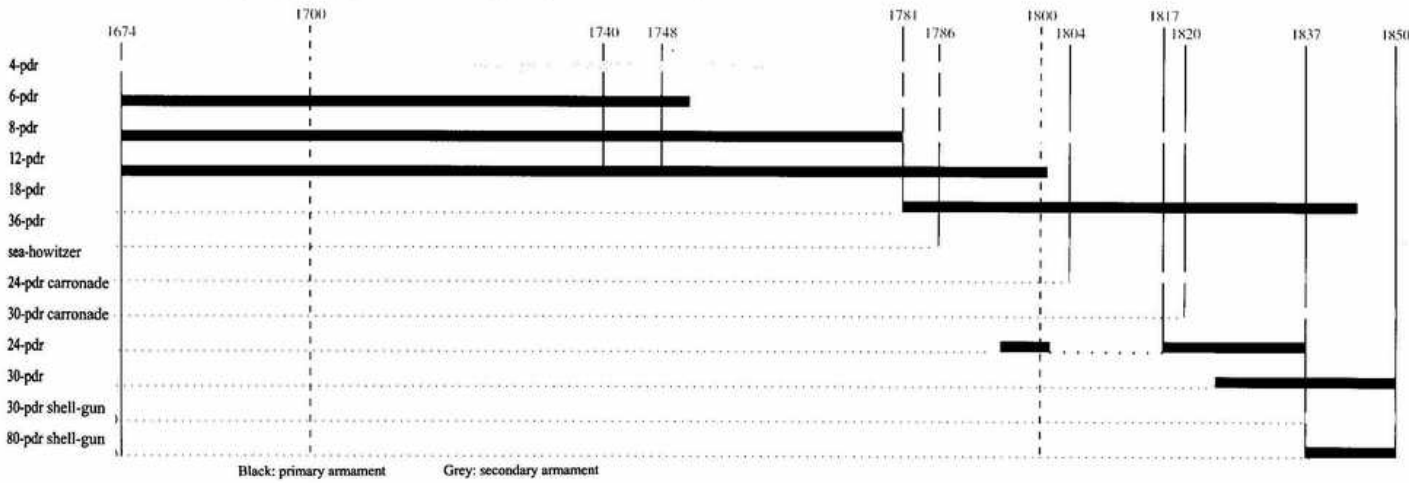
It may be of some interest to look at the relationship between weight of broadside, displacement, and cost. The following table illustrates these, taking 8- and 12-pdr frigates with their original armament, and the other frigates armed in accordance with the 1837 Establishment; the 90- and 100-gun ships are shown for the same year, while the 74s, 80s and 118s of the Sané-Borda type are shown armed as in 1827. The table shows the percentage of the broadside weight to overall displacement; likewise, on the basis of the building costs in 1826, I have shown the cost of delivering one pound of iron (broadside weight). Naturally these figures are extremely theoretical, but they provide a notional relationship between the various types of vessel.

The high cost, and the low percentage of broadside weight to displacement of the 8- and 12-pdr frigates is explained by the fact that they carried no carronades. The presence of carronades improves the figures for the 18-pdr class, but a real "return" is only achieved by the new 1st and 2nd Rank frigates, both of which (including the 2nd Rank after 1837) benefit from the adoption of the 30-pdr calibre throughout.
Note the very small difference in broadside weight between the 74-gun ship and the frigate of the 1st Rank. The new 90-gun ship redressed the balance considerably, but all this is a far cry from the undisputed superiority of the ship of the line over the frigate during the Revolutionary and Napoleonic Wars.

Vessel type	Displacement (tons)	Cost (francs)	Broadside weight (pounds)	Cost of 1lb of iron broadside weight	Ratio broadside weight to displacement
118-gun ship	5,081 t	2,564,000 F	1,460 lbs	1,756 lbs	3.48%
100-gun ship	4,440	2,298,000	1,604	1,432	2.76
90-gun ship	4,058	2,049,000	1,450	1,413	2.79
80-gun ship	3,749	1,961,000	1,160	1,690	2.23
74-gun ship	3,009	1,648,000	1,010	1,631	2.97
30-pdr frigate	2,557	1,351,000	950	1,422	5.38
24-pdr frigate	2,344	1,152,000	750	1,536	6.25
18-pdr frigate	1,391	853,000	490	1,740	2.83
12-pdr frigate	1,082	645,000	174	3,706	1.24
8-pdr frigate	868	550,000	112	4,910	1.55



SERVICE LIFE OF CALIBRES



Up to the middle of the 18th century, 4- and 6-pdr calibre long guns coexisted in the Navy as both primary and secondary armament (secondary for ship-frigates, primary for light frigates). However, with the adoption of the 8-pdr frigate the 4-pdr calibre was relegated to the secondary role only, and then disappeared with the last of the 8-pdr frigates. A similar situation prevailed with the 12- and 18-pdr frigates, with the three smallest calibres surviving only as secondary armament.

SHIPBUILDING MATERIALS (hull – masts & spars – rigging)

The table opposite is derived from a report on 18-, 24- and 30-pdr frigates drawn up in 1826[1]. In that year, a special commission was charged by the Minister for the Navy with the revision of the tables used by the Navy to calculate its building costs for each type of vessel.

This was not a new initiative, and there are a number of precedents dating back to the middle of the 18th century[2], which merit critical and comparative analysis in the context of the finances of the French Navy.

For the 8- and 12-pdr frigates, I have drawn on formulæ developed by Captain Costé and published in the *Annales Maritimes* in 1824. These calculations were supplemented with information given by Vial du Clairbois in the *Encyclopédie Méthodique: Marine*; I have also consulted several texts by Admiral Thévenard in his *Mémoires Relatifs à la Marine*, published in Paris in 1800 (4 vols, 8vo).

The 1826 Report only gives data for the hulls, but information on masts and rigging can be derived from Costé's formulæ. These have also been used for the labour calculations for ships built in the French naval Dockyards.

Class of Frigate	Oak (by type) 1st	2nd	3rd	4th	5th
8-pdr Frigate	50,138	109,312	75,207	17,781	6,996
12-pdr Frigate	65,587	142,543	98,235	23,028	8,745
24-pdr Frigate	185,560	247,775	141,669	17,490	12,826
18-pdr Frigate	60,049	168,778	155,661	26,235	14,575
30-pdr Frigate	269,637	313,654	87,450	13,992	6,121
(feet – pounds)					
8-pdr Frigate	172	375	258	61	24
12-pdr Frigate	225	489	337	79	30
18-pdr Frigate	206	579	534	90	44
24-pdr Frigate	640	850	486	60	50
30-pdr Frigate	925	1,076	300	48	21
(metres – kilos)					

Figures in the upper part of the table are in old French (duodecimal) measures: cubic feet (0.0342 m^3) for timber, pounds (0.489 kgs) for metals, tar, oakum, hemp. Canvas is estimated not in ells but in square feet (9.5 ft^2 = 1 m^2). The classification of oak timber into five categories is explained in volume I of *The 74-Gun Ship*.

I have assumed in my calculations that neither the 8- nor the 12-pdr frigates were coppered, and that they employed no bronze fastenings.

Figures in the lower part of the table are in modern (decimal) measures: steres for timber (29.15 ft^3), kilogrammes (2.04 lbs), and square metres (9.52 ft^2). The 1826 Report also gives the number of treenails, all the other species of timber (elm, beech, ash, walnut, poplar, lime, live oak, box, holly, lignum vitae), but since these were employed only in very small quantities (3.5 -4% of the amount of oak used), I have omitted them from the table. By the same token, I have also omitted the metals such as steel, sheet iron, tin-plate, cast-iron, pewter, which are insignificant overall in terms of the quantities used.

CALCULATING THE QUANTITIES EMPLOYED: MATERIALS AND LABOUR

The anchors and guns are not considered as part of the building, but rather of the fitting-out; I shall thus restrict myself here to giving the basic numbers from which a calculation of weight might be made.

Costé's formulæ are primarily based on the squares and cubes of the ship's beam. These are the relevant figures for the five frigate classes[3]:

	Beam	Square	Cube
8-pdr frigate	32.00 ft	1,024	32,768
12-pdr frigate	34.50 ft	1,190	41,063
18-pdr frigate	37.00 ft	1,369	50,653
24-pdr frigate	41.20 ft	1,697	69,934
30-pdr frigate	43.30 ft	1,874	81,182

Materials

Oak. The length between perpendiculars multiplied by the breadth extreme to outside of plank, the product then multiplied by the depth in hold (from the upper face of the keel to horizontal line of deck at the midship beam).

These dimensions in feet give a total which, in the case of frigates, is then multiplied by 0.4 to obtain the quantity of cubic feet of *rough-hewn oak*, of which half only is eventually used in the building[4].

Costé's tables then go on to give a breakdown of the total by category of timber, but in the table above I have simply applied the proportions given by Vial du Clairbois, and those noted in the 1826 report.

It is worth noting that compass timber (for the keel, stem, stern-post, hull timbers) accounts for a third of the timber worked.

Fir and pine. Used in the upper works of frigates in the form of plank, both for the outside and inside (quickwork) of the hull. The quantity employed varies between 5% and 7% of the volume of rough-hewn oak. Note that all of this timber is straight, so that there is little wastage.

Iron. I have assumed that the hulls of both the 8-pdr and the 12-pdr frigate were not copper-sheathed, so that the nails and bolts are all of iron. The other classes of frigate were coppered, and therefore required bronze[5] fastenings to the ratio of one eighth part of the amount of iron calculated from *7/10ths of the cube of the beam*. The iron required can also be estimated on the basis of 3 pounds weight for every cubic foot of timber worked (employed in the building)[6].

Copper. The number of sheets required (each of which weighs about 14 pounds) can be derived from a rule of thumb which takes the half-breadth, adding it to the average draught (half the sum of the draught forward and the draught aft, multiplying the sum by the length and then adding 50%. This gives a number of square feet, which has to be divided by the surface area of each sheet to arrive at the quantity. Each sheet measures 4′4″ by 1′1″, or 4 1/2 square feet. The weight of the nails is about one eighth of the weight of the sheets (see *74-G.S.*, vol. III).

Total	Building of the hull				Miscellaneous (caulking)			Masts, spars & rigging			
	Fir & Pine	Iron Stave/Bar	Nails	Copper	Lead	Pitch	Oakum	Timber	Iron	Hemp	Canvas
259,434	39,352	29,965	26,584		5,582	1,527	4,584	1,308	2,016	24,576	126,217
338,139	59,757	38,065	33,754		6,854	2,057	6,169	1,644	2,517	30,795	155,325
423,549	81,620	52,654	31,304	36,666	8,286	2,458	7,374	2,028	3,108	37,987	176,348
608,069	96,195	93,218	40,920	43,016	10,865	4,206	12,621	2,798	4,286	52,449	219,668
690,854	104,940	105,971	50,306	52,004	12,805	4,574	13,725	3,247	4,975	60,885	238,858
890	135	14,653	13,000		2,730	747	2,242	44.90	986	12,017	13,286
1,160	205	18,614	16,506		3,512	1,006	3,017	56.40	1,231	15,059	9,892
1,453	280	25,748	15,308	17,930	4,052	1,202	3,606	69.60	1,520	18,576	11,380
2,086	330	45,584	20,010	21,035	5,313	2,057	6,172	96.00	2,096	25,648	14,107
2,370	360	51,820	24,600	25,430	6,262	2,237	6,712	111.40	2,433	29,773	15,578

Apart from the copper used for sheathing purposes, sheet copper is also used in the galley and in the magazines and powder-rooms, but in small quantities.

Caulking. The number of pounds of oakum needed comes to 1/18th of the product of the principal dimensions, the value for the depth in hold being taken from the upper face of the keel to the gunwale at the maximum breadth of the frigate. The quantity of pitch may be estimated at one third of that of the oakum, in pounds.

Lead. In pounds, about 1/6th of the cube of the beam.

Masts. The number of cubic feet of fir or pine is equal to 1/25th of the cube of the beam, allowing one third for spares. The ironwork may be estimated at 1½ pounds for every cubic foot of timber worked.

Sails. The quantity of canvas required can be obtained by multiplying the length between perpendiculars by the breadth to outside of plank; the product is multiplied by 3.46 and then by 9.5, to obtain the number of square feet of canvas necessary, spares included.

Rigging. The weight of cordage necessary is equal to 1½ times the cube of the beam, expressed in pounds. Of this total, spares amount to about 1/8th part. The weight of the running rigging is about the same of that of the standing rigging.

The weight of the anchor cables and cablets is (in the case of frigates) equal to 34 times the square of their beam[7] (6 cables – 3 cablets – 3 hawsers).

Blocks. Frigates require about 750 blocks of all types, spares representing 1/6th of the total.

Captain Costé gives other formulæ, also based on the square or the cube of the beam, for calculating the number of treenails, the weight of junk, the quantity of leather, etc. Since these items are less significant, we have not included them here.

Labour.

This is calculated in terms of time (man-days) rather than as a cost, because of the changes over time and in different Dockyards in labour costs.

Shipwrights. 10 man-days per stere (29.15 cubic feet) of *rough-hewn*[8] timber are required.

Sawyers. 2 man-days per stere of rough-hewn timber.

Auger-men. The same formula as for the sawyers.

Joiners. One man-day per stere of rough-hewn timber.

Plumbers. One tenth of the amount calculated for the sawyers.

Caulkers. For caulking, one man-day for 6 to 7 pounds of oakum. For copper sheathing, one caulker can fasten 50 square feet or 5.25 m^2.

Smiths. Costé gives no times for the forging of iron and bronze, but estimates the costs at Frs 0.50 per kilo of metal worked, including the cost of coal. According to the same source, the average cost per man-day is 2 francs, with supervision costs of one eighth of the labour costs. These figures apply to the cost of building the hull, excluding fitting-out costs[9].

Mastmakers. The manufacture of the masts and spars, including spares, demands 1⅛ man-days for each unit of the square of the beam (in feet): 36 x 36 = 1,296 x 1.33 = 1,724 man-days for a vessel with a beam of 36 feet.

Sailmakers. The sewing of the sails (including spares) demands 1/14th of a man-day per square metre of cloth.

The manufacture[10] and the setting up of the rigging represents in man-days 1/31st part of the cube of the beam, or (using the same example): 36 x 36 x 36 = 46,656 : 31 = 1,505 man-days.

Masting the ship, heaving down (for copper sheathing), scraping, ballasting[11] and stowage, demand the same number of days as it does to manufacture the rigging and rig the ship. Costé gives no indication of the supervision costs for any of these fitting-out

operations. The costs of the boatmakers, oarmakers, carvers, masons are all items for which it is impossible to define accurate estimates on the basis of formulæ.

1. Baron Tupinier questioned the accuracy of this report in his own report entitled *The matériel of the Navy*, published in 1838.
2. 1744: *Essai sur la marine, ou tableau des dépenses nécessaires* (Bibliothèque Nationale, French manuscripts, Supplementary n° 6206).
1752: *Répertoire de construction*, Pierre Morineau (Archives Nationales, fonds marine, G.234).
1775: *Dénomination des prix*, Train (MS, Brest Dockyard, ref. 52).
1785: *Constructions navales, prix et matières* (Bib. Nat., recent acquisitions n° 14883).
1790-1806: *États de la dépense nécessaires pour la construction et l'armement des bâtiments de guerre* (Service Historique de la Marine, Vincennes, SH.320, vol. 5).
3. The breadth at the midship beam of 8-, 12- and 18-pdr frigates varies, and the figures employed are averages. For 24- and 30-pdr frigates the breadths given are those for the class designs.
4. The wastage in timber is equal to 50% of the quantity employed. Nor must it be forgotten that the timber stocked in the Dockyards has already been rough-hewn (barked and squared) in the forest in order to save on transport costs. For the merchant navy the wastage is considerably less (see J. Boudriot: *Le Navire Marchand sous l'Ancien Régime*, Paris, 1991.
5. Making use of as many treenails as possible in order to limit the number of expensive bronze fastenings.
6. For vessels which were not copper-sheathed, the total quantity of iron employed (including iron knees) comes to 8% or 9% of the cube of the beam, expressed in pounds. The use of iron knees in place of timber knees varied from Dockyard to Dockyard, depending on the availability of suitable compass-timber.
7. Taking into account the adoption of chain-cable for 24- and 30-pdr frigates, this formula is valid for the 18-pdr class. It should be noted that the weight of a cable, irrespective of the type of vessel, is equal to 5 1/2 times the square of the beam in feet expressed in pounds. The thickness of the cable is equal to half the beam reduced to inches (less one inch from about 1800 onwards).
The weight of the anchors is equal to half the weight of their cables.
8. A stere of rough-hewn timber is the unit of measure for the total quantity of oak employed in the building of a vessel (1,450 to 1,500 steres for an 18-pdr frigate).
9. Fitting-out excluding the guns and ammunition, victuals, etc.
10. From ropes which have already been laid.
11. The weight of ballast can be calculated at 2.8 times the cube of the beam (36 x 36 x 36 = 46,556 x 2.8 = 130 tons).

Note on the weights of anchors. According to de la Coudraye*, the weight of the waist or spare anchor, the heaviest of the anchors, may be calculated on the basis of the ratio of the square of 46 and the square of the beam of the vessel in question: $46^2 : x^2 = y$ x 6,720. Thus, for an 18-pdr frigate, with a beam of 36 feet: 36 x 36 = 1,296; 46 x 46 = 2,116; 1,296 : 2,116 = 0.71; 6,720 x 0.61 = 4,099 pounds.

Frigates are supplied with four principal anchors. The weight of each may be calculated at $24/24^{ths}$ for the waist anchor, $23/24^{ths}$ for the sheet anchor, $22/24^{ths}$ for the best bower, $22/24^{ths}$ for the small bower. The weights of the stream anchors are equal to approximately one quarter respectively of the best and small bowers.

Another rule of thumb given by Pierre Morineau is to multiply the length from the outside of the perpendicular of the stem to that of the sternpost by the breadth at the midship beam, and the product by the half-breadth; the result, divided by 25, gives the weight of the heaviest anchor. Thus, for the example already used, with a vessel measuring 145 feet by 36 feet: 145 x 36 x 18 = 93,960 : 25 = 3,759 pounds – a result which is slightly smaller than that obtained with the previous formula.

In principle, the weight of the heaviest anchor ought to be equal to half the weight of its cable (see below), or 7,776 : 2 = 3,888 pounds. According to Admiral Thévenard, in a report dating from 1776, the French Navy had been in the habit for the previous thirty years of reducing by about 1/10 the circumference of the cables calculated in inches on the basis of the half-breadth in feet. There is no doubt that the cables were strong enough, but they were too light for the anchors which equalled half the weight of the cables at the reduced circumference. On Thévenard's initiative, the size of the cables was retained at the same level, but the weight of the anchors was increased on the basis of a simple rule of thumb which called for the half-weight of the cable to be increased by one third in order to obtain the weight of the principal anchor; the same applied to the stream anchors, the cablets of which were half the circumference of the largest anchor cables.

In 1807, Regulations laid down that the 18-pdr frigate would be supplied with anchors weighing respectively 2,100 – 2,100 – 2,000 – 1,800 – 600 – 560 kilogrammes.

Further texts published in 1832 and 1836 (fitting-out), establish precisely the characteristics of the anchors employed at the time in frigates.

*François Célestin de Loynes Barraud, Chevalier de la Coudraye: *Dictionnaire de Marine*. St Petersburg, Imprimerie de la Marine, 2 vols. in 1, 4^{to} (letters A & B only, remainder unfinished).

Note on the cables and cablets. Frigates are supplied with six cables of 120 French fathoms (600 feet – 195 m). Five of these have a circumference which is equal to half the beam in feet expressed in inches. Thus for a frigate with a beam of 36 feet, the cables measure 18 inches in circumference. The weight in pounds of one fathom of cable for any given vessel is about $1/5^{th}$ of the square of the circumference in inches, so that for the same example 18 x 18 = 324 : 5 = 64.8 pounds, giving a weight for a cable of 120 fathoms 7,776 pounds. The diameter of the sixth cable, used when mooring, is one tenth less.

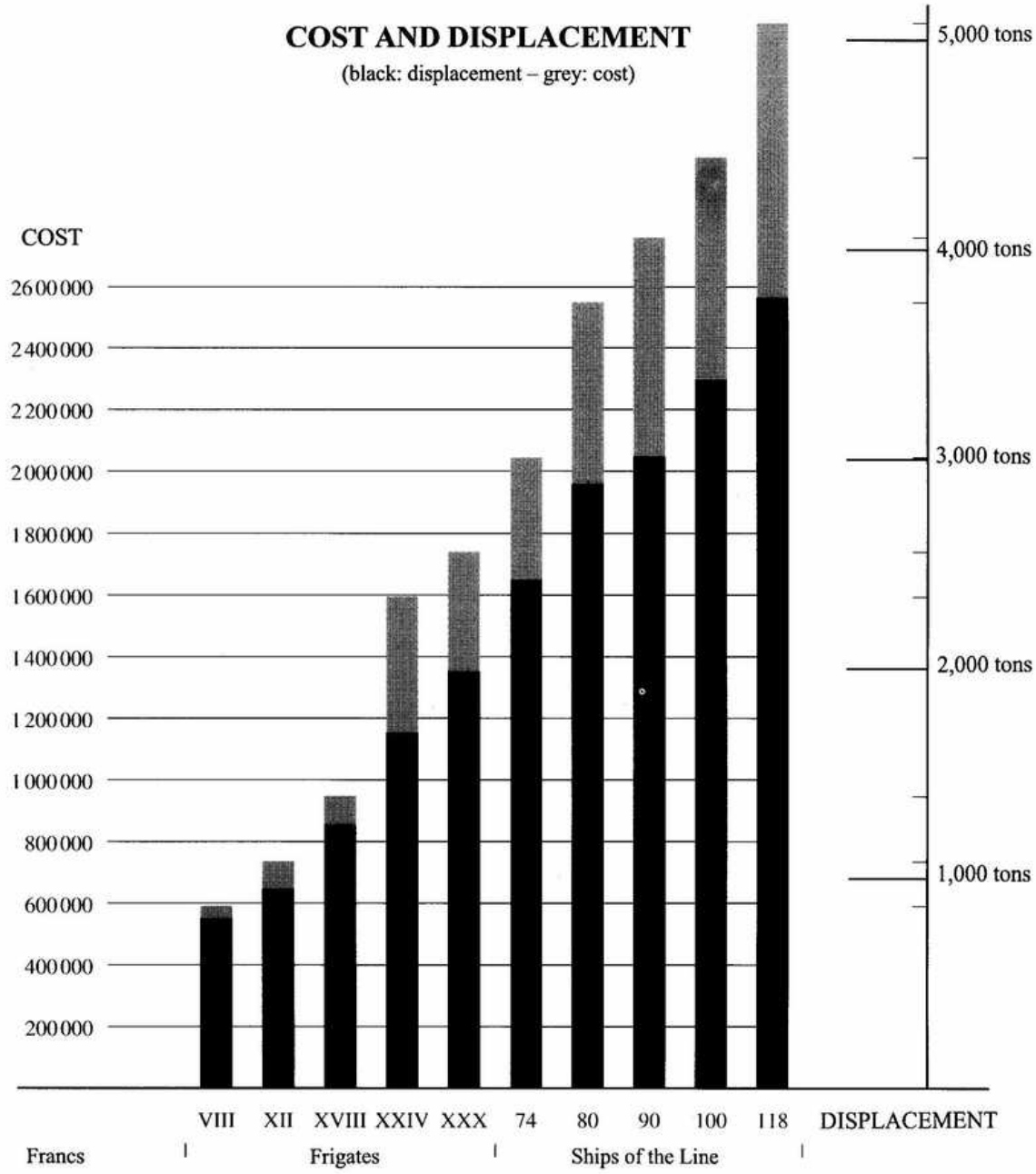
The circumference of the cablets is as a rule half that of the cables, and their weight can be calculated using the same formula.

An alternative formula offered by Pierre Morineau consists of taking a the weight of a 120-fathom 20-inch cable weighing 9,600 pounds; to obtain the weight of an 18-inch cable, multiply 9,600 by 18^2, giving 3,110,400, and divide by 20 to obtain 7,776 pounds.

As already explained in the previous section covering the anchors, the circumference of the cables was determined on the basis of the half-breadth reduced to inches, and this was reduced by one tenth from about the middle of the 18^{th} century onwards; this was officially sanctioned in 1807, and remained in force until the adoption of *chain-cables*, the use of which became more or less general in the 1830s*. These iron cables were 180 (French) fathoms in length, in sections of 36 fathoms joined by a shackle. The section or diameter of each link had the same number of lines ($1/12^{th}$ of an inch) as the hemp cables had inches in circumference.

Thus, for 30-pdr frigates, the link diameter was 52 mm; 24-pdr frigates, 48 mm; 18-pdr frigates, 44 mm. A fathom of chain-cable weighed approximately twice as much as a fathom of hemp cable of the corresponding size.

*According to Tupinier, approximately 300,000 metres of chain-cable were manufactured between 1830-1838, and nine more years were to elapse before the total needs of the Navy in chain-cable could be satisfied (*Report on the matériel of the Navy*, 1838).



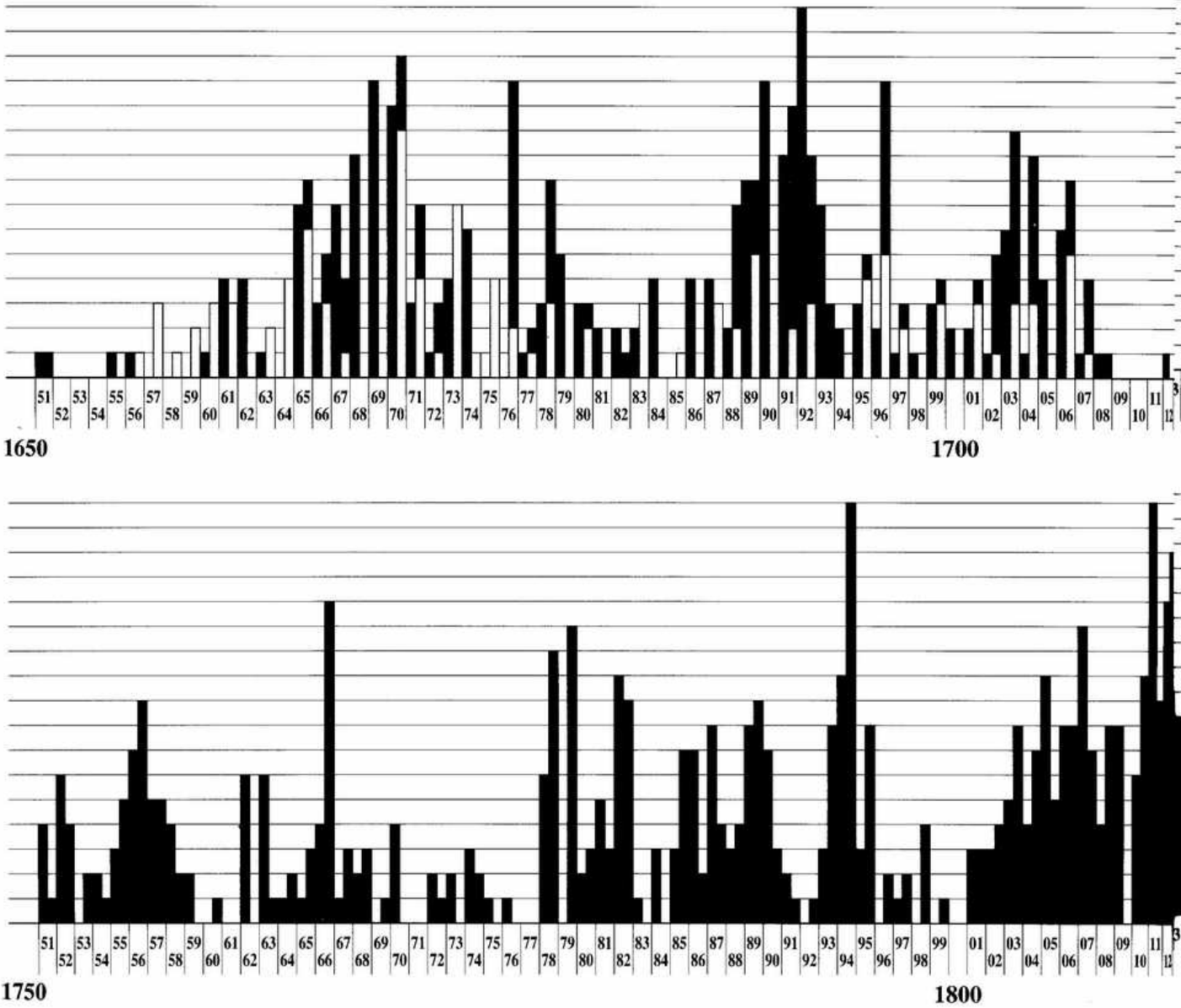
This graph shows, for each type of vessel, the cost of building and fitting out in francs. The figures come from the 1826 Report; for the 8- and 12-pdr frigates which are not covered by the Report, I have used estimates from 1777 increased by a factor of 1.65.

VESSELS	Cost of building /fitting out	Displace-ment
118-gun ship	2,564,000 frs	5,081 tons
100-gun ship	2,298,000 frs	4,440 tons
90-gun ship	2,049,000 frs	4,058 tons
80-gun ship	1,961,000 frs	3,749 tons
74-gun ship	1,648,000 frs	3,009 tons
30-pdr frigate	1,351,000 frs	2,557 tons
24-pdr frigate	1,152,000 frs	2,344 tons
18-pdr frigate	853,000 frs	1,391 tons
12-pdr frigate	645,000 frs	1,082 tons
8-pdr frigate	550,000 frs	868 tons

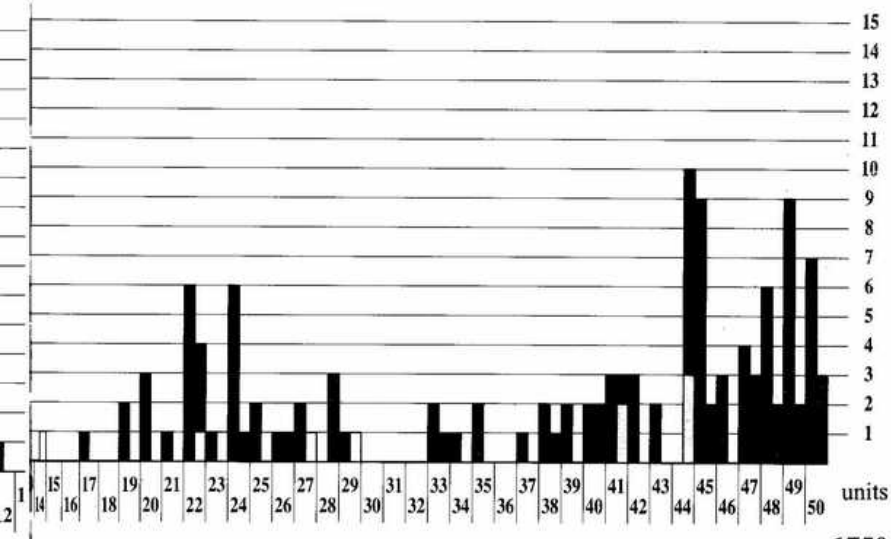
Above the black bars representing the cost, the grey bars show the displacement of vessels fitted out and stored for six months at sea.

French tons of 2,000 pounds (978 kgs). Francs expressed as equivalents of *livres*. Figures rounded up.
The 118-, 80- and 74-gun ships are of the Sané type; the 90- and 100-guns ships of the *Commission de Paris* type.
Note the displacement of the 18-pdr frigate, increased by about 40 tons from the original specification by reason of the increase in armament.

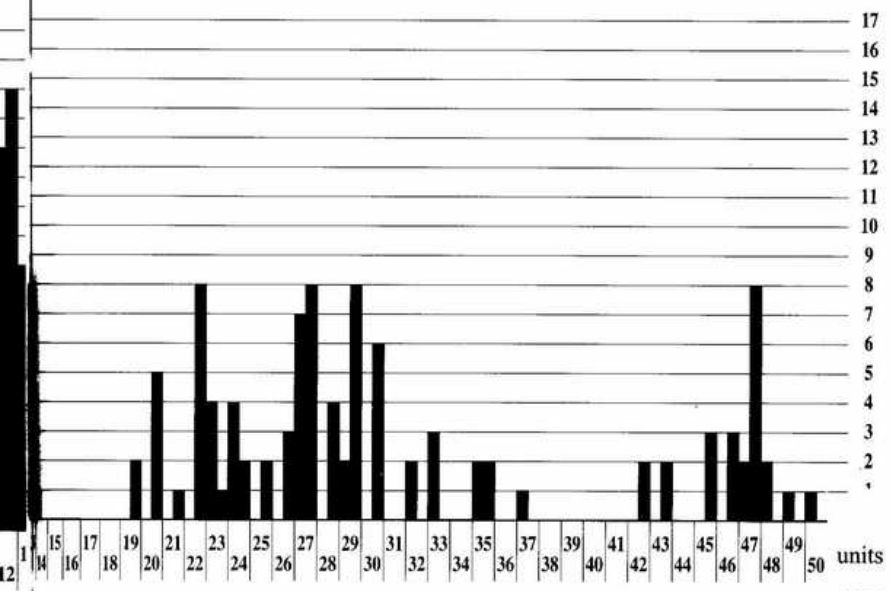
NUMBERS OF FRIGATES AND SHIPS LAID DOWN BY YEAR, 1650-1850



This graph provides a visual demonstration of the activity of the French Dockyards over two centuries. *The grey bars represent the frigates laid down each year, the black bars the ships of the line.* In order to simplify the tale, no distinction has been made between the different classes of frigate*, the aim being simply to indicate over the years the relative numbers of frigates laid down compared with ships of the line. The various ranks of vessels in the French Navy were defined for the first time in the Regulation of 1674, but it was not until 1689 that the composition of the Navy was defined: 12 ships of the 1st Rate, 24 of the 2nd, 36 of the 3rd, 30 of the 4th, 18 of the 5th. In total, 120 ships of the line, to which were added 20 light frigates, fireships, storeships, bombs and sloops, bringing the total to 222 vessels. As we have seen, the 4th and 5th Rates can be considered as ship-frigates[2], making 48 in all. The Navy was rebuilt following the Battle of the Hogue (1692), but this was not kept up after the end of the 17th century. On the death of Louis XV in 1715, the Navy numbered only 82 vessels, of which 23 of the 4th and 5th Rates, and 14 light frigates. The situation continued to deteriorate, so that by 1719 the French Navy had only 49 ships of all Rates, and of even this meagre total it is questionable how many could actually be fitted out for sea, in view of their state of dilapidation. The situation was no better by 1736, the French Navy having barely 40 ships of the line and ship-frigates, the War of the Polish Succession having done nothing to stimulate new building. However, the War of the Austrian Succession (1741-8) resulted in very real efforts being made, so that by 1752 the Navy consisted of 64 ships of the line and 24 frigates. The disastrous Seven Years' War made it abundantly clear that France had to have a powerful Navy if her foreign policy was to be credible. Over the next fifteen years a major building programme was initiated, so that by the outbreak of the American War of Independence the French Navy was able to



1750



1850

confront the English Royal Navy without too serious a numerical disadvantage. In 1786, almost a century after the *Ordonnance* of 1689, a Royal decree set down the composition of a truly modern Navy: 81 ships of the line and 60 frigates, out of a total of 241 vessels of all types. The building programme to achieve these totals was well under way by 1791, but was somewhat compromised by the events of the Revolution, despite a large number of vessels being laid down between 1793 and 1795; they were however only completed slowly. The pace accelerated again at the beginning of the 19th century, with major programmes during the early years of the Empire, reaching a peak in 1811-12; however, there was no new Edict defining the composition of the Navy, and its size must be recognised as being only relative by comparison with the English Royal Navy[3]. The Fall of the Empire cast a shadow over the whole future of the French Navy, but fortunately its strength was able to be kept up under the Restoration, albeit on a less ambitious scale, but with the core retained. The Royal decree of 1837 once again defined the strength of the Navy, in terms not only of its numbers and Rates, but also of its armament. The core was composed of 40 ships of the line and 50 frigates, which clearly demonstrates the strategic significance of the frigate by this date. Nevertheless, the application of the 1837 text marks the end of the classical period of the French Navy, whose origins went back to 1660.

1. For the frigates, see the general lists. The ship-frigates are however shown in light grey.
2. As we have seen, the 1689 *Ordonnance* prescribed (in theory) that 4th Rates would be armed with four brass 18-pdrs on the lower deck. This arrangement was however never respected, the whole of the lower deck armament being composed of 12-pdrs.
3. In 1812-13 the French Navy had approximately half the number of ships of the line to be found in the English Royal Navy (Admiral Dupont, *l'Amiral Decrès et Napoléon*).

Chapter XII
A STUDY IN EVOLUTION

A STUDY IN EVOLUTION

We have already looked at the evolution of the frigate in terms of the development of its armament. The following chapter also looks at evolution, but in more general terms, relevant not only to frigates but to all the vessels which go to make up the French Navy of this period.

The chapter is organised into a series of discrete sections. The first covers internal arrangements, the second examines the guns, the third the changes in carved-work and decorative styles, while the fourth is devoted the various changes which took place in the proportions of masts, sails and rigging. Each of these sections is restricted to the key elements only, but there are a number of supplementary notes on particular aspects of the progress and evolution of the frigate.

The chapter concludes with a series of photographs of models from the collections of the *Musée de la Marine*; each photograph is captioned, providing a visual complement to the text in the various sections. However, these examples are drawn primarily from the end of the 18th century and the first half of the 19th, since not a single model has survived of a French frigate from the Ancien Régime*.

This final chapter is extremely long, despite the fact that, as already indicated, it has only been possible to treat the bare bones of each subject: to take but one example, a thorough treatment of the rigging of frigates would have demanded a complete history of rigging, a vast project requiring at least one if not several volumes on its own; the same applies in no lesser degree to the decoration and carved work, and I can only hope that this may inspire other authors to treat such subjects in the detail which they deserve.

*The models which have survived of 4th and 5th Rates and frigates from the 17th century are unfortunately reconstructions dating from the middle of the 19th century. There is a large model of a frigate claiming to represent the *Sultane*, and another model of the *Dédaigneuse*, but both have suffered from successive "rebuilds".

EVOLUTION OF INTERNAL ARRANGEMENTS

A distinction can be made between two periods: the first runs from the 17th to the end of the 18th century, and the second begins with the Empire and ends at the middle of the 19th century.

The first period is covered in great length in the three frigate monographs, representing the three main classes of frigate (8-, 12- and 18-pdrs[1]), of which some of the plans are reproduced in this volume. These should be examined in conjunction with the text which follows, to which I have moreover added a number of early manuscripts which will be commented on in full when we get to them.

Hold. The internal arrangements do not differ greatly from those of ships (see *74-G.S.*, vol. II). Right at the bow there is a diminutive space reserved for the Bo'sun, the *forepeak*; access is by way of a scuttle in the planking of the lower deck forward of the foremast. The forepeak is separated by bulkheads from the forward *powder rooms*, which have sliding doors and contain filled cartridges as ready use ammunition for the forward guns; access is usually by way of a small scuttle let into the lower deck abaft the foremast. A sturdy bulkhead separates the powder rooms from the *cable tier*, where the cables are coiled up over a flat raised a little way above the internal planking of the hold. A glazed window protected by a grille is let into the forward bulkhead in order to provide illumination, by means of a lantern, to the powder rooms. The *main hold* is situated abaft the cable tier, with sufficient headroom for two tiers of water casks (three in ships of the line). It stretches aft as far as the mainmast, which is enclosed by the *well*, containing the pumps and, in the forward part, the *shot locker*. Abaft the well, the hold is divided horizontally by a flat, with the *after hold* (for wine) below, and the *issuing room*[2].

Following on from the after hold are the *magazines*, containing powder in barrels and also filled cartridges in rooms similar to those found in the forward part of the vessel. A *light room* encloses a lantern to provide illumination, and access is by way of a corridor dividing on the upper level the *bread rooms*, the magazine being on the lower level. There is a scuttle in the corridor providing access to the magazine, with additional scuttles on occasion for passing up the cartridge cases. I should add that the storerooms for dried vegetables and for the officers' sea stock are set up on either side of the issuing room, while the casks of flour and salt meat are usually stowed in the after hold, or, failing that, in the main hold.

An alternative arrangement which may be found on occasions[3] is that the after hold runs the full height of the hold, with the issuing room not placed overhead but displaced further aft.

Lower deck. It is at this level that the differences between the internal arrangements of ships and frigates are most marked, since the lower deck in frigates occupies part of the space taken up by the orlop in ships; the lower deck must thus accommodate a large number of storerooms, the crew's hammocks, and some of the officers' cabins, whereas in ships of the line the crew berth one deck higher and the officers have their cabins or bunks on the upper deck or beneath the poop.

All of the forward part of the lower deck is set aside for the Bo'sun (in addition to the space in the forepeak), but this area often also houses the *chests of grain* for the shipboard poultry, and the *coal store* for fuel for the officers' cooking stoves (charcoal). Abaft the foremast is the scuttle leading down to the forward powder rooms, and there is also the scuttle leading to the forepeak when this is used by the Bo'sun.

Abaft the Bo'sun's storeroom and backing onto the *carpenter's walks*, are the Warrant Officers' storerooms[3], for the Master, Caulker, Sailmaker, Carpenter, and Surgeon. The precise arrangement of these storerooms may vary, but as a rule they occupy the space in the bow, and do not extend further aft than the *cable-hatch*. The crew also sling their hammocks on the lower deck, but this does not prevent the installation of a *sheep pen*[4], running from the cable-hatch to the *main-hatch* and equal in breadth to one or other of these hatchways. Fortunately, this arrangement was

discontinued in the 1770s and 1780s, the sheep being placed in the manger, and in a number of temporary pens placed between the gunports on the upper deck. A *bread oven* is frequently installed between the main-hatch and the mainmast surrounded by the pumps.
Continuing aft and some distance away is the *after hatch*, and backing onto the vessel's side may be the storerooms and chests for the dried vegetables and the officers' sea stock, as an alternative to their being placed in the issuing room; this allows the after hold to occupy the full height of the hold, as indicated above. Generally however, the *sail locker*[5] occupies this space, running the full width of the lower deck.
Moving aft again, we come to the *cockpit*, which provides a sort of "wardroom" with space for six cabins each about six feet square for the officers[6], the doors to which have a grille in place of a window providing some ventilation[7] from the "wardroom". Abaft the cockpit is the *gunroom*, the domain of the Warrant Officers, with on the port side the bunk of the ship's *Writer* at the stern, and forward of this the *Surgeon's* bunk. In the corresponding positions on the starboard side are the bunks of the *Gunner* and the *Chaplain*. From the gunroom itself two scuttles lead down, one to the magazine and the other, right at the stern, to the diminutive *lady's hole* or *after peak* just abaft the bread rooms.
For the crew, the lower deck is linked to the upper deck by a ladderway placed just abaft the cable-hatch, and a further ladderway may be installed forward of the after hatch. Both ladderways are double.
Various detailed differences may occur, but the layout of the gunroom and the cockpit are in principle standardised, the latter being peculiar to frigates.

Forecastle. At this level are to be found the hawseholes, the partners of the bowsprit, the riding bitts, and the foremast passing down between the standards of the bitts. The forecastle provides accommodation for the galley fires, which are placed either back-to-back in the usual manner (see *74-G.S.*, vol. II), or else one ahead of the other abaft the riding bitts; alternative locations are on either side forward of the foremost gunport, or between the first and second ports. The length of the forecastle varies according to the class of frigate from about 30 to 40 feet. The fore jeer capstan is stepped as usual on the forecastle.

Quarterdeck. In 8-pdr frigates the quarterdeck breastwork is clear of the mainmast and the pumps, while in 12- and 18-pdr vessels it is forward of the mainmast but nevertheless clear of the main topsail-sheet bitts. The main capstan may have either one or two barrels, the lower barrel being of course on the upper deck (it is stepped on the lower deck). The steerage is always placed abaft the mizen-mast on the quarterdeck.

Poop. The arrangements for berthing the officers have many variants. Let us start by examining "ship-frigates", where the arrangements are similar to those to be found in ships of the line (*74-G.S.*, vol. II). If the size of the vessel is such as to warrant the fitting of a poop, which may be up to 18 feet in length, this affords space for a great cabin (albeit a small one), with a cabin forward of it on either side, to starboard for the Captain and to port for his Second. On the upper deck is the wardroom, while there is a gunroom on the lower deck. The poop may have a stern-gallery, but this does not extend round the quarter.
Where the upper works are restricted in height and there is no poop, there are merely a couple of deck-cabins, barely more than hutches, placed against the stern and reserved for the Master and the Bo'sun. The wardroom then serves as the great cabin when required, and is preceded by one or two cabins on either side.
As an alternative, the poop may be much shorter and lower, extended by deck-cabins.

These arrangements are very different in what we have called "modern" frigates with a single tier of guns, where there is no great cabin: the space is always occupied by a wardroom beneath the quarterdeck, lit by stern-lights, and with the doors leading off to the quarter-galleries[8].
There are two canvas-screened cabins[9] in the wardroom, and on either side there are one or sometimes two gunports. Since there is no poop, there is a cabin on either side forward of the wardroom, each containing a further gunport. It should be noted that these ports are not armed in peacetime, whereas in wartime the cabins themselves are done away with[10]. As a rule, the sheer of the upper works towards the stern allows space for two deck-cabins (starboard for the Bo'sun, port for the Master).
The existence of a poop was a subject of considerable controversy. Its adversaries objected to the raising of the upper works, which prejudiced the vessel's speed of sailing and its stability[11]; its protagonists, however, argued that the officers were entitled to a minimum level of comfort, pointing out that cabins over the quarterdeck did not need to be struck down when the frigate cleared for action and afforded better opportunities to supervise sailhandling and steering[12]. In certain instances the poop might be extended as far forward as the mizen-mast, with space for a great cabin of considerable size and with a stern-gallery for the Captain, with two or even four cabins for officers forward of it[13].
A less extreme solution consisted of a half poop with space for two cabins (for the Captain and his Second); this would not then exceed 7 feet in length, with very low deck-cabins (3 feet in height only) set up forward of it. The top-hamper caused by such a poop could be further reduced by lowering the height of the sleeping-cabins to little more than that allowed to the deck-cabins for the Warrant Officers. Such poops were built as lightly as possible: slender beams covered with light boards and sealed with a layer of tarred canvas. The headroom might be increased somewhat by the pronounced round-up of the beams.
During the second half of the 18th century there was a trend away from installing poops in frigates. However, whether roundly condemned or simply tolerated[14], they did not disappear completely until the beginning of the 19th century.
A sort of compromise solution was proposed in the 1780s, consisting of roundhouse or quarterdeck-cabin[16], which was a light, independent structure set up on the quarterdeck and with room for a sleeping-cabin and day-cabin for the Captain. The roundhouse ended at the mizen-mast, affording some protection for the steerage. Since it is possible to walk all round the roundhouse (hence the name), this made it easier to handle the ship, and also to serve stern-chase guns in case of need. The height of the roundhouse was about 5'6", and it measured 7 to 9 feet athwartships and 12 to 16 feet fore-and-aft (depending on whether it was a 12-pdr or an 18-pdr frigate). The roundhouse was clinker-built and far from æsthetic; furthermore, it provided accommodation only for the Captain, with his Second being berthed in the wardroom, in a cabin backing onto the forward bulkhead amidships.

It was not until the Regulations of 1807 came into force that an end was finally made to the controversy of the previous century. Strictly applied, it did away once and for all with the poop in frigates, with consequences which we will examine in the pages which follow.

To conclude this section, which has been devoted primarily to "modern" frigates, I should say a few words concerning the arrangements in light frigates. In the hold, there was no difference, with the Bos'sun's storeroom in the bow, forward of the bitts, and a cable tier abaft the bitts. Next, there was the main hold, followed by the well, and the after hold. The bread rooms and storerooms for the dried vegetables were situated abaft the after hatchway, with the magazine placed beneath the bread rooms. The absence of an orlop or lower deck made it necessary for the crew to be berthed in the main hold, where they slung their hammocks as well as they could overhead the upper tier of water casks. The Warrant Officers' storerooms were replaced by chests or lockers, and there was no sail room. On the gundeck, a small forecastle sheltered the galley, while beneath the quarterdeck, at the stern, there was a cabin for the Captain with two small bunks forward of it, the quarterdeck scarcely ever stretching further forward than the mizen-mast.

In the case of two-decked light frigates, the arrangements were very similar to those in "modern" frigates, although everything was much more cramped, and the presence of a lower deck made it possible to berth the crew elsewhere than in the main hold.

Arrangements of the *Chimère*

This frigate was built at Toulon in 1758 to the draughts of J.-M.-B. Coulomb. The draught shows the arrangements at the various levels, although it would have been more complete if the forward part of the **hold** had been illustrated as well, rather than stopping at the well, which contains a shot-locker at its forward end divided into two sections.

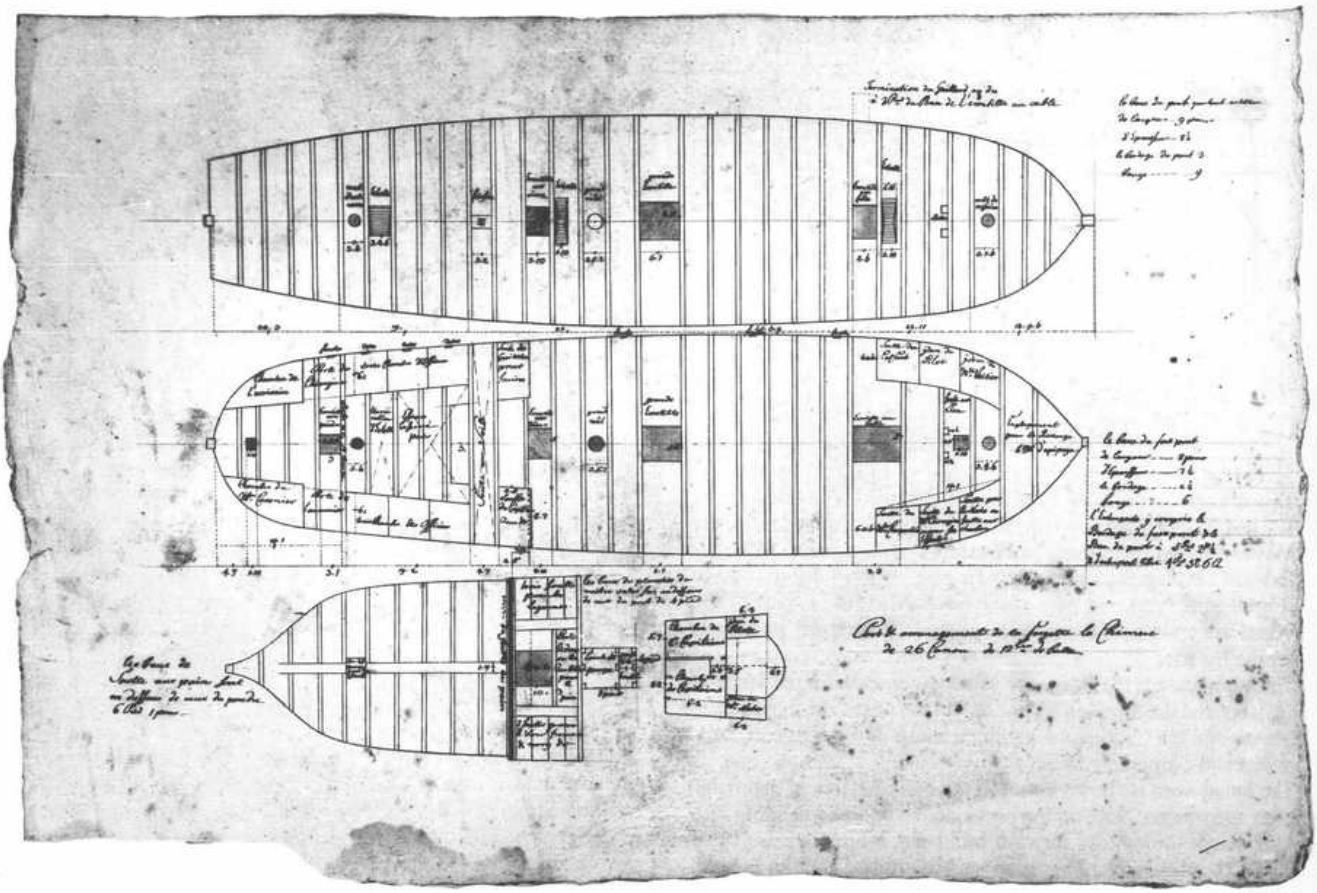
Backing up against the bulkhead separating it from the after hold are a number of shelves for wine-pitchers and bread-barges (see *74-G.S.*, Vol. IV), and amidships is the issuing room, which has a very large hatchway[1]. On the port side of the issuing room are the storerooms for dried vegetables, and there are others on the starboard side for the officers' sea-stock. Moving aft, and separated by a cofferdam bulkhead[2], are the bread rooms, the internal divisions of which are not shown. Between the bread rooms is a corridor or passageway, with a scuttle leading down to the magazine below. The after hold for the wine is set up below the issuing room and the various storerooms leading onto it. The main hold (for water) runs forward from the bulkhead of the after hold, which forms the after side of the well, to the cable-tier bulkhead which is directly beneath the after edge of the cable-hatch.

Frigates of this class carried some 90 tons of shingle and iron ballast. Three months' water[3] totalled 80 tons, including the weight of the casks; one full cask weighed 542 pounds [265 kgs], so that the hold must have contained the equivalent of 292½ hogsheads (of 242 litres) stowed in two tiers. The wine came to 46 tons (including cask), or 170 hogsheads. The total victuals for the crew for six months, including wine, casks, wastage and seepage, weighed 156 tons, plus the 80 tons of water. Firewood and dunnage was in addition, the former calculated on the basis of 6 billets per 100 men per day (1 billet weighing 22 lbs or 10.8 kgs), making a total of 2,800 billets for 6 months or about 30 tons; dunnage-wood came to a further 8 tons. The officers' stores (including those for the midshipmen, but excluding water) came to 11 or 12 tons. These figures give some idea of the quantity of stores which must be stowed in the hold of a frigate of this size, to which must be added the cables and hawsers, munitions of war, etc.

The deck-plan of the **lower deck** is shown in the middle of the draught. Starting from the bow, there is first of all a space reserved for the Bo'sun in the forepeak, followed by three storerooms on the port side (Caulker – Master – Sailmaker), and three on the starboard side (Carpenter – Surgeon – charcoal, or the Bo'sun). Abaft the foremast and forward of the pins of the riding bitts is a scuttle leading down to the Bo'sun's storeroom below and to the forward powder rooms. Next, the cable-hatch, followed by a large open area for berthing the crew, then the main-hatch and the mainmast; there is no indication of a bread oven); then, the after-hatch, and two storerooms for the Captain's sea-stock[4]. Next comes the sail room, occupying the full width of the vessel. The cockpit takes up a large part of the after part of the vessel, with three bunks on either side giving onto a sort of wardroom. A short way abaft the mizen-mast is the gunroom bulkhead, with the powder-hatch hard up against it. To port is the Writer's bunk, with the Surgeon's station forward of it. To starboard, the Gunner's bunk, and the Chaplain's station. There is a small scuttle aft leading down to the Gunner's spares in the lady's hole.

At the level of the **upper deck** no internal partitions or bulkheads are indicated, so that the deck is entirely free from end to end. Starting from the bow, we find the foremast, the pins of the riding bitts, the forward double ladderway for the crew, the cable-hatch, the main-hatch, the after ladderway for the crew, the after-hatch,

1. This class of frigate, so characteristic of the French Navy under the First Empire but still in service after the Restoration, underwent several modifications in order to conform to the new Regulations, especially with regard to their internal arrangements.
2. The issuing room was the province of the Purser, an employee of the victualling agent.
3. All the storerooms are formed of stanchions berthed up with pine boards and fitted with sliding doors.
4. It must have been impossibly cramped, when we consider that the headroom varied from a little less than 4 feet to a maximum of 5 feet in the most favourable of cases! The sheep pens were formed of uprights running the full height from deck to beam, spaced 3 to 4 feet apart, with planks nailed longitudinally to these uprights, leaving a space 3 to 4 inches in between. There was a grating overhead the pen, and the floor of the pen was raised about 1 foot above the deck.
5. The sail room was sometimes placed in the cable-tier, above the cables.
6. 8-pdr frigates had seven officers, including the officer of Marines; there were the same number in 12-pdr frigates, with one more in 18-pdr frigates.
7. Sometimes very small air-ports are cut between the deck-clamp and the waterway.
8. The same applies to the two-decked ship-frigates.
9. These cabins are sometimes formed of bulkheads of pine boards, or else of frames over which canvas is stretched. The panels thus formed are fastened with hooks and eyes so that they can be easily struck down. In the 17th century, simple curtains sufficed.
10. Under these circumstances, the Captain and his officers had to make do with canvas-screened cabins in the wardroom, easily struck down in action. The other officers could be berthed in canvas-screened cabins forward of the wardroom, or else use the deck-cabins on the quarterdeck normally reserved for the Master and his mates.
11. These arguments had already been put forward by Blaise Ollivier, who, as we have seen, recommended that frigates should be built as flush as possible.
12. The protagonists of the poop quoted the case of the *Renommée* (1767), the *Hébé* (1757), the *Terpsichore* (1762), the *Fleur de Lys* (1753), all of which had poops and yet performed very well.
The opponents argued that the removal of the poop could only have improved their excellent qualities!
13. An extreme case, illustrated for example by the *Alcmène* and the *Aimable* in 1774.
14. Thus in December 1770 the Minister temporarily authorised the installation on the quarterdeck of two small cabins, one for the Captain and the other for his Second. These cabins were not to rise any higher than the taffarel fife rail. The length of these half poops was 7 to 8 feet for 8-pdr frigates and 9 to 10 feet for 12-pdr vessels. This arrangement made it possible to replace the pine bulkheads of the two cabins situated forward of the wardroom with canvas screens. In 1778, the order was given to build no further poops in frigates, and to do away with those already in existence. However, close examination of draughts from the period makes it clear that ministerial decisions were not always respected.
16. This is the definition of the roundhouse given by Willaumez in his Dictionary: "structure built at the stern of a vessel; it is clad with pine boards and tarred canvas, the sides being clinker-built; or else the fore and after sides as well. A roundhouse is higher than a deck-cabin and is less convex on top."

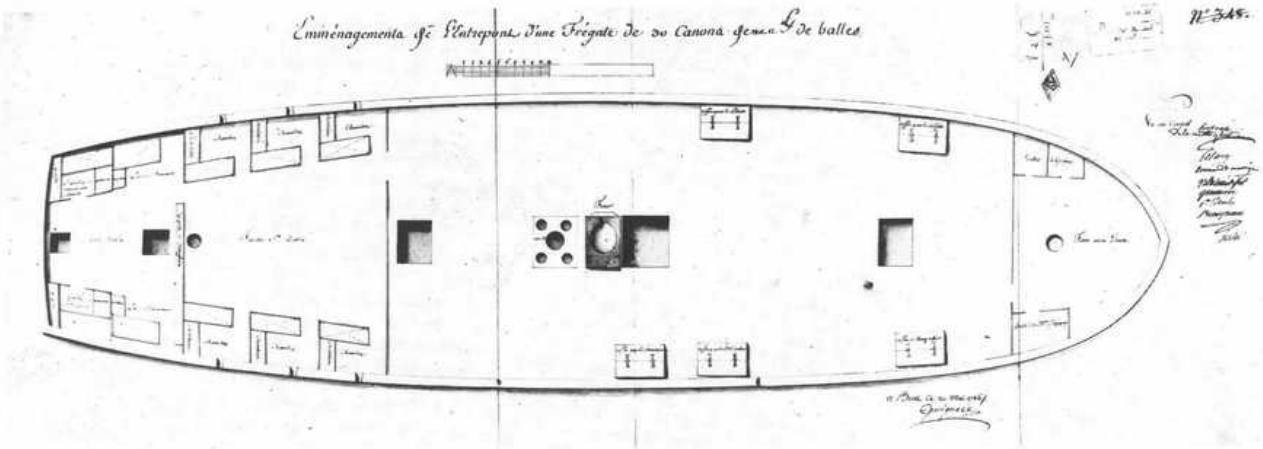


the partners of the main capstan (those of the fore jeer capstan are not shown, nor is the galley), the after ladderway for the officers, and the mizen-mast.

At the bottom of the draught there is a small sketch indicating the accommodation under the half **poop**, hard up against the taffarel; there is a small cabin to port for the Second Officer, and a larger one on the starboard side for the Captain. Adjoining these sleeping cabins are two deck-cabins, to port that of the Master, and to starboard that of the Bo'sun, with the steerage under cover in between. The presence of these cabins confirms the absence of accommodation on the upper deck, but it would appear that the *Chimère* had no wardroom or great cabin.

A number of manuscript notes give the scantlings of the beams and plank, the round-up; I will merely note the headroom between decks of 4'3½" on the lower deck and 5'2½" on the upper deck beneath the forecastle and quarterdeck.

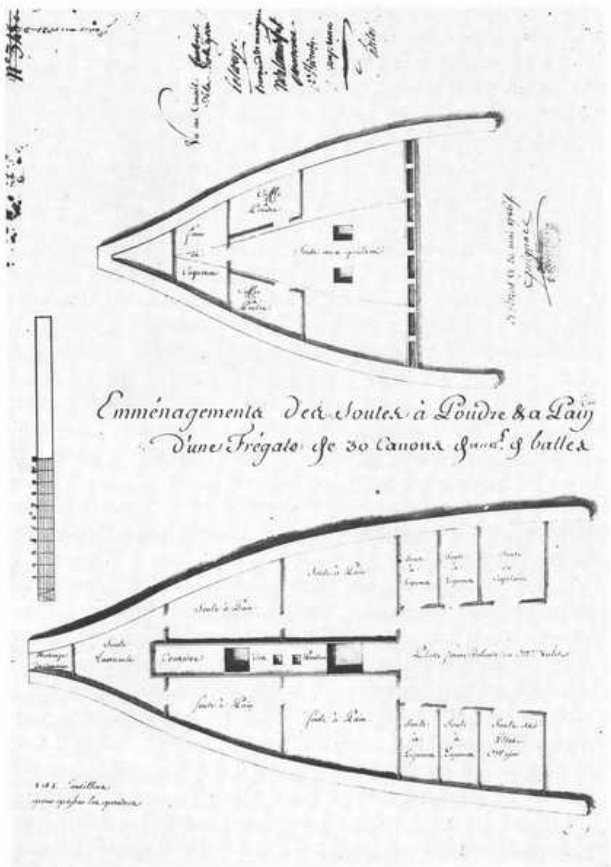
1. Its dimensions are significantly greater than those of the after-hatch, especially with regard to its length; I can think of no explanation for such dimensions, or even for the hatchway itself, since the the large hogsheads of wine are lowered through the main-hatch.
2. The cofferdam bulkhead is double-skinned and packed with earth (*74-G.S.*, vol. II).
3. The normal calculation of the water ration is 1¼ hogsheads per hundred men per day, giving for the estimated 260 men of the *Chimère* (1765 Regulations): 1.25 x 2.6 = 3.25 x 90 days = 292½ hogsheads.
4. Six months' wine at ¾ of a *pinte* (0.7 litres) per man per day, with some of the warrant and petty officers receiving an extra half-ration. The wine for the officers' table is not included in this calculation.



This draught dates from 1786 and illustrates the lower deck of 12- and 18-pdr frigates with the arrangements proposed by the Master Shipwright of Brest Dockyard, L.-M. Guignace. All of the forward part is reserved for the Bo'sun's spares, more usually stowed in the forward part of the hold. Also in this part of the vessel are grain bins for the poultry and a closed-off storeroom for the Bo'sun.

The innovation is to replace the usual storerooms for the Warrant Officers and the Surgeon by chests: on the port side, those of the Master and the Caulker, to starboard those of the Surgeon, Sail-maker and Carpenter.

The bread oven is shown between the main-hatch and the main-mast and pumps. Note on the port side the doorway leading into the cockpit through its forward bulkhead, which is set up just abaft the after-hatch. The arrangements in the cockpit are the usual ones, with six small cabins giving onto a wardroom; there is a small air-port for each cabin. There is a door leading into the gunroom on the port side, so that it can only be accessed by way of the cockpit, where there is also the after ladderway for the officers. The gunroom bulkhead has shelves for the cartridge-cases. The furnishings are shown summarily (but see *74-G.S.*, vol. II). Also illustrated are the mizen-mast, the powder-hatch and the scuttle to the lady's hole.

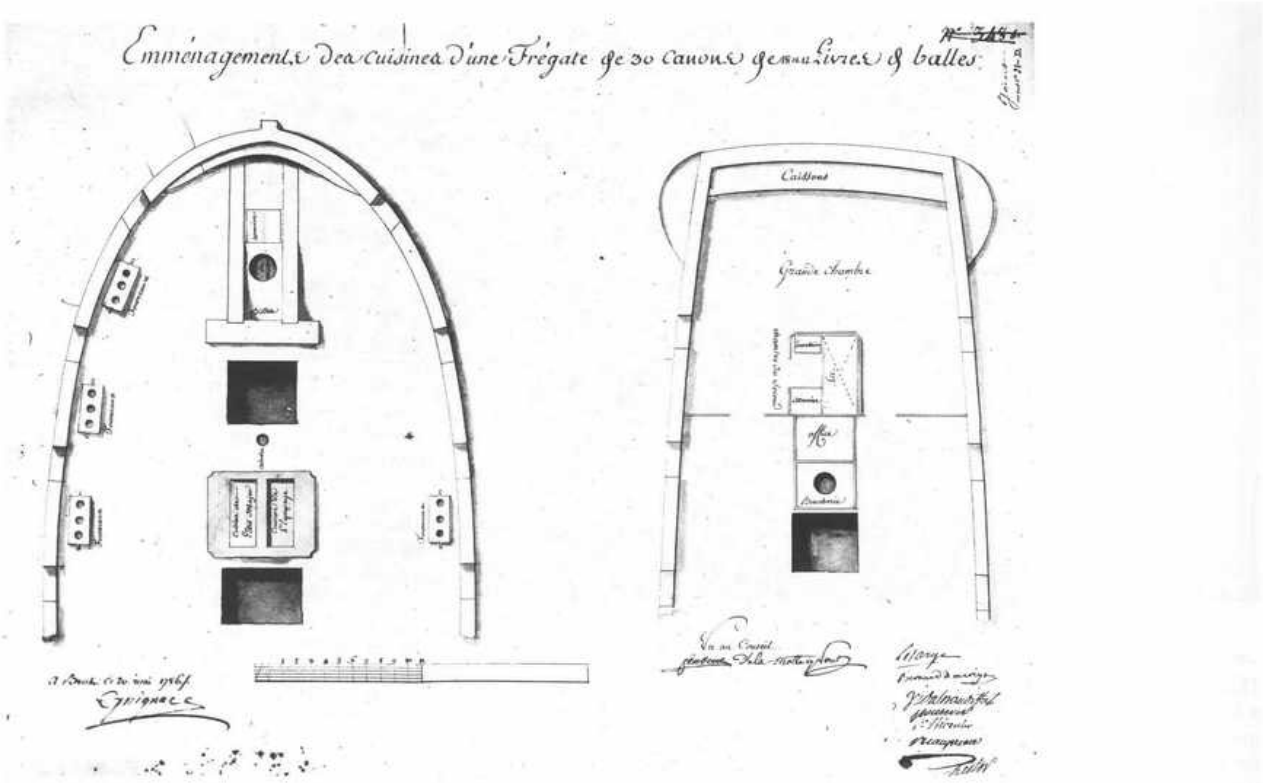


This is another document from 1786, also by Guignace, from the same series. The upper drawing shows the arrangements of the magazine (in the lower part of the hold), showing it divided into two parts, one containing filled cartridges, and the other, abaft the cofferdam bulkhead separating it from the after hold, for stowing powder in barrel (see *74-G.S.*, vols. II & IV). There are two scuttles to allow access to the shifting ballast beneath the flat of the magazine. Unfortunately, the light-room has not been shown.

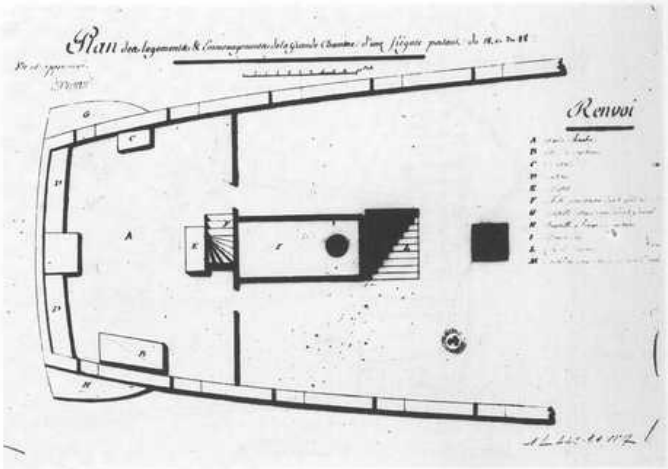
The lower of the two sketches shows the arrangement of the various storerooms under the lower deck and overhead the magazine and the after hold. Right in the stern is the lady's hole for Gunner's spares, which is accessed by way of a scuttle in the gunroom.

The biscuit is divided up among five bread rooms, one of which runs all the way athwartships in the stern. The bread rooms give onto a corridor in which there are four scuttles: the forward one leads down to the magazine and the next two to the powder rooms; the fourth scuttle may provide access to a light room. Forward of the bread rooms there is a shifting platform* for the Purser (with the corridor giving off it), and also the storerooms for the dried vegetables (beans) and the officers' sea-stock. Access to this platform, the issuing room, is by way of the shifting ladder of the after hold.

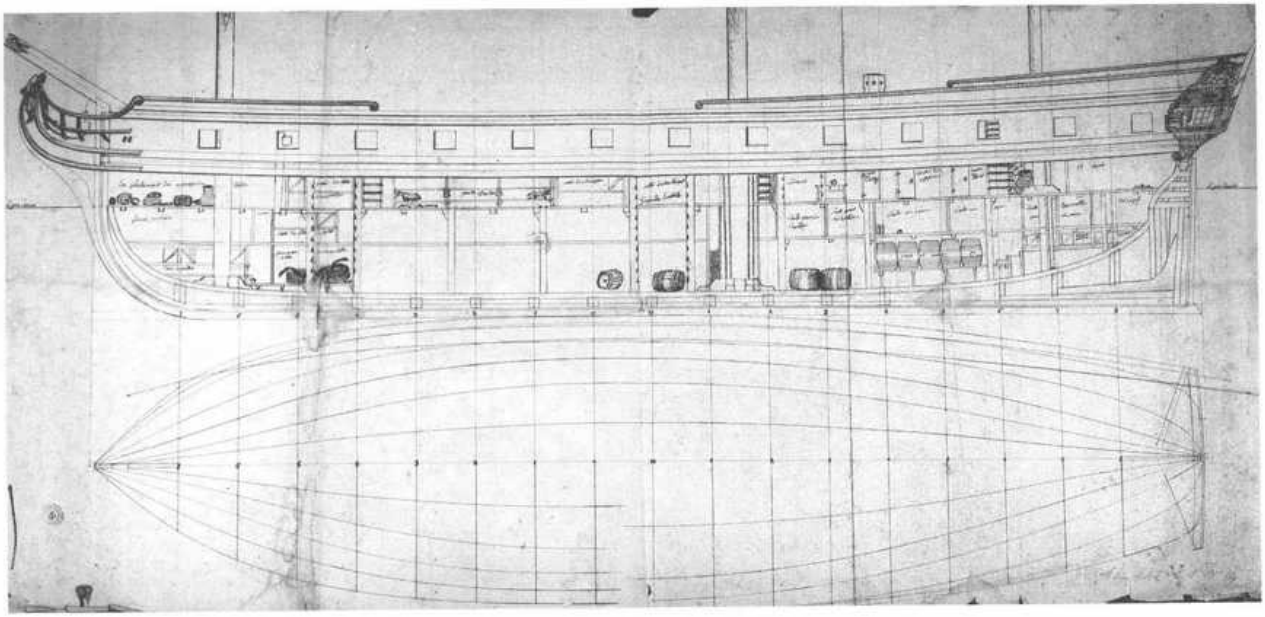
*Laid over the top of the after hold where the wine is stowed, this platform is very lightly constructed and its planks can be readily removed.



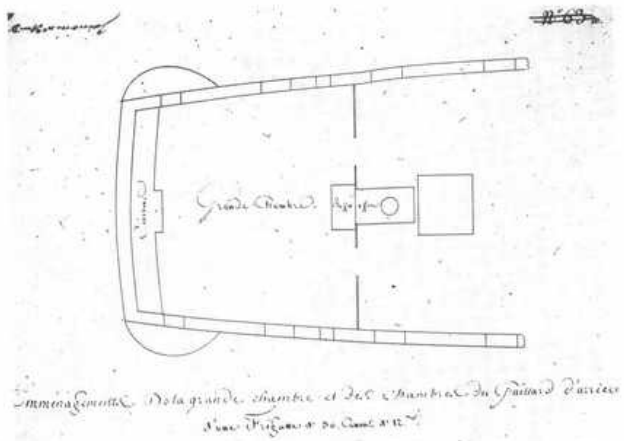
The two drawings above also bear the signature of Guignace, and conclude the representation of the lower deck with the arrangements beneath the quarterdeck and forecastle. Under the forecastle can be seen the riding bitts, with a cupboard placed between the standards. The space taken up by the galley is also shown, situated between the cable-hatch and the forward ladderway. While this means that the cables do not have to run through the galley, the bitts have had to be moved further forward. On the port side there are three charcoal stoves (gimballed) for the officers, with one only on the starboard side for the sick crew-members. A bulkhead at the after end of the upper deck allows space to be made for a wardroom or great cabin, with doorways leading to the quarter-galleries and with one gunport on either side. Amidships there is a cabin for the Second (the Captain has his quarters under a half poop), and forward of this sleeping-cabin there is a pantry, a meat-room surrounding the mizen-mast, with the after ladderway for the officers immediately in front of it.



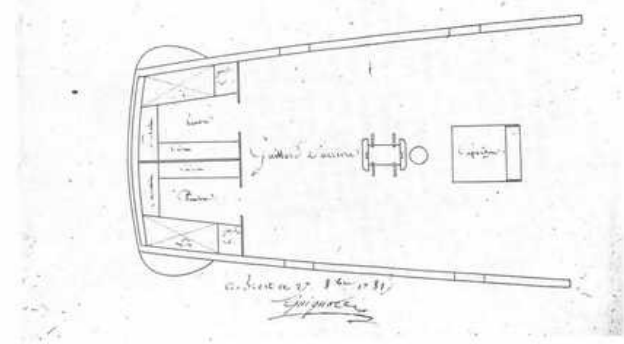
This small document is signed by the Comte de la Luzerne, Minister from December 1787 to October 1790, and illustrates an alternative arrangement to that shown in the preceding drawings. All the after part of the upper deck is set aside for the Captain (it is worth comparing with the model of the *Flore* on page 387). His bunk is situated on the starboard side close to the quarter-gallery which is reserved for his use, the port gallery being designated as a working place! Abaft the sideboard **E** is a winding staircase leading up directly onto the quarterdeck. Lockers marked **C** complete the furniture. **I** indicates the meat-room. The officers' ladderway **L** is preceded by a skylight providing illumination to the cockpit. (*Toulon Dockyard Archives*, ref. L.442.1.17)



This rather naïve drawing, probably dating from the 1760s, shows a frigate and her internal arrangements in the hold and on the lower deck. They are not dissimilar to those already illustrated for the *Chimère*. The Bo'sun's spares are clearly visible at the bow, and below them the forward powder rooms, followed by the cable-tier. Note the sheep pen, the forward and after ladderways for the crew, the shot-locker, the issuing room with a number of hold-alls and a table, the bread rooms, and beneath these, the after hold. Further aft is the magazine. Forward of the mizen-mast is the officers' ladderway, and beside this a water-jar which has been marled with spun-yarn to afford protection. The pumps are entirely of wood, and somewhat unusually, there is an additional single pump to starboard of the mizen-mast.



This document dates from 1781, and is signed by Guignace. It shows the officers' quarters in a 12-pdr frigate.
At the after end of the upper deck is a great cabin with one gunport on either side, forward of which there is a second, smaller port or scuttle suggesting that there were canvas-screened cabins set up in the corners of the cabin. The doorways to the quarter-galleries are shown, and there is a stern-locker (*74-G.S.*, Vol. II). Also shown is a sideboard, a pantry surrounding the mizen-mast, the position of the after ladder.
Overhead the quarterdeck is a half poop affording space for two sleeping-cabins or bunks for the Captain and the Second. Abaft the mizen-mast can be seen the double wheel, and forward of it the after ladderway again, with the watch bench.

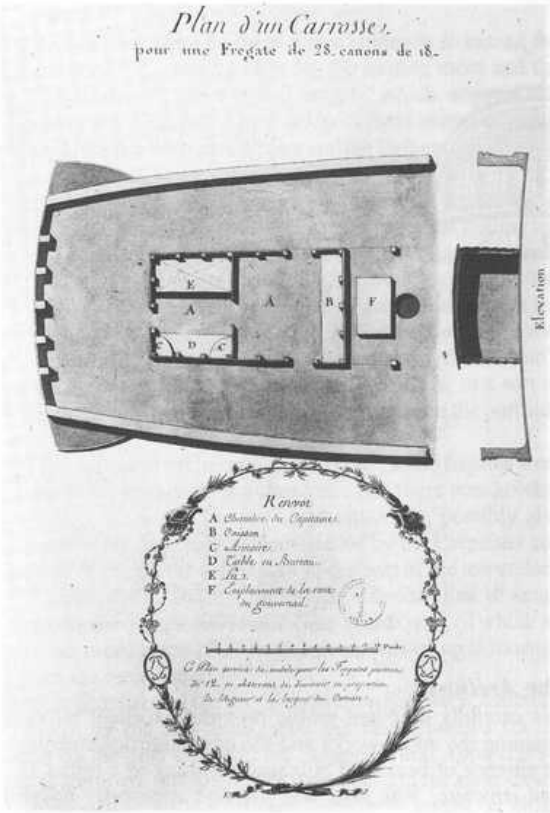


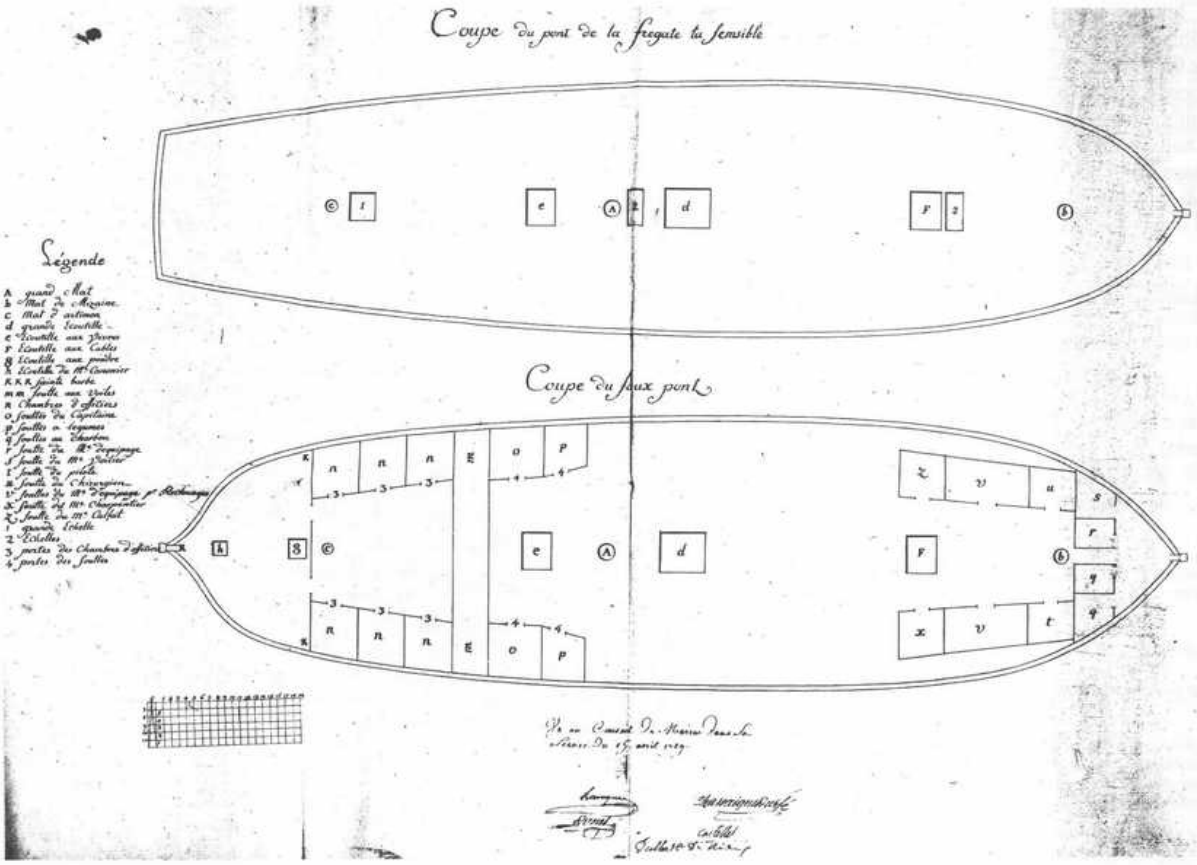
This document relates to the 12-pdr frigate the *Sensible*, laid down at Toulon in 1786. It provides a useful comparison with the Guignace plans, confirming the fact that different Dockyards followed different practices.
The general principles are the same, with the Warrant Officers' storerooms at the bow, additional storerooms on either side of the after hatch, and a sail room separating the cockpit from the forward part of the lower deck.
The text identifies all the various storerooms, and the positions of items of gear and hatchways. Note the two ladderways for the crew leading up to the upper deck.

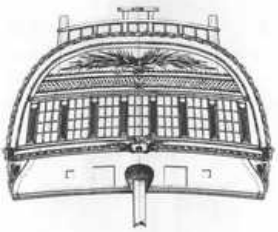
This document provides an excellent illustration of the roundhouse, adopted after 1778 following the Order to do away with poops in frigates. This is not to say that such structures were unknown earlier, since there is a model dating from the 1760s or 1770s at the Musée de la Marine illustrating precisely such an arrangement*. In 12- and 18-pdr frigates, the Captain enjoyed relatively spacious accommodation, with a sleeping-cabin complete with desk and a small day-cabin some 9 feet square. An awning extends the roundhouse forward, affording shelter for the steerage.

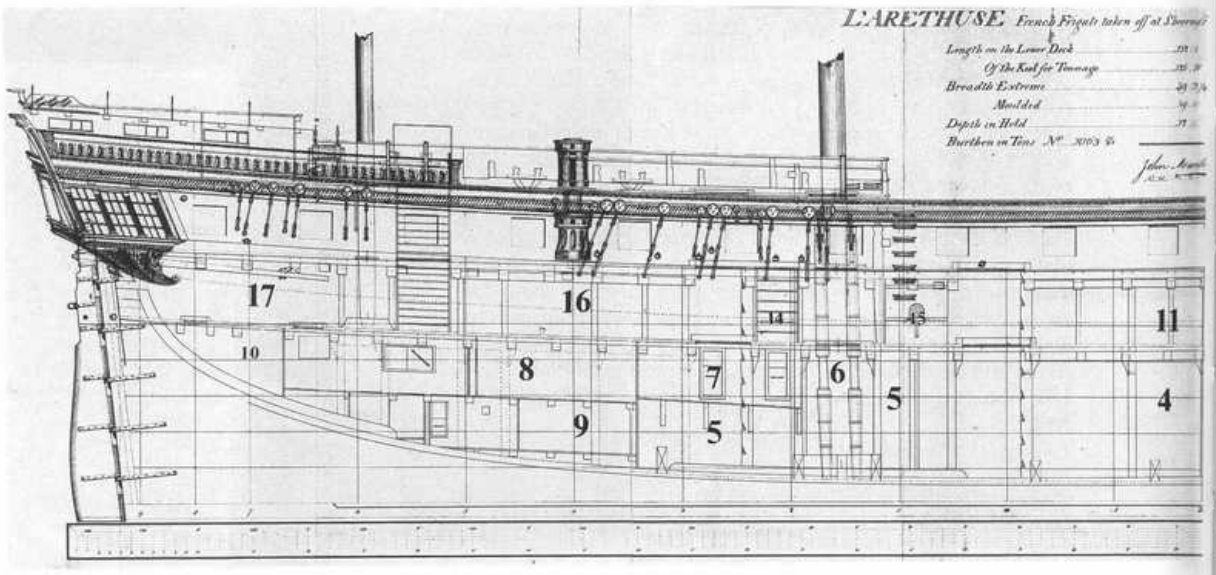
The roundhouse enjoyed only an ephemeral existence, since a ministerial instruction dating from October 1785 ordered that they should be done away with, in order to make room for increased armament on the quarterdeck. It is however open to doubt to what extent these instructions were obeyed in practice. Although this document is undated, it is presumably later than 1781, the date of the laying down of the first 18-pdr frigate (the *Vénus*).

*See the article by J. Boudriot in *Neptunia*, n° 140, 1980.









The *Aréthuse*

This carefully executed profile provides excellent information regarding the upper works and the internal arrangements. Note the absence of beakhead bulkhead resulting in a rather strange head structure, with only one rail and apparently no vertical head-timbers*. The *Aréthuse* was an 18-pdr frigate captured in 1793, but still bore the arms of France as foreseen in the 1786 (pre-Revolutionary) Regulations! Note the ugly poop rising above the taffarel, which is otherwise an excellent example of the traditional horseshoe. The numbers on the draught indicate: **1** Bo'sun's storeroom – **2** forward powder rooms – **3** cable-tier – **4** main hold – **5** after hold – **6** well – **7** issuing room – **8** bread rooms – **9** magazine – **10** lady's hole (Gunner's spares) – **11** lower deck – **12 & 14** crew's ladderways – **13** lower deck cable-hatch – **15** bread oven – **16** cockpit (wardroom) – **17** gunroom.

*The hawseholes are fitted with rollers.

The arrangements which we have examined in these pages continued to be followed until the beginning of the 19th century, without for all that being in any way officialised by Regulations. However, following the studies and publications of several officers, such as de Kersaint and Burgues de Missiessy[1], a strict schedule of the internal arrangements was laid down.

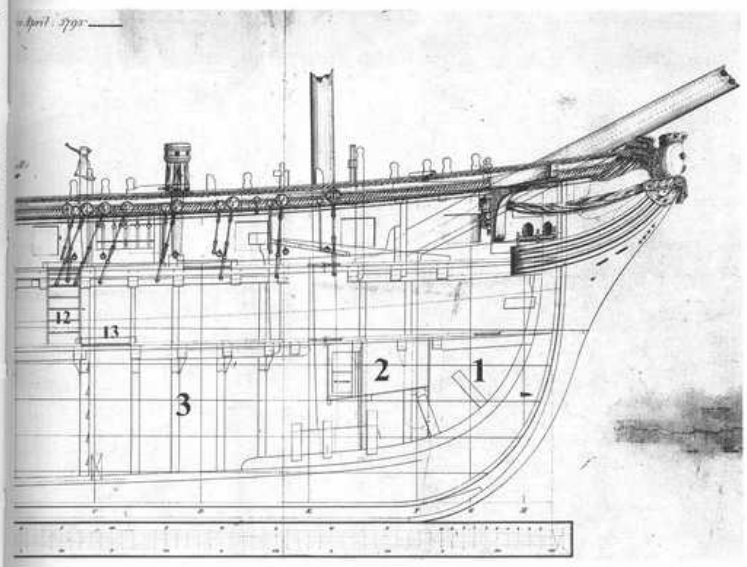
March 1807. These Regulations laid down the arrangements to be followed for all rates of vessel in the Imperial Navy, from brigs to three-deckers. The Regulation was complemented by a series of Orders relating to the accommodation of officers and their furnishings.

I will summarise only those relating to 18-pdr frigates, which by this time was the only class in the French Navy.

Hold. The storeroom for the charcoal and the small forward powder rooms were maintained. Next came the main hold, but the cable-tier was done away with, the cables being henceforth coiled in the well on either side, on a shifting platform laid over the first tier of stowage[2]; above the cables, the planking of the lower deck can be removed. The after hold runs from the after bulkhead of the well to the cofferdam bulkhead of the main magazine. Laid over the top of the upper tier of casks there is a shifting platform providing space for the issuing room, with storerooms on either side for dried vegetables and the officers' sea-stock.

As far as the magazine, bread rooms and lady's hole are concerned, there was no change. The new arrangements were thus characterised by the moving of the cables and hawsers to the central part of the vessel, and the creation of a space between the upper tier of wine casks and the lower deck for the issuing room and related storerooms[3].

Lower deck. The forward part was occupied by the storeroom for the Bo'sun's spares. Abaft this, and immediately below the main capstan was the free area set aside for berthing the crew; the Warrant Officers' storerooms being replaced by lockers, there was now space athwart the main-hatch for the Surgeon's and Apothecary's station (to starboard), with the Gunner on the port side. The sail-locker and the midshipmen's berth (to port) marked the limit of the space set aside for the crew. Abaft the sail-locker was the dining area set aside for the officers, indirectly lit by



skylights in the upper deck and quarterdeck, and with a doorway leading to the midshipmen's berth.

Access to this dining area was by way of a ladder placed just forward of a glazed bulkhead, with a doorway on the port side leading into a wardroom with three sleeping-cabins on either side for the officers. The remaining space between the stern and the officers' quarters was filled with lockers on either side.

Among these new arrangements, note in particular the disappearance of the traditional gunroom to the advantage of the officers, who thus acquired a dining area separate from the wardroom onto which their cabins looked. However, the headroom on the lower deck was only five feet or less.

Upper deck. Underneath the forecastle the traditional arrangements were retained, although the cable-hatch was now always placed between the riding bitts and the galley fires[4].

Beneath the quarterdeck and beyond the aftermost gunport there was a removable bulkhead screening off the great cabin which was entirely at the disposal of the Captain, although he had no sleeping cabin, merely lockers at the stern, and he had to be content with a cot bed[5]. Nevertheless, he now had the benefit of a so-called "English-style" stove in the great cabin (made of cast-iron and burning sea-coal), and access to both the quarter-galleries[6].

Forecastle & Quarterdeck. On either side and forward of the fore channels there was provision for a 24-pdr carronade and two 8-pdr long guns.

On the quarterdeck there were two carronades abaft the mizen channels, one more forward of the main channels, and a further two between the channels, with three 8-pdr long guns. Thus the secondary armament came to 16 pieces in all, with the main armament consisting of twenty-eight 18-pdrs.

The Regulations also stipulated that the bower anchors should be stowed abaft the fore channels, with the other two anchors in the main channels. In addition to the three boats usually carried, two more were added, one on either side slung on davits over the mizen-channels.

One is entitled to ask to what extent the 1807 Regulations were in fact followed. According to authorities such as L.-S. Baudin (*Manuel du Marin*, 1828), the principal provisions were respected, but as time went by there was a tendency to extend the platform in the hold, initially only for the issuing room and the cables. Eventually, it ran the full length, which allowed the installation of a general stores forward, with three rooms on either side set aside for the Warrant Officers and the Surgeon, the Bo'sun retaining the central part[7].

Abaft the general store and backing against the forward bulkhead of the well, this extended platform afforded space for coiling the cables and hawsers, and also for stowing the salt meat, firewood, breakers, the Carpenter's and Caulker's spares, oars and other spares for the boats[8]. This saving in space had an impact on the accommodation on the lower deck, so that in the bow there was now room, in the place previously occupied by the Bo'sun's spares, for berths for the petty and warrant officers, in a sort of gunroom, the Gunner employing part of the space on the port side for his spares.

Against the bulkhead of this new "gunroom", some frigates were fitted with a dispensary on the port side, and there was another small room to starboard for the Master-at-Arms, possibly also with chests for the day-to-day items needed by the Carpenter and the Caulker. Running the full length of the part of the lower deck where the men were berthed there was a double line of small sea-chests for their personal effects. The bread oven, of which no mention was made in the 1807 Regulations, was set up in its usual place abaft the main-hatch.

Abaft the mainmast and the pumps was the after hatch, followed immediately by the sail-room, with the midshipmen's station athwart it on the port side, and the Surgeon's and Apothecary's stations to starboard, but smaller. All the space in the stern served as accommodation for the officers, with three berths on either side, two of which gave onto a dining area or mess, separated by a glazed bulkhead from a space extending right to the stern and still called the gunroom; this was very cramped because of the fine lines of the hull in the stern and because of the space taken up by the tiller, but the two remaining cabins gave onto it, the one on the port side being reserved for the Surgeon and the other for the Officer of Marines.

As a rule, access to the officers' mess was by way of a ladder forward of the mizen-mast, but in some frigates it was to be found in the after hatch, this allowing more space in the mess.

On the upper deck, the space set aside for the Captain was preceded by a true wardroom, with two 18-pdrs on either side. The bulkhead screening this cabin from the upper deck could be struck down when the frigate cleared for action, leaving the deck entirely clear from end to end.

The adoption in the 1820s of iron water tanks (see below), also had repercussions on the internal arrangements, through a saving in space; an excellent example of this is provided by the plans of the hold and lower deck of the *Médée*, reproduced on pp. 306-7, which can be compared with those of the *Flore* overleaf.

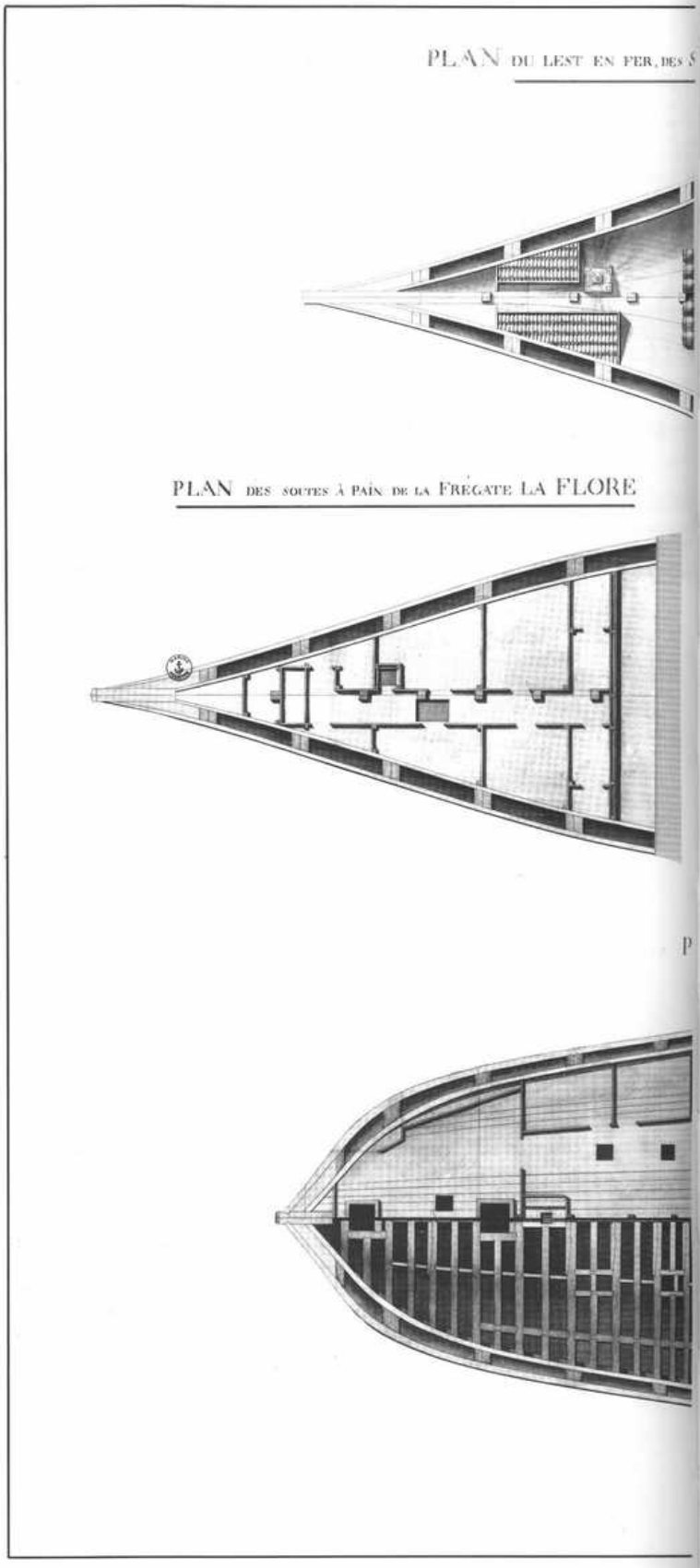
1. Édouard-Jacques Burgues de Missiessy, *Arrimage des Vaisseaux*, 1789, and *Installation des Vaiseaux*, An VI, (1798). See also *Archives Nationales*, fonds marine $D^1 22$ for the reports by Mr de Kersaint, which inspired the publication of these two books.
2. With further casks of 242 or 484 litres in the wings.
3. An arrangement which made it necessary to substitute brandy for some of the wine allowance, in order to save space.
4. These were still made of masonry, since the adoption of iron galley fires burning sea-coal was still under discussion!
5. See *74-G.S.*, vol. II (midshipmen).
6. In some cases the Captain used the starboard quarter-gallery as a privy and the port gallery as a washroom. Alternatively, the latter might have been made available to the officers, who gained access by way of a spiral staircase from the quarterdeck. As a rule however, the upper level of the galleries had a doorway leading onto the quarterdeck. All these arrangements were done away with, with the advent of the round stern.
7. The Bo'sun and the Bos'sun's mate berthed in this area.
8. Some of the petty officers had their berths at this level, especially over the cables.

Hold

In the rich DD[1] series of manuscripts preserved at the *Service Historique de la Marine* at Vincennes there is a major series of draughts of 19th century frigates (ref. n° 7 & 8DD[1]). One of the best sets of draughts are those of the *Flore*, an 18-pdr frigate built in 1804 at Rochefort to the draughts of P. Rolland. There is a model of the same vessel at the *Musée de la Marine*, of which a number of photographs are reproduced at the end of this book[1].
The first plan clearly shows the stowage of the ballast, made up of 100-pound iron pigs, with some 50-pound pigs[2]; the pigs are arranged so that free access is always available to the limber passages, since the limber-board must never be covered up. Note the absence of riders. As a convention, only the bends are shown in the cross-section of the vessel's side, the filling-frames being omitted.
The small forward magazine is on the starboard side, and the light-room is in the Bo'sun's store[3]. A cofferdam bulkhead separates these from the main hold. Separated from the after hold by another cofferdam bulkhead, filled with earth, is the main magazine. The powder in barrels is stowed in the forward part of the magazine, while in the after part are cupboards containing the filled cartridges (ready-use stock); illumination is provided by a lantern placed in a double-glazed and grilled light-room.
As is usual, the bread rooms are arranged overhead the magazine; note the scuttle giving access to the latter, and the second scuttle for the light-room.

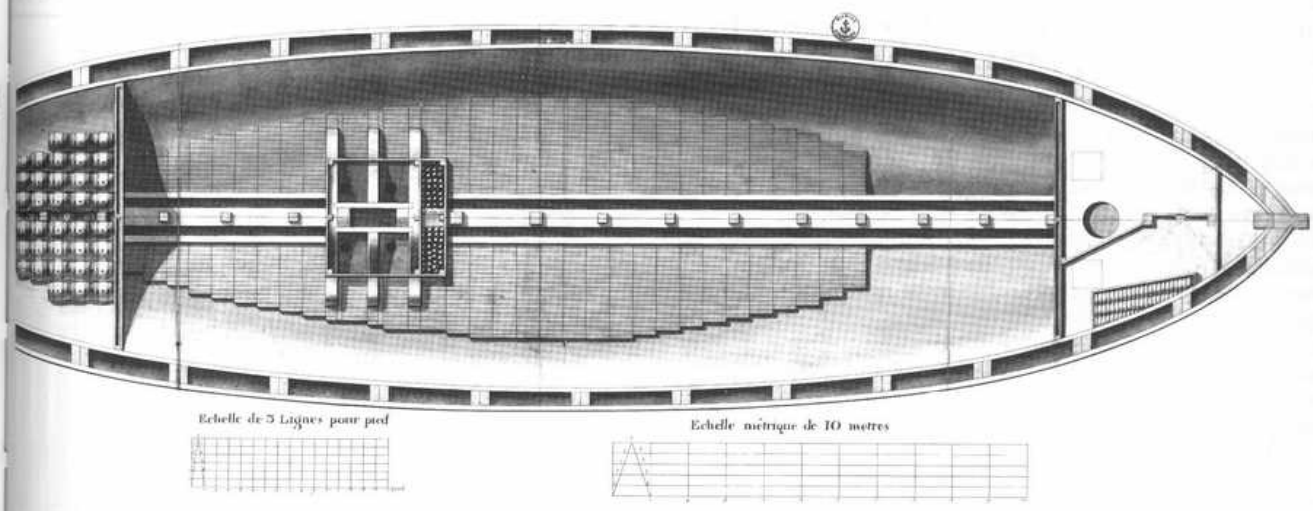
Lower deck

The lower deck arrangements are entirely typical for the period; note the scuttle on the port side of the foremast affording access to the Bo'sun's stores, and another placed symmetrically to starboard for the forward powder rooms. The cable-hatch[4] is in its original place, but the cable-tier itself has disappeared, with the cables being coiled down on a flat laid over the ground tier of casks. The bread oven is shown between the main-hatch and the mainmast and pumps. The after hatch is placed forward of the sail-room, and to port of this is the midshipmen's berth, to starboard the surgeons' station. There are six cabins for officers giving onto the cockpit or officers' mess; a pantry surrounds the mizen-mast, and the two scuttles on either side are for the bread rooms. There is no indication of any cabins in the gunroom, but note the scuttle leading to the magazine, that giving access to the lady's hole, and a third scuttle from the passageway between the breadrooms on the port side for passing up the cartridges in battle.



1. There are a number of differences between the plans and the model, which are worth noting.
2. The weight of the ballast shown totals some 160 tons.
3. The light-room and the powder rooms are raised on a flat.
4. This hatchway now provides access to the forward part of the main hold.

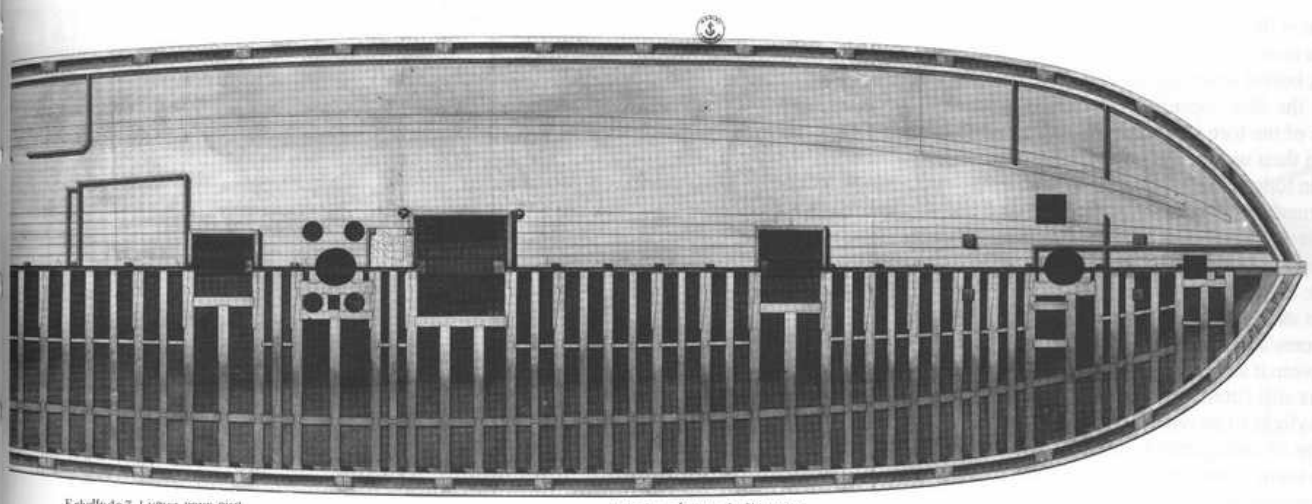
OUTES À POUDRE DE L'ARRIERE ET DES COFFRES À POUDRE DE L'AVANT DE LA FREGATE LA FLORE, Pt DU 18 EN BATTERIE



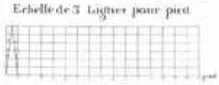
Echelle de 3 Lignes pour pied

Echelle métrique de 10 metres

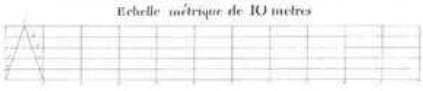
LAN DU FAUX-PONT DE LA FREGATE LA FLORE Pt DU 18 EN BATTERIE



Echelle de 3 Lignes pour pied

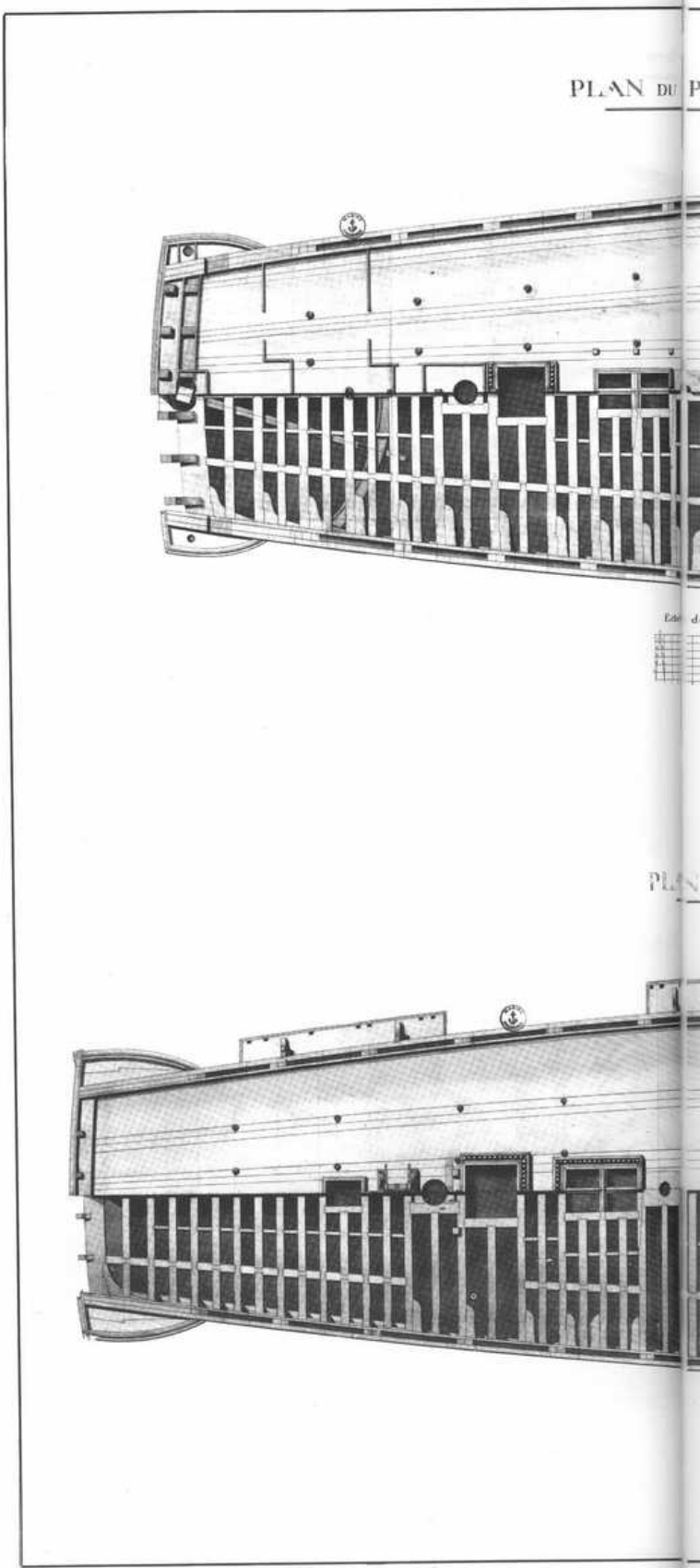


Echelle métrique de 10 metres



Upper deck

The plan of the upper deck illustrates the double riding bitts, unusual in a French vessel of this size, and a scuttle abaft the foremast. The step of the fore jeer capstan is next to the cross-piece of the main pair of bitts. Next comes the casing for the masonry of the galley-fires, and the cable-hatch, which, like the other hatchways, is surrounded by a coaming forming a shot-rack. Abaft the mainmast is the crew's ladderway[5], the after hatch, the lower barrel of the main capstan, a skylight divided into four parts, the after ladderway for the officers, a pantry surrounding the mizen-mast, and the bulkhead screening off the quarters of the Captain and his Second. It is difficult however to explain the arrangement of the latter, since the only access to the quarter-galleries appears to be through the cabins!
The structure of the decks is minutely represented, with the beams being made in two parts; the knees are all timber. The ledges are supported by carlings, and in the way of the hatchways they fit into broad hatch-carlings, which are scored down into the lateral faces of the beams; these serve the same purpose as the other carlings. At their outboard end they rest in culvertail scores cut in the inner waterway.

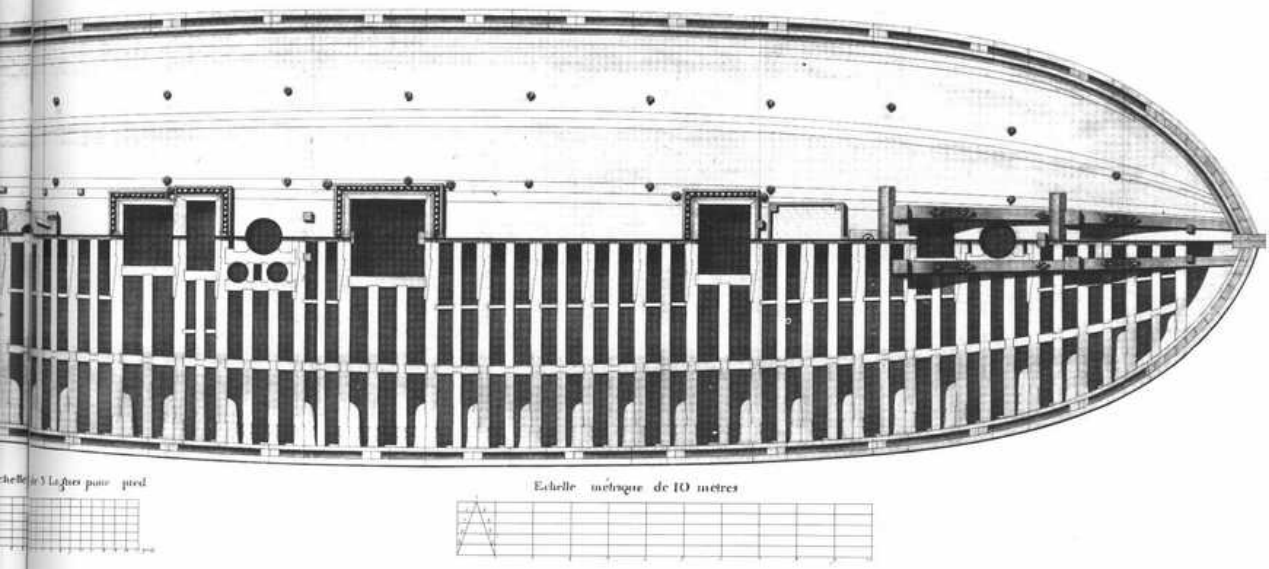


Forecastle & Quarterdeck

The plan is drawn with the same meticulous attention to detail. Note the new arrangement of the inner arm of the catheads (the cat-tail), bolted under rather than over the beams. Other fittings, such as the fore topsail-sheet bitts, the foremast pin-rail, the partners of the fore jeer capstan, and the cowl of the galley fires are all in their usual positions.
The main topsail-sheet bitts rise as high as the quarterdeck; next, the quarterdeck breastwork, the mainmast and the four pumps, the pin-rail, the after hatch, the partners of the upper barrel of the main capstan, all in their usual positions; an innovation is the skylight; together with a second skylight immediately below, it provides indirect lighting to the officers' mess.
The officers' ladderway is a short way forward of the mizen-mast, and between it and the mast are a pair of bitts. The double steering wheel[6] is still fitted abaft the mizen-mast. Further aft is another small skylight to provide illumination to the Captain's quarters. This type of arrangement, unknown in the 18th century, was to become more common after the Regulations of 1807. Note the final disappearance of the poop, which was still quite common at the beginning of the 19th century.

5. It is possible that there was a second ladder in the cable hatchway.
6. The arrangement of the tiller and its sweep can be seen in the plan of the upper deck.

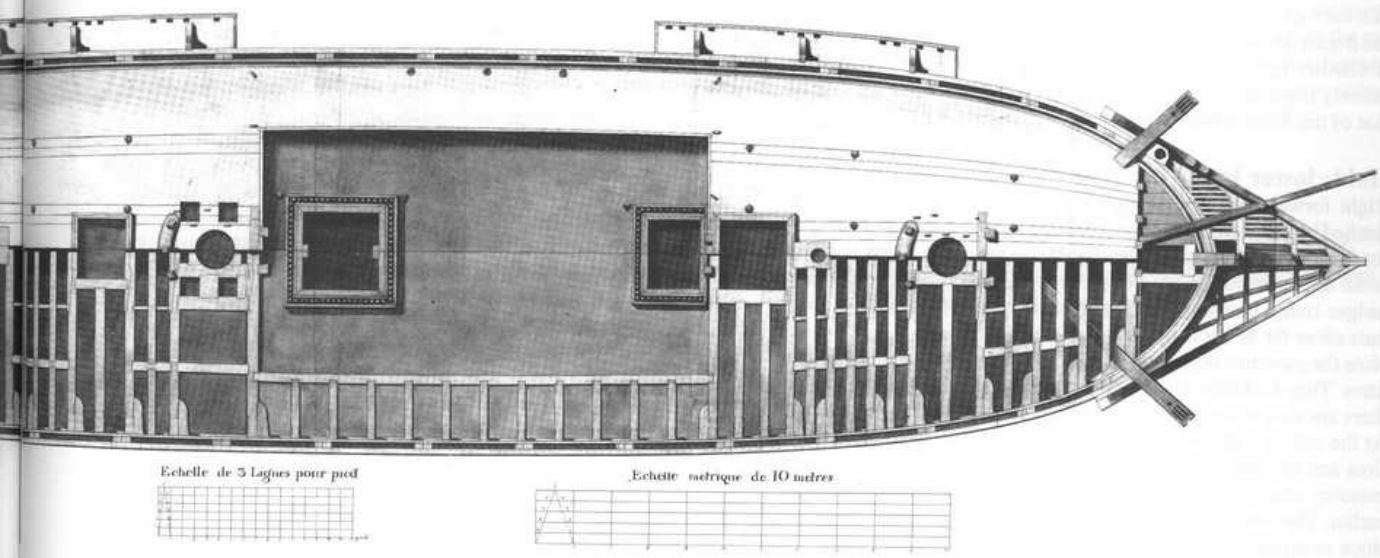
ONT DE LA FREGATE LA FLORE PORTANT DU 18 EN BATTERIE



Echelle de 5 Lignes pour pied

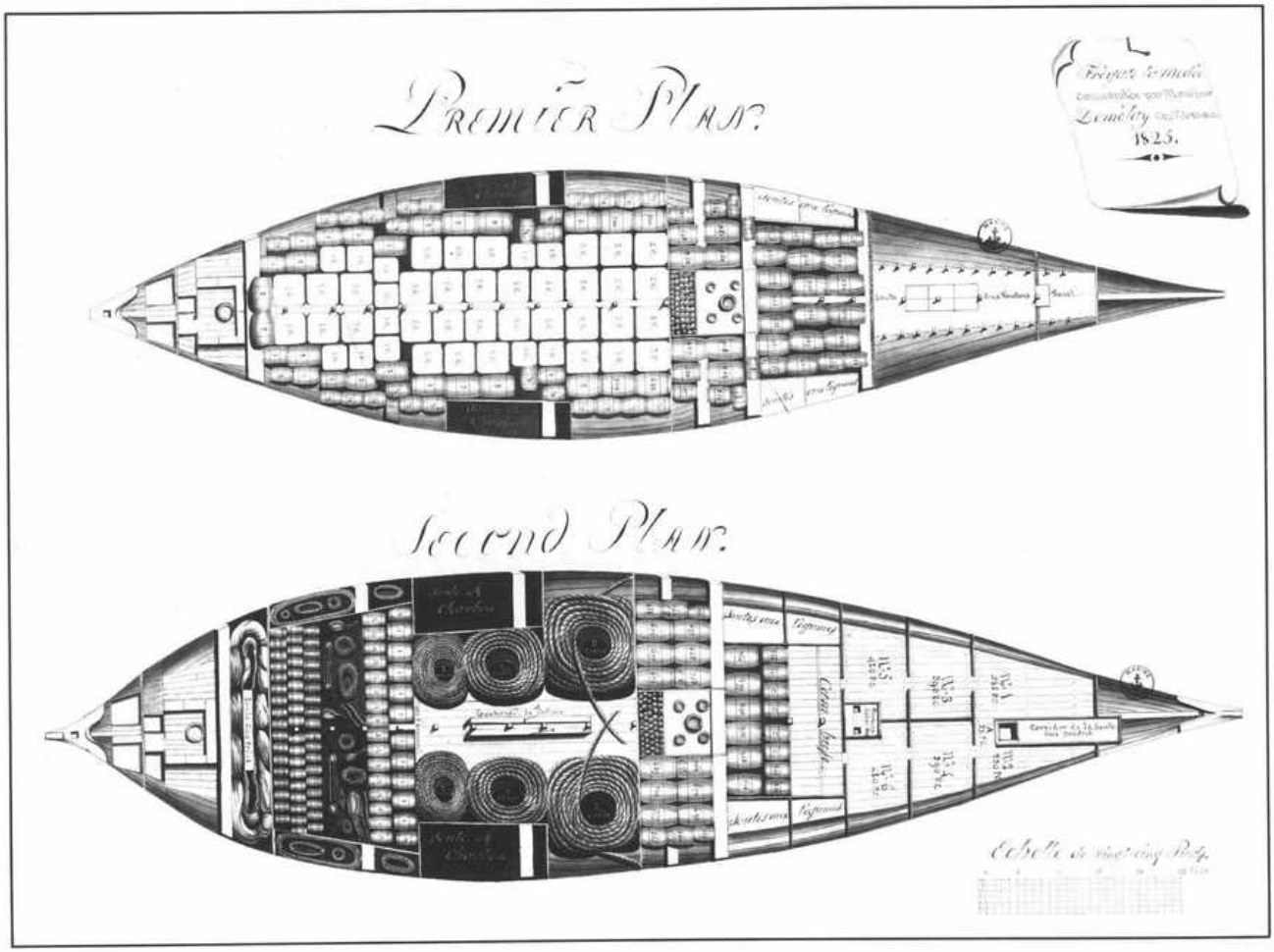
Echelle metrique de 10 metres

A DES GAILLARDS DE LA FRÉGATE LA FLORE, PT DU 18 EN BATTERIE



Echelle de 5 Lignes pour pied

Echelle metrique de 10 metres



This document is preserved at the *Service Historique de la Marine* (ref. nº 8 DD[1]6). The plans bear the date 1825 and are of the frigate *Médée*, built at Genoa in 1810 to Sané draughts. There is another plan showing the stowage of the ballast, which is entirely made up of pigs of 50 and 100 pounds weight, similar to that of the *Flore* which we have already examined.

Hold: lower level. This is stowed directly over the ballast. Right forward is the forepeak, followed by the powder room, flanked by a storeroom for mattresses on the port side and another for brooms to starboard. Also visible is the light-room and the small antechamber to the powder room, with the racks for cartridges round the foremast. Further aft is the main hold, which runs aft as far as the shot-locker.

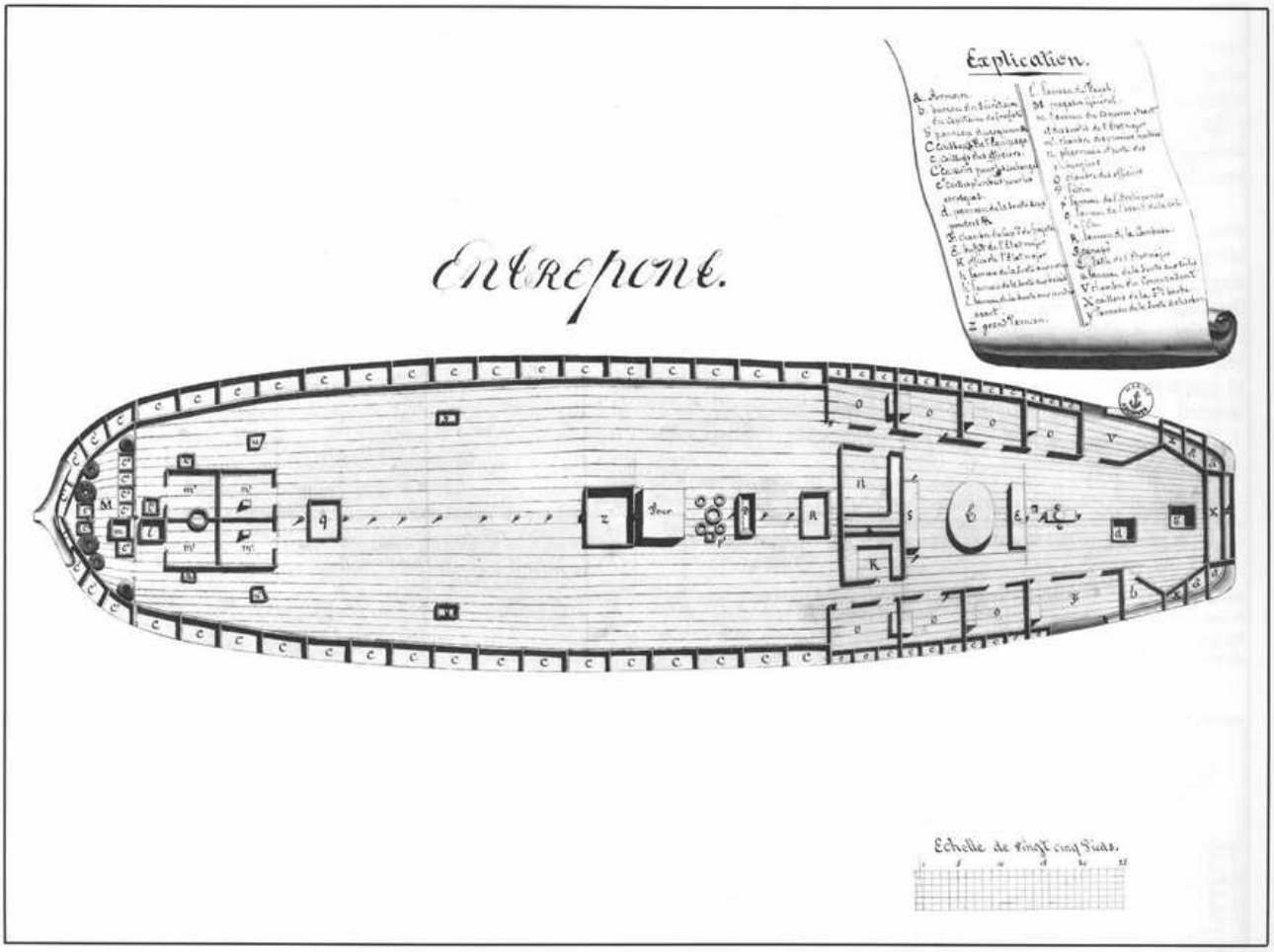
Note the presence of *fresh water tanks* containing 1,000 or 2,000 litres. They had only recently been adopted, which explains why there are also water casks to be seen[1].

At the side is a storeroom for *sea-coal*, used by both the galley fires and the iron oven, which by now have replaced the earlier masonry structures burning firewood, still widely used a decade earlier. The forward bulkhead of the shot-locker extends athwartships to separate the main hold from the after hold, which ends at the main magazine.

On either side of the after hold can be seen the storerooms for the dried vegetables. The magazine completes this lower level, and it is lit by a lantern in a light-room.

Hold: upper level. At the bow and running the full width of the vessel is the sail-room, preceded by the upper level of the forward powder room below. Next are the Bo'sun's spares, as well as casks of flour, salt meat and the breakers[2]. All these are stowed on shifting platforms which can be taken up to allow access to the lower level. The cables and hawsers[3] are coiled up amidships, with a spare rudder in the centre of their flat; on either side can be seen the upper part of the coal stores running up from the lower level. The upper part of the after hold is mainly composed of a second tier laid over the ground tier, with space left for an issuing room; the storerooms for the vegetables extend up from below, and abaft the issuing room are the bread rooms. There is a small area screened off for the cartridges to be passed up, and the aftermost bread room is separated into two parts by the passageway providing access to the magazine and light-room.

Lower deck. Note the run of lockers stretching almost the full length of the deck; those marked **C'** are for spares, while those marked **C** are for the crew's personal effects, followed by those for the officers. **M** marks the general storeroom, where there are other lockers lined with lead for oily substances; others contain coiled up rigging, and **m** marks the scuttle leading to the forepeak. Abaft the bulkhead of the store are two scuttles marked **l** and **l'**, giving access respectively to the forward powder room and the light-room. At **m'** there are four cabins for the Warrant Officers.



Marked **h**, **h′**, **u** and **u′** are four small scuttles leading to the storerooms for the mattresses, brooms, and spare sails. The forward hatchway to the main hold is marked **q**, while the coal store scuttles are marked **y**. **Z** indicates the main-hatch, followed by the bread oven, and the mainmast flanked by the four pumps; at **p′** is the scuttle leading to the well, at **p** the kneading-trough, **R** the hatch of the issuing room.

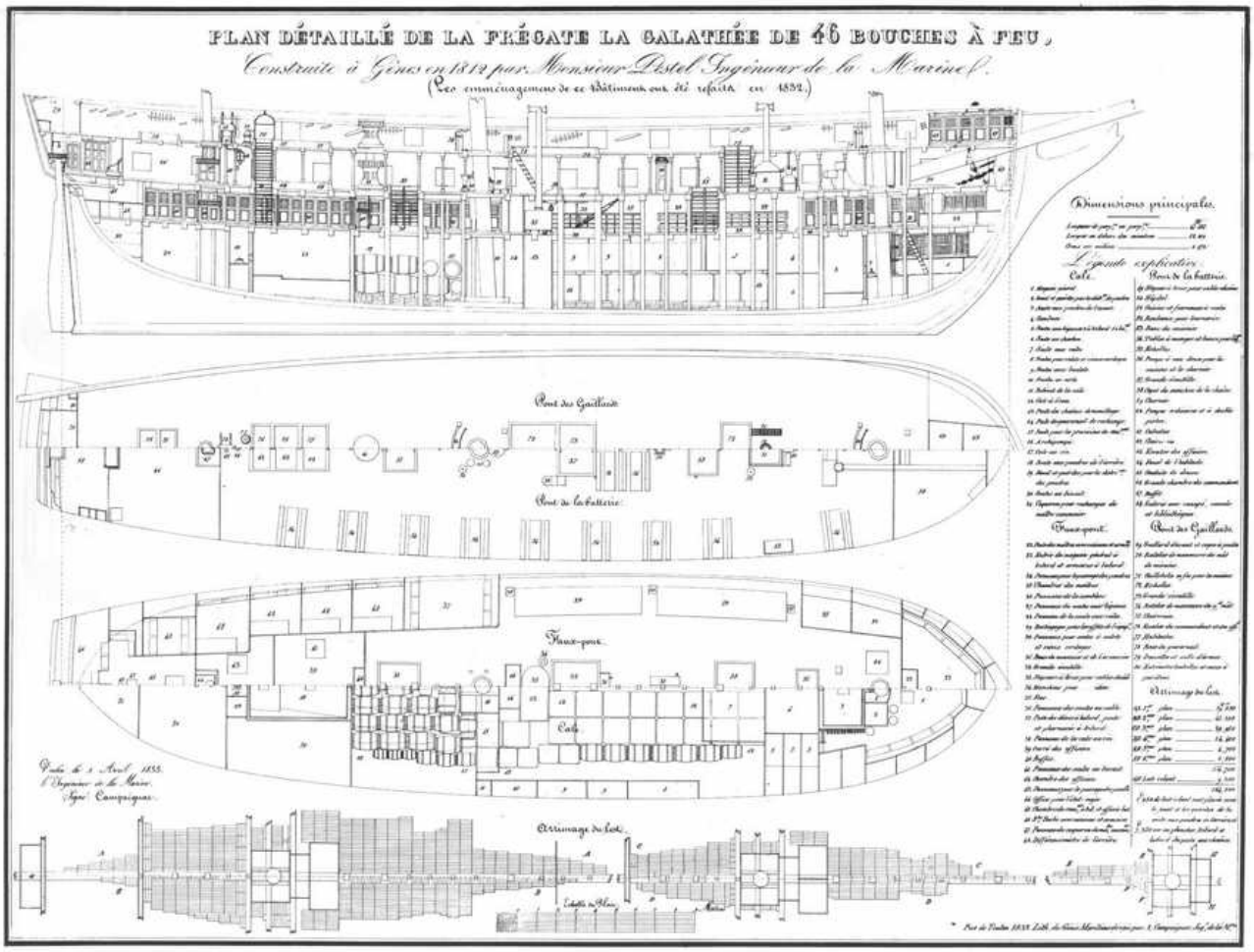
All the after part of the lower deck is reserved for the officers, with six cabins marked **O**, four of which lead onto the mess, where there is a table, a settee and a sideboard. Against the forward bulkhead of the mess can be seen the pharmacy (**n**), which also serves as the surgeons' station, while **k** marks a pantry for the officers' table.

The after bulkhead of the mess is half-glazed, providing light to a small area leading to another officer's cabin **O** and to a rather less cramped cabin **F** for the Second Captain; the Captain's quarters are on the starboard side, marked **V**, with a small area for the Second's clerk at **b**. **X** marks a number of chests, and there are cupboards at **a**. Note that the gunroom has by now disappeared. The magazine-hatch is shown at **d**, and the scuttle to the after peak is at **b′**. At the fore side of the step of the mizen-mast is a scuttle for passing up the powder.

Note that the ladders leading up to the upper deck are not indicated.

These documents conclude the description given earlier of the internal arrangements of 18-pdr frigates. The main changes were the adoption of fresh water tanks, the use of coal to fire the galley and the oven, and the disappearance of the traditional gunroom in the stern. Note also the continued presence of hemp cables, on the eve however of the generalisation of chain-cable.

1. Later a whole range of sizes of tank was introduced.
2. The breakers served for running off the daily allowance of water from the larger casks at sea (and also as gang-casks).
3. On either side there is a coil of two cables, with another of a single cable's length and a fourth of three hawsers.



The draught reproduced above should be examined in conjunction with those of 60-gun frigates on pages 310 and 311. It illustrates the final modifications made to a class of frigate whose original designs went back to the 1780s. All the new arrangements adopted after the 1820s are illustrated, and it is even more detailed than the one we are about to examine. Those readers who understand French will find much of interest in the key regarding minor details of the internal arrangements, including the furniture (note for example the presence of mess-tables for the crew on the upper deck).

Frigates of the 1st rank.

The various technical changes which came about made it necessary to establish new regulations concerning the internal arrangements; these were introduced in December 1838, with plans being drawn up for each rate. I have reproduced on pp. 310-311 the plan covering frigates of the 1st Rank, the so-called 60-gun frigates (layout constraints made it impossible to reproduce it on this page). For the other ranks of frigates including the old 18-pdr the arrangements were identical.

The new internal arrangements were governed by the introduction of iron water tanks, already quoted, chain-cables, and the use of coal instead of firewood; dunnage wood was still required for the stowage of the wine casks, since the wine did not keep in iron vessels. To these innovations we might add the use of copper chests for the cartridges, and the use of iron pigs exclusively for the ballast[9].

Regulations of December 1838. The plates illustrate very well the text which is given in the collection of draughts or *Atlas du Génie Maritime*. For those who read French, the key on the draught provides additional information, apart from that given on the following pages.

Hold. Hard up in the bow is the general storeroom, followed by the forward magazine or powder room, with screened doors[10] in its forward bulkhead for passing up the cartridges, and between them the light room with its lantern; above the magazine is the vegetable store. The main hold stretches aft as far as the well, and the earlier two tiers of water casks have been replaced by a single tier of iron tanks. On either side are the storerooms for coals, projectiles, and sand, and these rooms run up the full height to the lower deck. Above the water tanks there is a shifting platform or flat[11], with the issuing room at its forward end, followed by the sail room. Immediately abaft the well is the chain locker, with compartments on either side for shells.

The after hold runs from the chain locker to the forward bulkhead of the after magazine, which is surrounded on its three remaining sides by bread rooms running up the full height of the hold. Above the magazine is a low storeroom for vegetables.

Screened doors allow for the safe handling of the cartridges, and there is a light room between these doors. The main points of interest are the very considerable gain in space through the use of chain-cable rather than hemp, and the shifting forward of the issuing room.

Lower deck. Right up in the bow is the petty officers' mess, followed by three cabins or bunks on either side for their use. In the space reserved for the crew's bedding, four pigeon-holed racks provide stowage for their personal effects. Athwart the mainmast is the midshipmen's station, on the port side, while on the starboard side is the surgeons' and pharmacist's station. These are followed on either side by seven bunks for the officers, with a mess between them; at the forward end is a pantry, and at the after end is the gunroom. The ladderway leading up from the mess is situated between the mainmast and the capstan (the fore jeer capstan has by now been abandoned), and it is supplemented by two small ladders running up from the gunroom and the magazine.

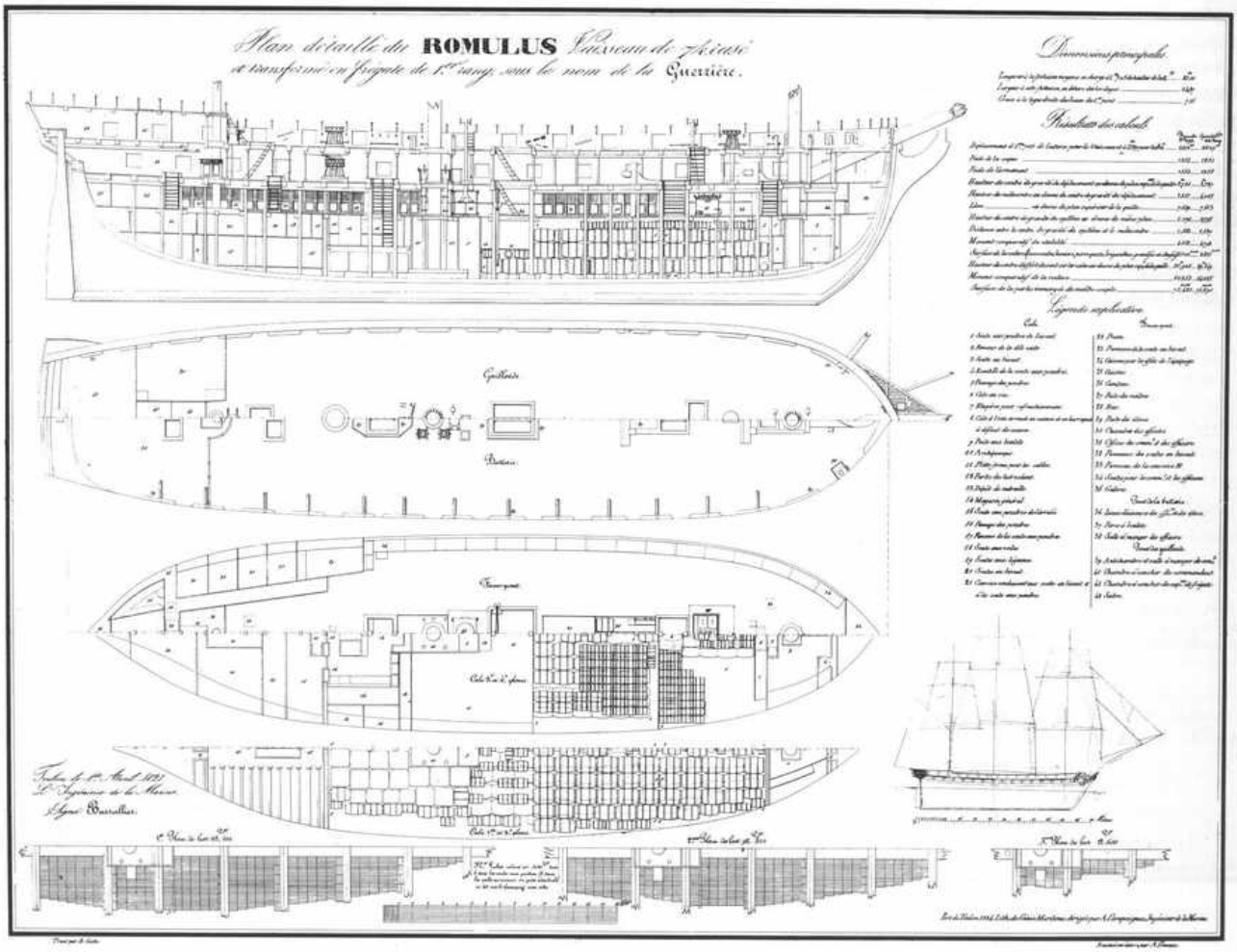
Upper deck. Between the foremast and the stem is a space allocated as a sick berth. Next come the bitts and the iron galley stoves (the bread oven remains in its usual place on the lower deck, but coal has replaced firewood both for it and the galley). The poultry coops are installed between the forward ladderway running up from the lower deck and the main-hatch. The Captain has the benefit of a great cabin which also serves as a wardroom at times, and of a stern-gallery.

Forecastle & Quarterdeck. There is a small deckhouse forward affording some shelter for the forecastle hands when handling the sails. At the stern there is another deckhouse, serving if necessary as an armoury, and sheltering on the starboard side the Captain's privy and that of the officers and midshipmen to port. This new arrangement is imposed by the introduction of the round stern (see below).

In the 1840s a Captain M.-G. Lugeol set out proposals for a new stowage plan, which imposed further modifications to the internal arrangements. As early as 1842, a first trial was made in the frigate *Belle-Poule*, but the system was not officially recognised until 1848. Despite its several points of interest, I do not propose to analyse it here, since I have set myself the year 1850 as my *terminus adquem*. It should also be said that the beginning of steam propulsion was already beginning to transform internal arrangements in a major way.

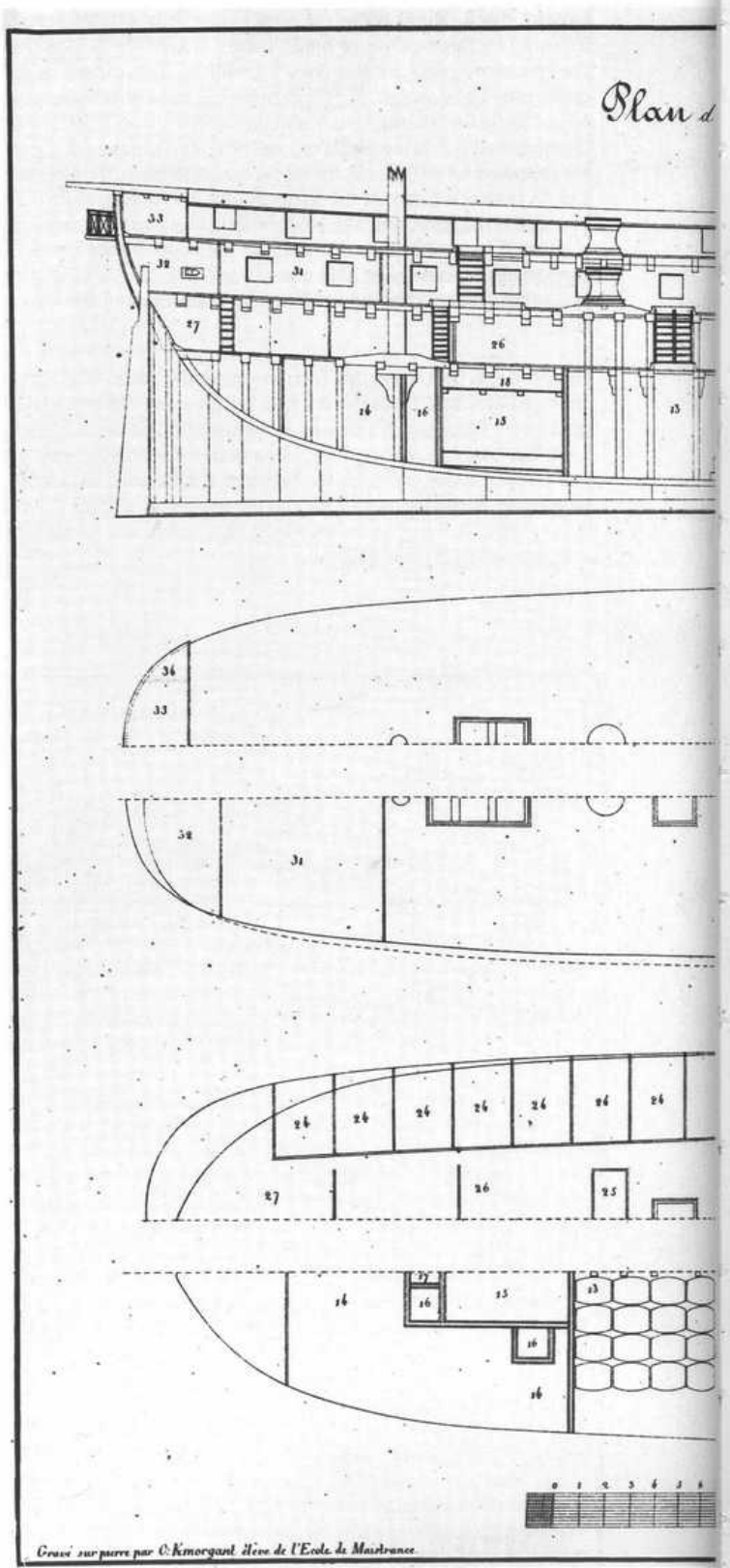
9. A small quantity of shingle ballast was used to fill up the spaces.
10. Screened doors were essentially double-doored entrances providing better safety.
11. The platform in the hold was composed of a light framework of beams and carlings covered with removable boards in order to provide easy access to the casks, water tanks, etc.

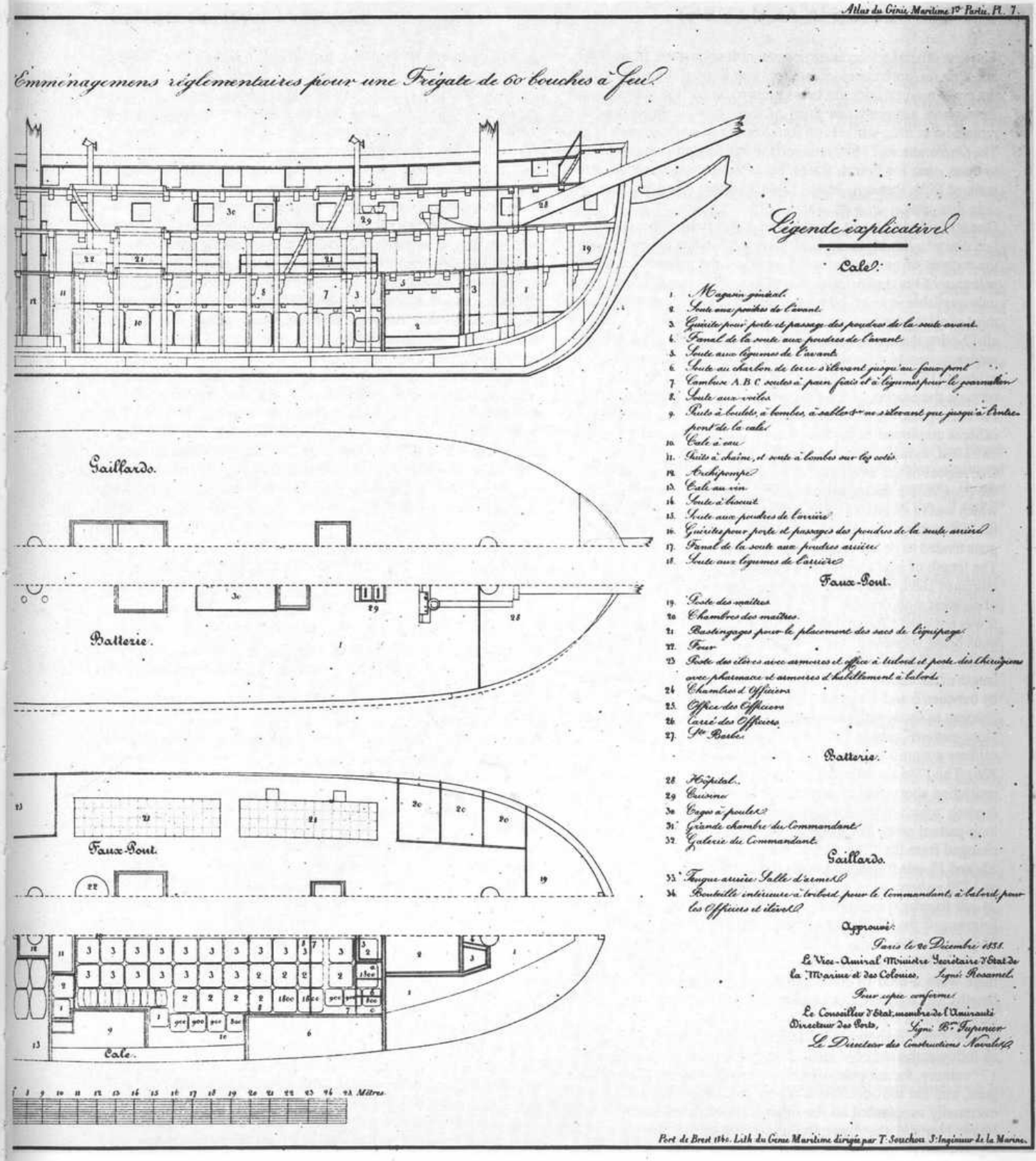
This draught relates to the rasée 74s previously discussed, but shows in great detail the changes which were made. I will not comment on it in detail, apart from pointing out the presence of water tanks in the space normally occupied by the wine casks in the after hold, with additional water in cask stowed with the wine.



The 1838 Regulations were accompanied by a series of plans specifying in detail the internal arrangements to be followed for each rate of vessel in the Navy. These provide precious details for all the classes of frigate. Since they are all very similar, I have merely reproduced the plans for a 60-gun vessel of the 1st Rank, and the key once again gives considerable detail; I would add however the following comments:

2 Forward magazine, which is by now the same size as the magazine in the stern.
3 The screened doors allow the cartridges to be passed up without the need to enter the magazine.
4 The lantern placed abaft the foremast can be accessed from the general storeroom.
7 Close examination of the plan view (lower drawing) reveals the outline of the issuing room overlaying the water tanks. The storerooms for fresh bread, marked **a.b.c**, are placed hard up against the cofferdam bulkhead of the magazine on either side of the light room.
9 The shot locker is in addition to the large number of shot racks on the upper deck, forecastle and quarterdeck; it also contains the sand used in large quantities on the decks.
11 Although marked "bomb store", this in fact contains shells, stowed in individual cases.
15 Like the forward magazine, the after magazine also has a low vegetable store overhead.
17 The light-room for the after magazine is accessed from one of the double doors for the cartridges.
19 On the lower deck, the Warrant Officers' quarters have been moved from the stern to the bow, with the old area corresponding to the gunroom taken over by the officers. Note the ladder which now links the officers' quarters with the Captain's cabin.
34 With the introduction of the round stern, the privies were moved up to the quarterdeck, at either side of the deckhouse. This arrangement means that the starboard privy, reserved for the Captain, is no longer accessible directly from his cabin. The external stern-gallery being now at quarterdeck level, there is an internal gallery in the great cabin.




Atlas du Génie Maritime 1re Partie. Pl. 7.
Emménagemens réglementaires pour une Frégate de 60 bouches à Feu.
Légende explicative.
Cale.
1. Magasin général.
2. Soute aux poudres de l'avant.
3. Guirlte pour porte et passage des poudres de la soute avant.
4. Fanal de la soute aux poudres de l'avant.
5. Soute aux légumes de l'avant.
6. Soute au charbon de terre s'élevant jusqu'au faux pont.
7. Cambuse A.B.C. soutes à pain, fours et à légumes pour le gournalier.
8. Soute aux voiles.
9. Soute à boulets, à bombes, à sabords ne s'élevant que jusqu'à l'entrepont de la cale.
10. Cale à eau.
11. Soute à chaine, et soute à bombes sur les côtés.
12. Archipompe.
13. Cale au vin.
14. Soute à biscuit.
15. Soute aux poudres de l'arrière.
16. Guirlte pour porte et passages des poudres de la soute arrière.
17. Fanal de la soute aux poudres arrière.
18. Soute aux légumes de l'arrière.
Faux-Pont.
19. Poste des maîtres.
20. Chambres des maîtres.
21. Bastingages pour le placement des sacs de l'équipage.
22. Four.
23. Poste des élèves avec armoires et office à tribord et poste des chirurgiens avec pharmacie et armoires d'habillement à tribord.
24. Chambres d'Officiers.
25. Office des Officiers.
26. Carré des Officiers.
27. Ste Barbe.
Batteries.
28. Hôpital.
29. Cuisine.
30. Cages à poules.
31. Grande chambre du Commandant.
32. Galerie du Commandant.
Gaillards.
33. Fougue arrière. Salle d'armes.
34. Bouteille intérieure à tribord pour le Commandant, à babord pour les Officiers et élèves.
Approuvé:
Paris le 20 Décembre 1851.
Le Vice-Amiral Ministre Secrétaire d'Etat de la Marine et des Colonies. Signé: Rosamel.
Pour copie conforme:
Le Conseiller d'Etat membre de l'Amirauté Directeur des Ports, Signé: Bve Tupinier
Le Directeur des Constructions Navales
Gaillards.
Batterie.
Faux-Pont.
Cale.
Mètres
Port de Brest 1852. Lith du Génie Maritime dirigée par T. Souchon 3e Ingénieur de la Marine.

THE EVOLUTION IN ARMAMENT

The first official text concerning sea ordnance dates from 1669[1], and does no more than indicate for each Rate of the King's ships the proportion of iron and brass guns to be carried. Thus Fourth Rates were assigned one third of their guns in brass, and the remainder in iron, while Fifth Rates received no brass guns at all. The *Ordonnance* of 1689 retained the existing proportions of iron to brass guns for Fourth Rates, but allocated one quarter of the guns of Fifth Rates in brass. Light frigates, however, received only iron guns.

One is entitled to doubt whether the proportions of brass guns as laid down by the 1669 and 1689 texts were in fact observed, since the records of gun manufacture confirm the progressive disappearance of brass guns in favour of iron. Thus, brass 4-pdrs were only available in small quantities, and there were no more than a third of all 6-pdrs available in brass, a fifth of 8-pdrs, and half of all 12-pdrs, these proportions being the maximum available. The tendency was to reserve bronze casting capacity for the larger calibres (18-, 24- and 36-pdrs). By the first decade of the 18th century, the casting of bronze guns had all but ceased[2].

For brass guns, I shall accordingly do no more than illustrate the calibres employed in frigates, according to the provisions of the 1689 text, indicating their principal characteristics.

One aspect of the evolution of the armament of frigates is thus the progressive disappearance of brass guns in favour of iron, which was to all intents and purposes the only metal employed in the 18th century. It is also apparent that, for the same calibre, brass guns tended to be somewhat longer than their iron equivalents.

The length of iron pieces became more uniform with the Regulations of 1689, with some variations in weight (see p. 314), albeit of no great significance.

It was not until 1766 that any major changes were made, with all guns being shortened. The significant tumblehome of the upper works in frigates made it increasingly desirable to reduce the length of the barrels of guns, and they were accordingly shortened by between 6 and 14 inches. The 1779 System made only minor changes in the lengths adopted in 1766, but designated them as "long-pattern" pieces, introducing at the same time for all four calibres a significantly shorter pattern (see the same table on p. 326). The 1786 System reversed these arrangements in large part, restricting short-pattern guns to the smaller calibres (4-, 6- and 8-pdrs), which were in any case not greatly shorter than the long-pattern guns. For 12-pdrs, the lengths were effectively unchanged from the 1766 pattern guns.

12- and 18-pdr frigates were in principle armed either with 1766 or 1779 pattern guns, and later with those of the 1786 System. 24-pdr frigates were armed in accordance with the 1786 System. Frigates of the 1st Rank were armed with the new calibre of 30-pdrs, in both long- and short patterns as adopted in 1820; finally, in 1849, right at the end of the period covered by this work, there were a total of four patterns of 30-pdr gun, of differing lengths and weights. Let us also mention in passing the 50-pdr calibre, which was theoretically due to be introduced in 1849.

The evolution in the armament of frigates can thus be summarised as follows: the abandonment of the brass gun at the end of the 17th century, the adoption of shorter barrels with the 1766 pattern guns, and the introduction of a new calibre in 1820, whose use eventually supplanted all the other calibres in use in the French Navy. Nor did the "morphological" aspect of the guns alter significantly: they were simplified, and small details were changed, and they became lighter in the 19th century thanks to progress in metallurgy.

While it is true that from the middle of the 18th century onwards sea ordnance was better defined, and improvements in casting and boring might classify as a sort of evolution, well represented by the 1786 System of guns, the real evolution in naval armament came about through the adoption of new types of piece.

Thus, in 1786, the *sea howitzer* was adopted, derived from the land service pattern[2], and designed as a response to the English carronade. The use of explosive projectiles was a novelty, considered by seamen to be more dangerous to the user than to the enemy, so that howitzer shells were abandoned in favour of solid shot and grape; since howitzers had not been designed to fire such projectiles, the resulting performance was mediocre[3].

In 1804 the decision was taken to replace the sea howitzer with the iron carronade, copied from the English. Frigates thereafter benefitted from secondary armament which was extremely powerful when fighting at close quarters, marking a real step in the evolution of their armament.

In 1827, the developments of an army artillery officer, J.-H. Paixhans, led to the introduction of the devastating *shell-gun*, firing with remarkable effectiveness a hollow shot filled with explosive and incendiary compounds, such as had been tentatively tried in 1786. The Navy, always hesitant in such matters, finally adopted these new weapons in 1837, albeit in limited numbers, but this did not disguise the fact that the wooden navy was now condemned to extinction, timber providing no defence against the new projectiles. The old navy was now doomed, and only the absence of conflicts at sea allowed a period of grace which lasted until the middle of the 19th century, which finally marked the end of what I would call the "classical" period of the sailing navy.

1. Regulations of December 1st 1669.
2. The Colonial Artillery, derived from that of the Army, was given responsibility for the development of the new weapons, as an extension of the Gribeauval system.
The 1786 System for iron guns and the definition of brass guns for the Navy and for the Colonies fell to a close collaborator of Gribeauval, Brigadier Manson.
3. This does not however imply that, used with explosive projectiles, howitzers did not perform excellent service, but in the less hazardous conditions of the land service rather than at sea.

*
* *

Calibres employed by frigates

4-pdr long gun. Armed the gundeck of the smallest light frigates; employed as secondary armament in some ship-frigates. When the 8-pdr frigate entered service, its secondary armament was composed of 4-pdrs, but this calibre was abandoned when the 8-pdr class was discontinued. The length of the barrels varied between 1674 and 1779 from 6 feet to 4 feet 8 inches, the 1779 System envisaging both short- and long-pattern 4-pdrs (see table overleaf).

6-pdr long gun. Armed the gundeck of light frigates, and the upper deck, forecastle and quarterdeck of ship-frigates. With the introduction of the 12-pdr frigate, 6-pdrs constituted their secondary armament, but with the disappearance of this class the calibre also ceased to be used. The length of barrel varied from 7 feet to 5 feet 5 inches, both the 1779 and the 1786 Systems envisaging short- and long-pattern variants.

8-pdr long gun. Armed the lower deck of ship-frigates of the 2nd Order and the upper deck of some vessels of the 1st Order. It was this calibre which characterised the 8-pdr class. When they ceased to be built, the 8-pdr gun was adopted as the secondary armament of 18-pdr frigates[1]. The length of barrel varied from 8 feet to 6 feet 10 inches, with short- and long-pattern variants in both the 1779 and 1786 Systems.

12-pdr long gun. Armed the lower deck of ship-frigates of the 1st Order, and characterised the 12-pdr class. When this class of frigate was abandoned, the 12-pdr calibre ceased to be employed in frigates[2]. The length of barrel varied from 8 feet 6 inches to 6 feet 9½ inches, with short- and long-pattern variants in the 1779 System.

18-pdr long gun. Characterised the 18-pdr class, and ceased to be used after the withdrawal of the class, except as additional quarterdeck armament in 24-pdr frigates of the 2nd Rank. The 18-pdr measured 8 feet in length, with a short-pattern of 7 feet 4 inches introduced in 1824[3].

24-pdr long gun. During the Revolutionary period, some frigates were armed with guns of this calibre. With the adoption of a new class of frigate in 1817, the calibre was used again, before being abandoned in favour of 30-pdrs in 1837. The 24-pdr measured 8 feet 4 inches; in 1824 a short-pattern version was introduced, but it was never used to arm frigates.

30-pdr long gun. In 1820 a new calibre, the 30-pdr, was introduced into the Navy. It characterised the so-called 30-pdr frigates of the 1st Rank, adopted in 1824. In 1837 the frigates of the 2nd Rank were armed in like manner, in place of their 24-pdrs. Frigates of the 3rd Rank were also intended to be armed with 30-pdrs, which thus became the principal calibre employed in the new French Navy. The gun existed in two patterns, short and long, measuring 8 feet and 8 feet 8 inches respectively. The long-pattern was intended for the 1st Rank vessels, the short-pattern for the 2nd and 3rd Ranks. In 1849 changes were made, and four patterns were introduced, all of different lengths.

36-pdr sea howitzer. This piece was adopted in 1787, 12- and 18-pdr frigates being armed with four howitzers on the quarterdeck. Made of brass, sea-howitzers were abandoned with the introduction of iron carronades in 1804. Length overall[4] 2 feet 7 inches.

24-pdr carronade. In 1804 the cast-iron carronade was introduced into the French Navy, copied from the English Navy. Two calibres were planned, 36-pdrs and 24-pdrs, the latter finally[5] being allocated as secondary armament for the 18-pdr class of frigates. The pattern was changed slightly in 1824, and it was this pattern which was used in frigates of the 2nd Rank with 24-pdrs on the main deck. The Regulations of 1837 substituted 30-pdr carronades for frigates of the 2nd Rank, in order to maintain their uniformity of calibre, and the 24-pdr carronade was abandoned except for a few frigates of the older 1817 programme which were still in service and continued to be armed with 24-pdr long guns on the main deck. Length overall 4 feet 6 inches.

30-pdr carronade. Adopted at the same time as the 30-pdr long gun in 1820. This new calibre served as secondary armament in frigates of the 1st Rank (the so-called 60-gun frigates). The use of this calibre was extended in 1837 to frigates of the 2nd and 3rd Ranks. Length overall 5 feet.

30-pdr shell-gun[6]. In order to standardise on a single calibre, this new weapon was introduced in 1827. The 1837 Regulations ordered its partial use in the main armament of frigates of the 2nd and 3rd Ranks, and in the secondary armament of frigates of the 1st Rank[7]. Length overall 7 feet 6 inches; the pattern was modified in 1849.

80-pdr shell-gun[6]. This extremely destructive weapon was introduced in 1827; however, it was not until the 1837 Regulations that its use was ordered in frigates, and then only partially in those of the 1st Rank[8]. In 1841 the 1827 pattern was slightly modified, and in 1842 two new patterns were adopted, a short- and a long-pattern, these being modified once again in 1849. Length overall (1827 pattern) 8 feet 9 inches.

A decree dated July 1849 altered the armament of all three Ranks of frigate, with the adoption of four patterns of 30-pdr long guns and the introduction in each case of two 50-pdr long guns into the main deck armament, in addition to the two 80-pdr shell-guns cited above (see table overleaf).

1. 8-pdr long guns were also used as secondary armament in two 24-pdr frigates built during the Revolutionary period.
2. 12-pdr long guns were also used as secondary armament in two 24-pdr frigates built during the Revolutionary period.
3. The Regulations of 1837 ordered the addition of two short-pattern 18-pdrs to the secondary armament of frigates armed with 18-pdrs on the main deck.
4. It should be noted that for long guns the length is measured from the muzzle face to the base-ring.
5. From 1810 onwards.
6. The indication of the calibre as 30-pdr and 80-pdr is based on a calculation for solid shot. In reality, the shot were hollow (shells), and weighed 10 and 25.7 kgs respectively. They were also designated by the bore diameter of 16 and 22 cms.
7. The Regulations called for the inclusion of four 30-pdr shell-guns in each case.
8. Two 80-pdr shell-guns on the main deck.

Variations in the lengths of guns

(dimensions in French feet, inches and lines)

		Iron				Brass			
(Calibres)	XVIII	XII	VIII	VI	IV	XII	VIII	VI	IV
1674 Regulations		8'0"	7'6"	7'0"	5'6"	8'0"	8'0"	7'0"	5'6"
1685 Manuscript		8'0"	7'6"	7'0"	5'9"				
1689 Regulations		8'6"	8'0"	7'0"	6'0"	9'0"	8'6"	7'6"	66"
1721 Manuscript		8'6"	8'0"	7'0"	6'0"				
1758 Manuscript		8'6"	8'0"	7'0"	6'0"				
1766 Regulations		7'6"	6'10"	6'2"	5'6"				
1779 System	7'9.4"	7'6.6" 6'9.6"	6'11.4" 5'11.7"	6'3.8" 5'5.0"	5'6.1" 4'8.10"				
1786 System	8'0.0"	7'6.0"	8'0.0" 6'10.0"	7'0.0" 6'2.0"	5'6.0" 4'8.10"				

The manuscripts dated 1685 and 1721 are preserved at the *Archives Nationales*, fonds marine, ref. n° G 201-202. The 1758 manuscript is in a private collection, and was written by Maritz (reproduced in facsimile by Éds. Oméga, Nice). The 1779 System included both short- and long-pattern guns for the four smallest calibres, whereas the 1786 System originally envisaged short- and long-pattern guns for the three smallest calibres. The dimensions of the 4-pdr calibre in the 1786 System have been included for the sake of completeness only.

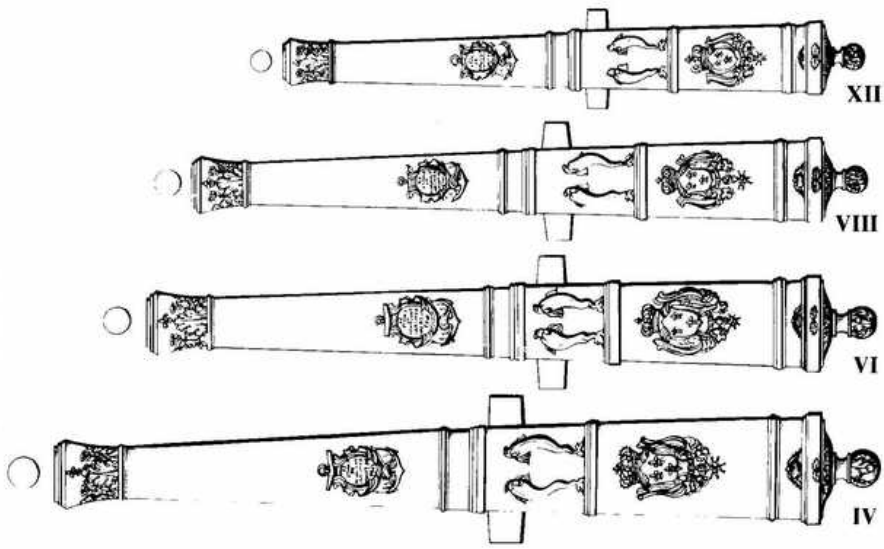
Calibres and weights (in French pounds)

(bore diameters in French inches, lines and points)

			1690	1721	1750	1766	1779		1786		1804	1820		1837
		mm					long	short	long	short		long	short	
4-pdr	Ø bore 3"	81	1,100	1,250	1,050	1,150		950	1,100**	800**				
6-pdr	Ø bore 3.5.2"	93	1,700	1,870	1,625	1,700	1,800	1,625	1,733	1,530				
8-pdr	Ø bore 3.9.6"	103	2,100	2,420	2,100	2,250	2,500	2,225	2,382	2,056				
12-pdr	Ø bore 4.4"	117	3,200	3,630	3,100	3,250	3,400		2,995					
18-pdr	Ø bore 4.11.6"	134							4,212					
24-pdr	Ø bore 5.5.4"	147							5,116					
30-pdr	Ø bore 6.1"	164										6,200	5,318	
24-pdr	carronade	147									1,543			
30-pdr	carronade	164										2,067		n° 1
80-pdr	shell-gun	220											7,435	5,566
30-pdr	shell-gun	164											3,026	

*To complete this table it is perhaps worth noting that in 1849 the weights of the four patterns of 30-pdr long gun were 3,085 – 2,487 – 2,140 – 1,860 kgs, and 4,710 kgs for the 50-pdr gun adopted in the same year.

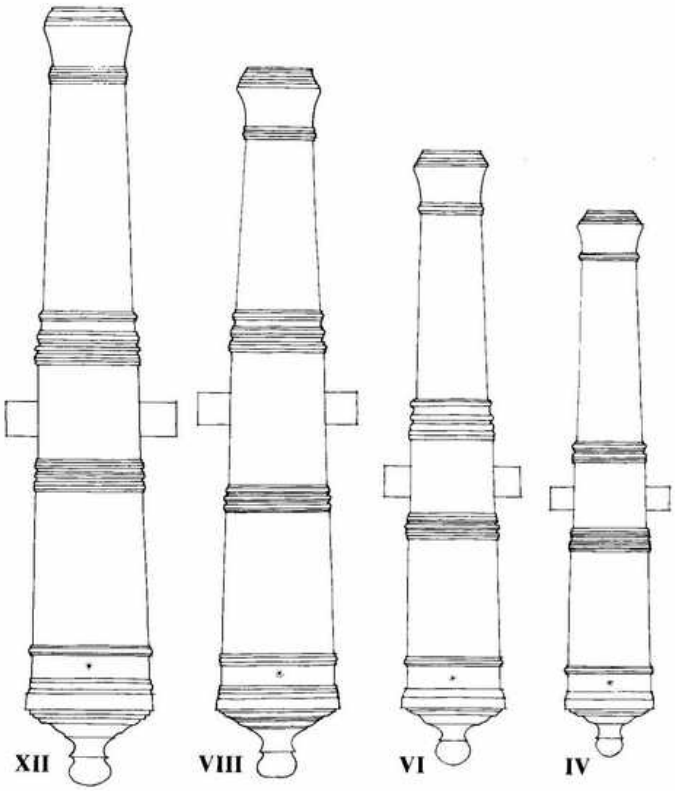
**For the sake of completeness only, since they were not employed in frigates.



Brass guns 1689

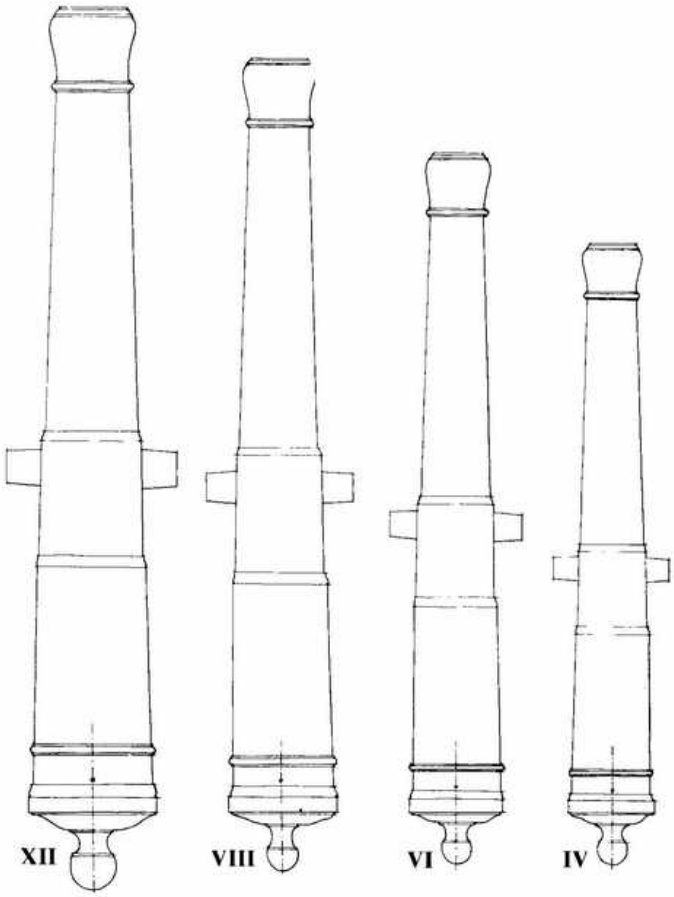
The drawings of the four calibres of brass guns employed in frigates in the 17th century are based on the dimensions found in the manuscript quoted (AN fonds marine G201).

Scale 1:24. The same scale has been used for all the other guns depicted on these pages.



Iron guns 1670-1680

Here are the four calibres of iron guns employed in frigates, based on the same manuscript source. The multiplicity of rings and ogees which go to make up the mouldings give an archaic appearance to these guns. The principal purpose of the document was to ensure that the calibre was respected, and the lengths laid down by the 1674 Regulations were not strictly followed. Thus the 8-pdr piece is only 7 feet long, and the 6-pdr six feet. The weight of the guns varied, and for the same calibre examples are to be found which have the weight as laid down, others which are lighter, and others which are reinforced and heavier.



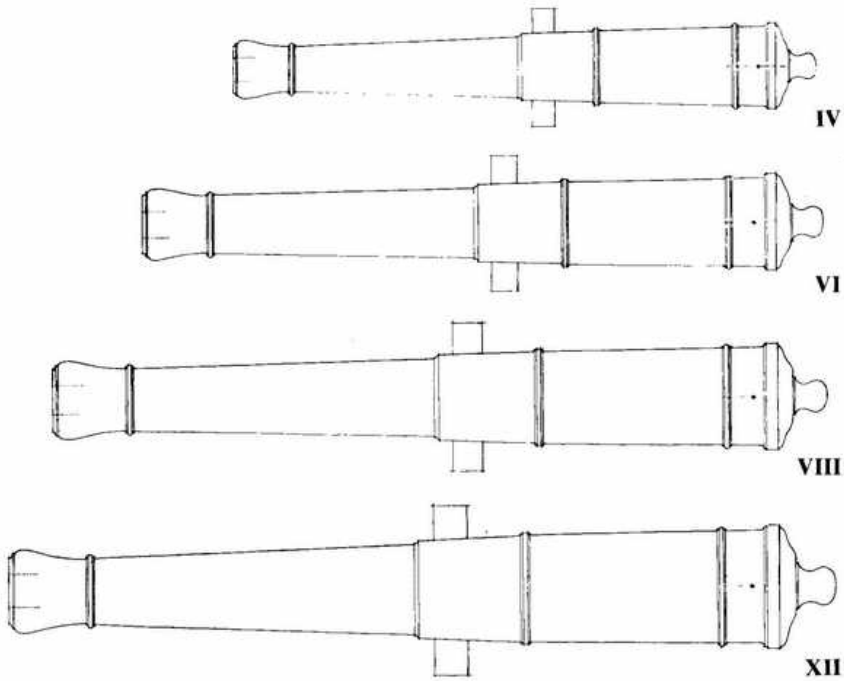
Iron guns 1700

These guns comply with regard to their length to the Regulations of 1689. The mouldings take the form which was to continue with only minor changes until the 19th century. Starting from the rear of the gun, note: the button, the cascable, the base-ring extending as far as the vent astragal, followed by the first and second reinforces, the chase ending in the chase astragal, then the muzzle swell and face.

Note the slightly conical form of the trunnions (diameter of the bore and diameter of the shot), which are placed just below the longitudinal axis of the bore.

Iron guns 1750

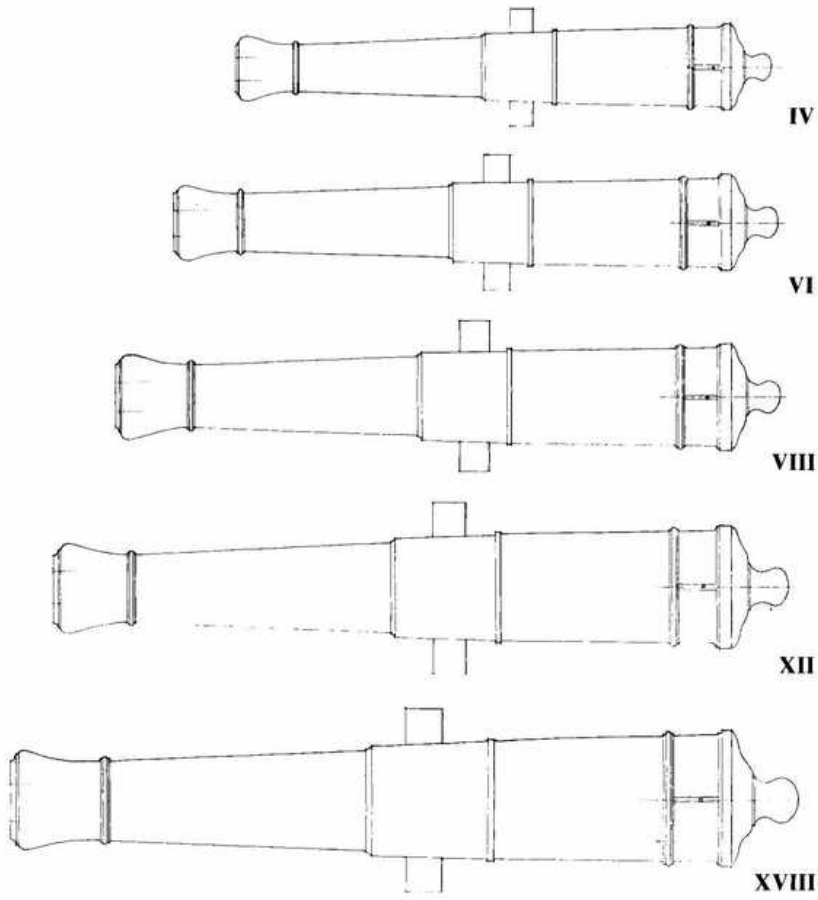
The lengths conform to the 1689 text. The mouldings are slightly different, and the trunnions are cylindrical.



Iron guns 1766

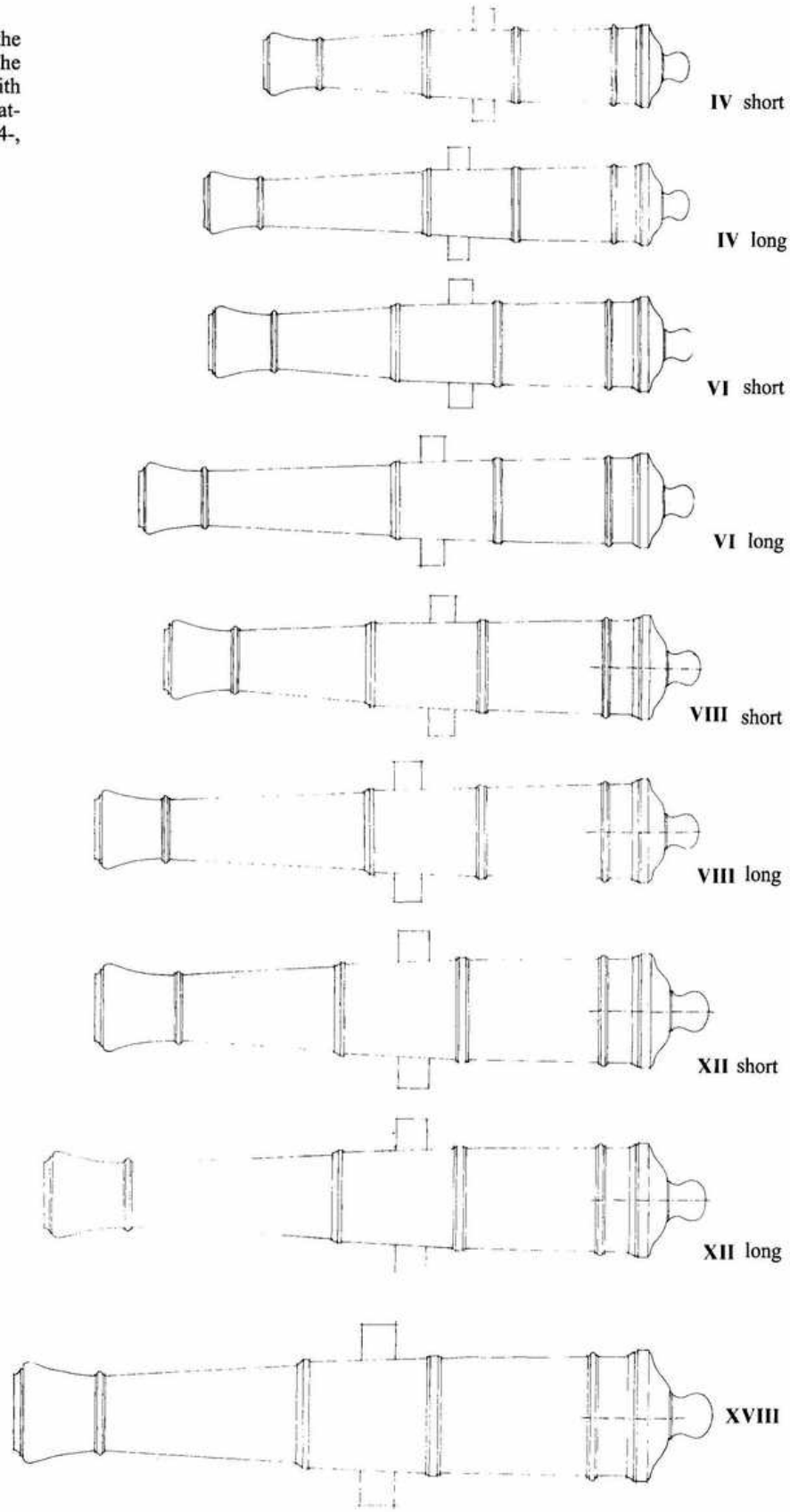
The Regulations modified the proportions laid down in 1689, especially with regard to length. The 12-pdr was reduced in length by 1 foot, the 8-pdr by 1 foot 2 inches, the 6-pdr by 10 inches and the 4-pdr by 6 inches.

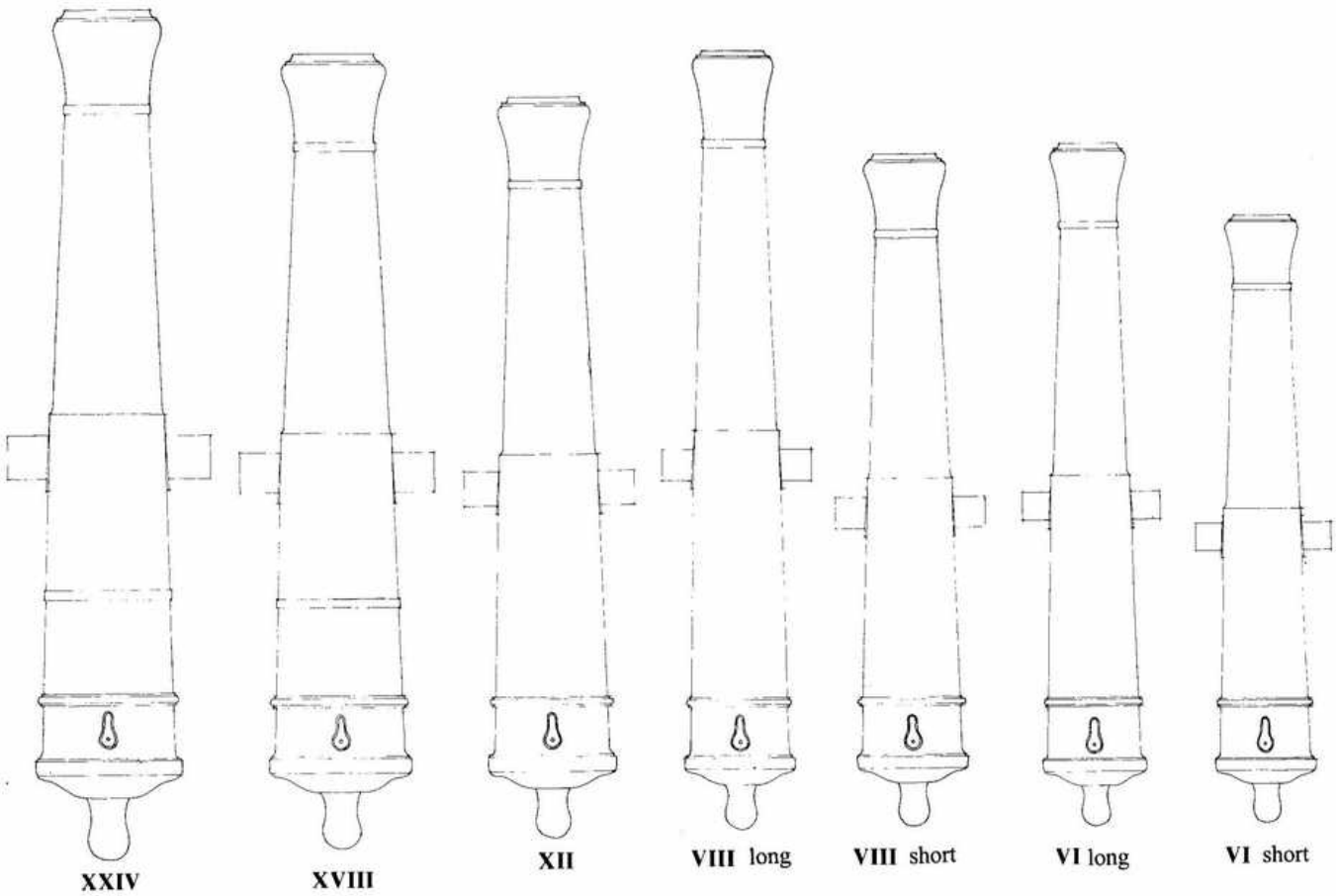
Guns of this pattern were also used in the 18-pdr frigates during the American War of Independence, which is why I have also included the 18-pdr calibre (length 8 feet). The use of the Maritz horizontal boring and turning machine from 1750 onwards resulted in a strict definition of all the guns' proportions, including their mouldings.



1778 System

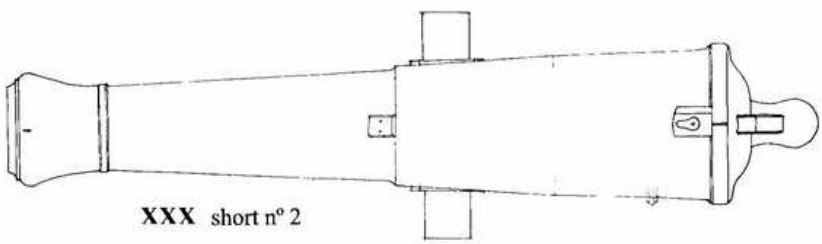
The 1766 Regulations were notable for the introduction of new, shorter guns. The 1778 System confirmed this approach with the adoption of both short- and long-pattern guns for the four smallest calibres (4-, 6-, 8- and 12-pdrs).

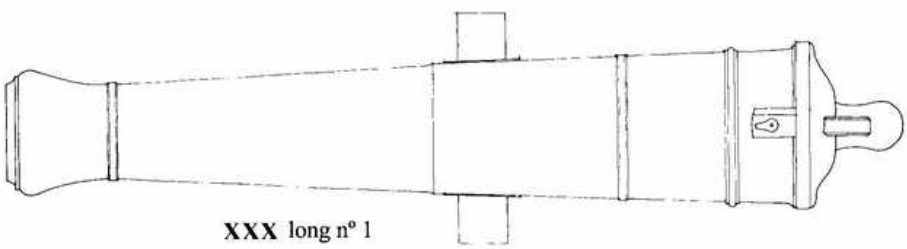




1786 System

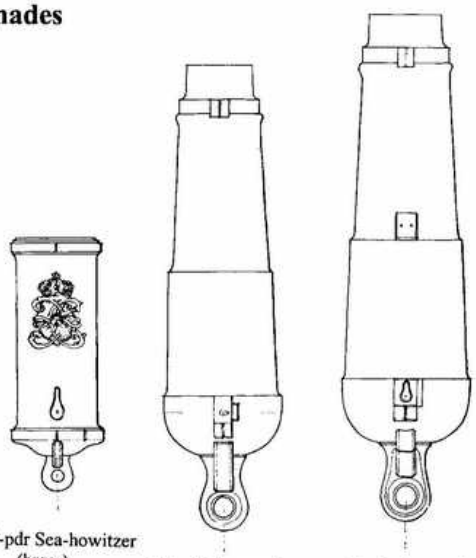
Marks the final development. Note the disappearance of the 4-pdr calibre, and the availability of short- and long-pattern versions of the 6- and 8-pdr calibres only. The series is completed by the 24-pdr calibre. For the smaller calibres there is now only a single reinforce, and the moulding have been simplified throughout. The long-pattern guns are extremely elegant.





The 30-pdr guns in both short-pattern and long-pattern versions were added to the 1786 System, although modified later (vent patch for a firing lock and a breeching ring). The drawing of the short-pattern gun shows it in its revised 1840 form, without the vent astragal, with an open breeching ring and an aim frontlet.

Carronades



36-pdr Sea-howitzer (brass)

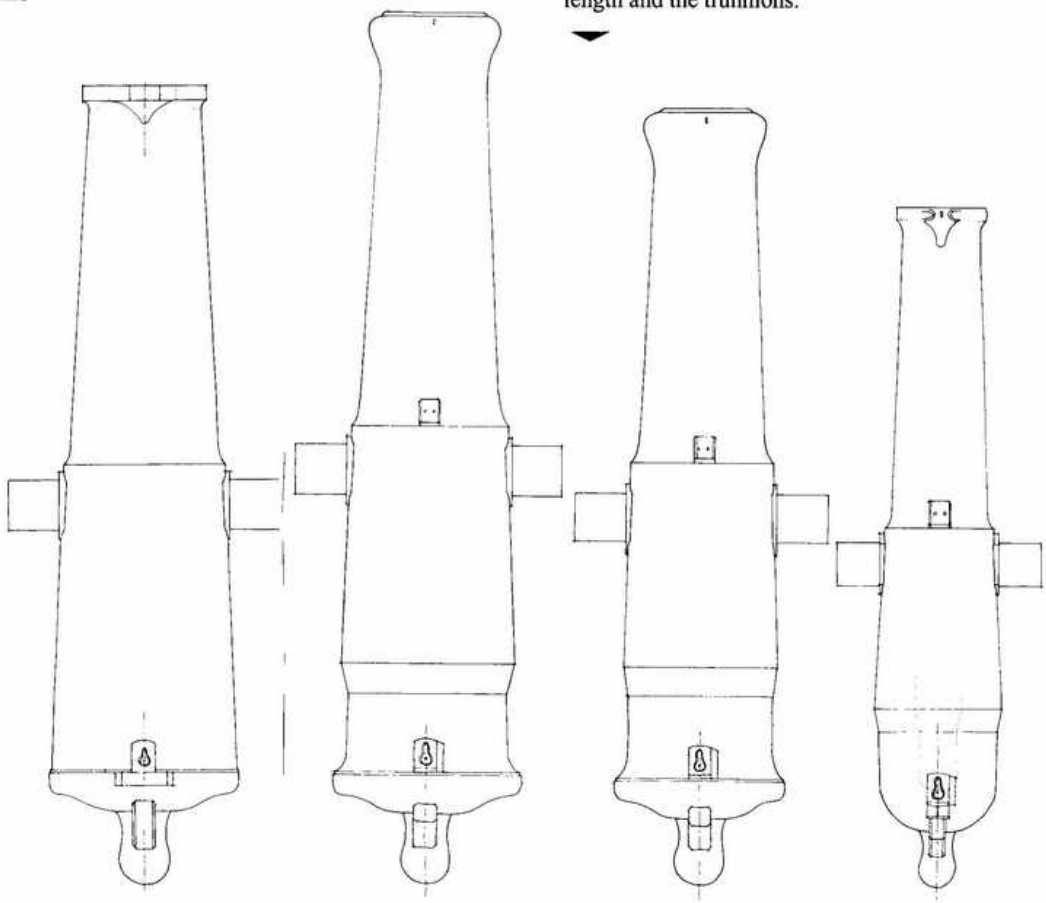
24-pdr Carronade 1804 pattern

30-pdr Carronade 1820 pattern

• The brass sea-howitzer was adopted in 1787, but was replaced from 1804 onwards by iron carronades of 24-pdr calibre. The adoption in 1820 of the 30-pdr calibre for long guns led to the introduction of carronades of the same calibre.

Shell-guns

• In 1827 the first type of 22cm shell-gun (80-pdr) was introduced, although a further ten years were to elapse before they were issued officially to frigates of the 1st Rank. The new model of 1842, in both short- and long-pattern versions, replaced the 1827 pattern, and was characterised by a better distribution of metal at the breech taking into account gas pressure at the outlet of the chamber. The 16cm (30-pdr) shell-gun looks more like a carronade, with its hemispherical breech, but differs with regard to its length and the trunnions.



22cm (80-pdr) 1827 pattern

22cm 1841 pattern n° 1

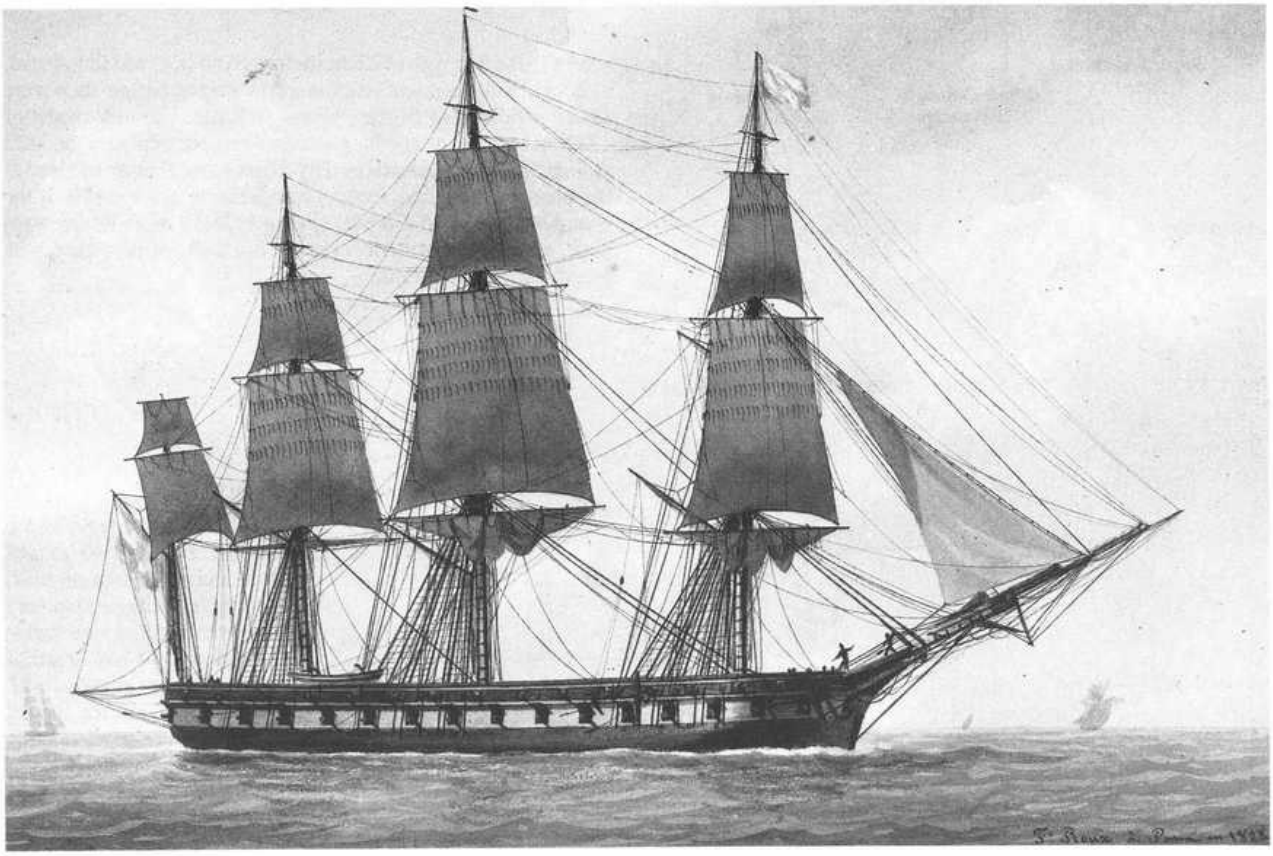
22cm 1842 pattern n° 2

16cm (30-pdr) 1827 pattern

Progression of calibres

	1745	1750	1781	1786	1804	1827	1837
12-pdr frigates	26x 12	26x 12	26x 12	26x 12			
		6x 6	6x 6	6x 6			
				4x 36			
18-pdr frigates			*26x 18	28x 18	28x 18	28x 18	
			6x 8	10x 8	8x 8	2x 8	4x 30
				4x 36	8x 24**	16x 24	16x 24

For 18-pdr frigates, the 36-pdr calibre corresponds to the sea-howitzer, the 24-pdr calibre to carronades, and the 30-pdr calibre to shell-guns.
*In 1781-2 some 18-pdr frigates were already pierced for 14 ports on either side.
**In 1804 36-pdr carronades were first used, but their weight being recognised as excessive, they were replaced by the 24-pdr model, a provision which was made official in 1810.



In his excellent *Dictionnaire de Marine**, Admiral Willaumez includes the above illustration of a frigate, with an amazing sail-plan – if I am not mistaken, he has represented even skysail studdingsails and a skysail-staysail! Another curiosity is the under-jib, running out beneath the jibboom, the flying-jibboom and its pole! The dolphin-striker serves to spread the small after leech of this rectangular sail, which is a sort of longitudinal spritsail.

The watercolour shows gaffs for the staysails. The driver has no boom, so that it is more accurately a gaff mizen, allowing a jigger-mast to be set up over the stern with a small fore-and-aft sail and two square sails. It seems as though even the crossjack-yard has a sail bent to it, although furled.

*First published in 1820, with other editions in 1825 and 1831.

Regulations of 1837

	Main deck	Forecastle & Q'deck
Frigate of the 1st Rank 60 guns	28x 30-pdr long-pattern 2x 80-pdr shell-guns	26x 30-pdr carronades 4x 30-pdr shell-guns
Frigate of the 2nd Rank 50 guns	28x 30-pdr short-pattern	18x 30-pdr carronades 4x 30-pdr shell-guns
Frigate of the 3rd Rank 60 guns	22x 30-pdr short-pattern 4x 30-pdr shell-guns	14x 30-pdr carronades

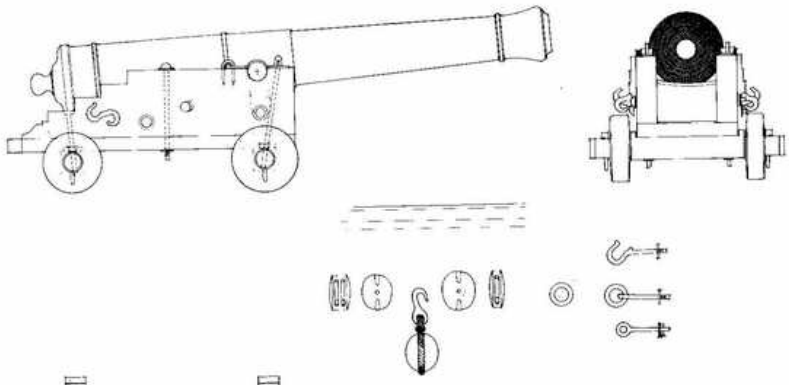
Decree of 1849

Frigate of the 1st Rank 50 guns	24x 30-pdr n° 1 pattern 2x 50-pdr 2x 80-pdr shell-guns n° 1 pattern	2x 30-pdr n° 1 pattern 18x 30-pdr n° 3 pattern
Frigate of the 2nd Rank 46 guns	24x 30-pdr n° 2 pattern 2x 50-pdr 2x 80-pdr shell-guns n° 2 pattern	16x 30-pdr n° 4 pattern 2x 30-pdr n° 1 pattern
Frigate of the 3rd Rank 40 guns	22x 30-pdr n° 2 pattern 2x 50-pdr 2x 80-pdr shell-guns n° 2 pattern	12x 30-pdr n° 4 pattern 2x 30-pdr n° 1 pattern

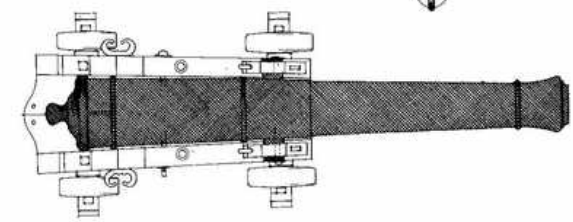
Carriages

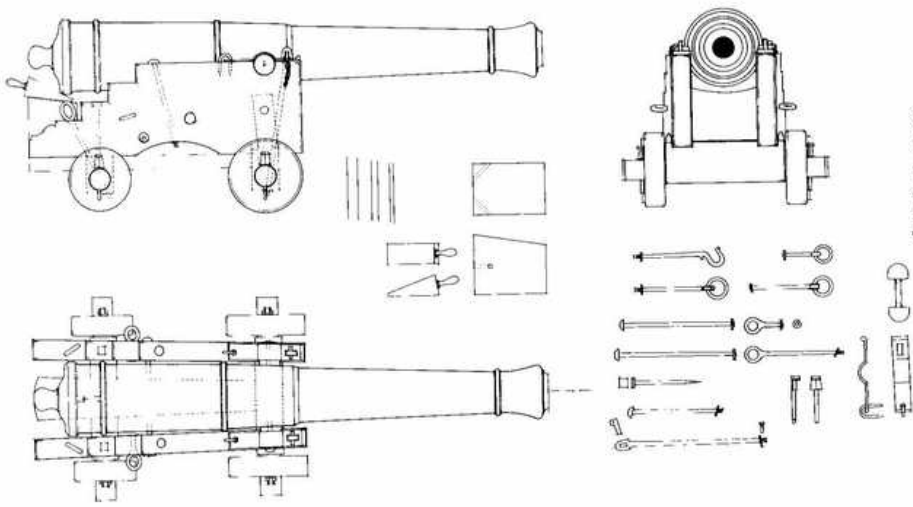
• Sea carriages for long guns remained essentially unchanged from the 17th to the 19th centuries: two cheeks with steps for handspikes are fastened together by a transom and a sole, with the carriage resting on two axletrees furnished with trucks. Made entirely of elm, except for the axletrees which are of oak, the carriages have a limited number of iron fittings, designed to fasten the various pieces, to hold the barrel of the gun in place, and to manœuver the carriage.
The original arrangements found in the 17th century remained in force until the middle of the 18th. In the 1750s and 1760s, the full sole was abandoned in favour of a broad transom linking the two axletrees, and with the same purpose of lightening the carriage the lower part of the cheeks was hollowed out in a semi-circle. Both modifications were inspired by English example. Other changes were that the fore and hind trucks were now of the same size, whereas previously the fore trucks had been of larger diameter in order to compensate for the camber of the deck. Other changes were of detail only.
As far as the ironwork is concerned, the arrangement for fixing the capsquares was improved. Another change of greater importance concerned the breeching, which originally passed through both the cheeks of the carriage. The adoption in 1820 of a breeching ring cast into the button of the cascable made it possible to avoid this former arrangement, so that the breeching now ran through a ring or a forked bolt in the side of the carriage and then through the breeching ring, which made for a better balance of the stresses on recoil.
However, apart from these few points, it has to be admitted that the evolution of guncarriages was limited in the extreme.
• The adoption of iron carronades called for carriages of a totally different type. The carriage had no trucks, and was composed of a sliding-bed supported on heavy scantlings or blocks and of a skid or sole which slid over the bed, the movement being controlled by a gudgeon moving in a slot. Carronades had no trunnions, but a "joint" underneath, secured by a joint-bolt between two joint-cheeks, the cheeks being bolted down into the skid.
The first sliding carriages of this type were of the recoil type, restrained by a breeching, the length of which called for a very long slide. With the adoption in 1804 of the "recoil-less" carriage, a fixed breeching being supposed to absorb the recoil without the benefit of friction, the sliding-bed was firmly fastened to the vessel's side by means of a "fighting-bolt", and was now the same length as the skid.
Various improvements were made over the years to this form of carriage, but the basic principles remained unchanged.
• The carriages of shell-guns resembled those of long guns, save that the hind trucks were done away with and replaced by skids or "deck-blocks". This arrangement had the effect of restraining the recoil.

This brief summary of the evolution of sea carriages is all that there is space for in the context of the present volume. Readers who would like to know more are invited to refer to my earlier book, *L'Artillerie de Mer: France, 1650-1850.*

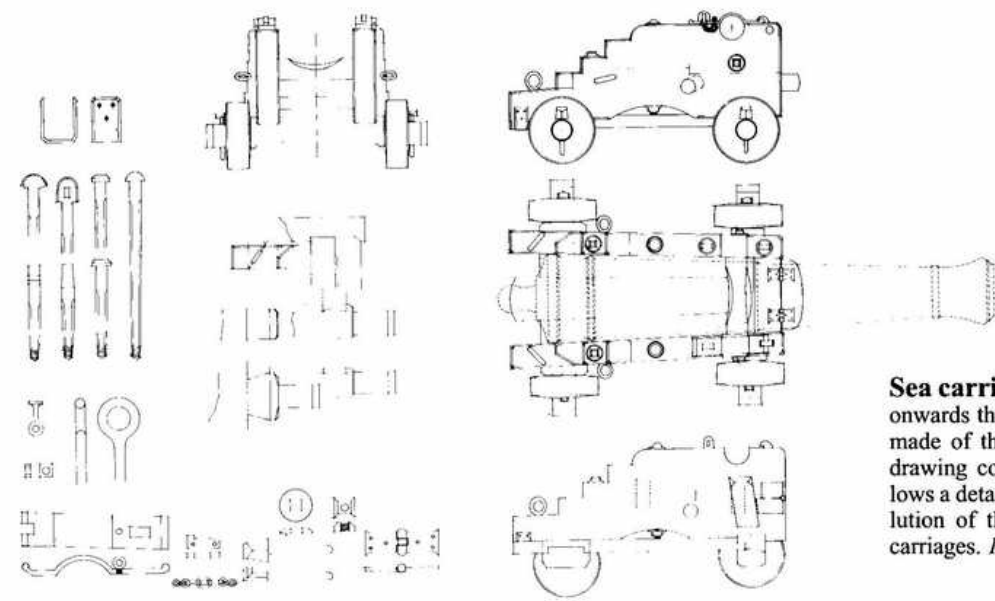


Sea Carriage 1650-1750. Characterised by its full sole and the difference in diameter between the fore and hind trucks. All the various items of ironwork have been represented. *8-pdr gun and carriage, at 1:36 scale; the same scale has been adopted for all the drawings of carriages in the following pages.*

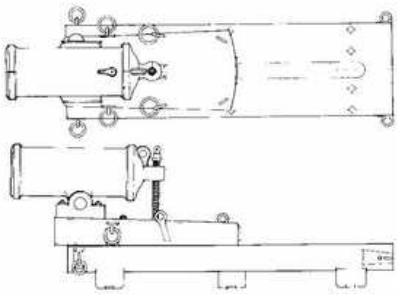




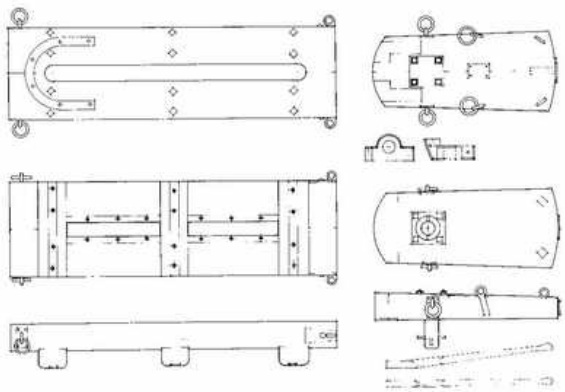
Sea Carriage 1750-1760. The full sole has been done away with, but the trucks are still of different diameters. All the ironwork is shown. *6-pdr gun and carriage.*

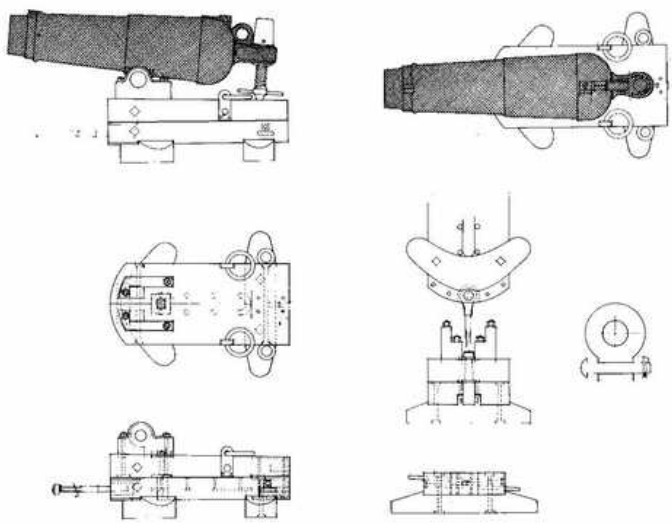


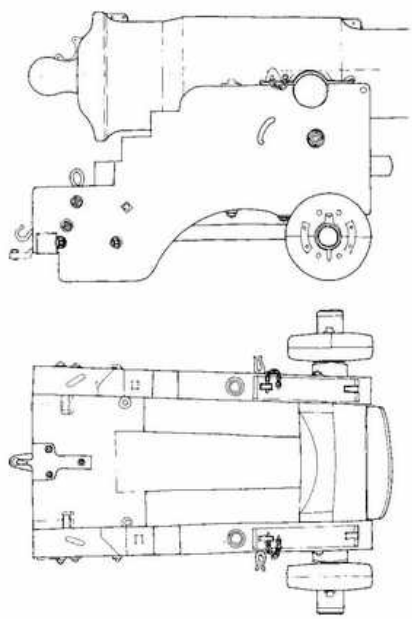
Sea carriage 1786. From the 1760s onwards the fore and hind trucks were made of the same diameter. This last drawing completes the series, and allows a detailed appreciation of the evolution of the ironwork in French sea carriages. *12-pdr gun and carriage.*



Shell-gun carriage. The same elements are present as in the carriage for long guns, save that the hind part of the carriage is supported not on trucks but on deck-blocks. This arrangement was intended to reduce the amount of recoil through friction.







Sea-howitzer carriage. Of the recoiling type, with the sliding-bed significantly longer than the skid, resulting in considerable space being taken up on deck and limiting the areas where such weapons could be used.

Carronade carriage. Recoil-less type, where the very small amount of recoil allowed by the fixed breeching made it possible to make the sliding-bed of the same length as the skid. In other respects the arrangements are similar, save that the bed is secured by means of a fighting-bolt driven into the vessel's side.

EVOLUTION OF THE CARVED-WORK AND DECORATION

Heading thirteen of the Regulations of October 1674 concerning the general policies to be followed in the Royal Dockyards, defined all the responsibilities of Dockyard personnel, from the Intendant down to the foreman. One article is devoted to the carvers and painters[1], and provides some information as to their functions: "Master-Carvers and Painters shall make accurate and detailed drawings of all the works which are to be done in the King's ships".

Each year the King issued instructions for the building-work to be carried out in the Royal Dockyards, listing the number and Rate of each ship to be built. As a rule these decisions were accompanied by the names to be given to each vessel, thereby providing a central theme for the work of the Master-Carver.

The names chosen for frigates were always feminine (*frégate* is feminine in French), frequently borrowed from classical mythology; it is worth noting in passing that the same was true for sloops of war (*la corvette*), but in general the names chosen reflected their lesser importance.

The principal sources of documentation which have survived from the Ancien Régime are to be found in the collections numbered D[1]68-69 and in a manuscript[2] numbered SH.G187. For the 19th century there are the series 7 and 8 DD[1]; all these documents are preserved at the *Service Historique de la Marine* at Vincennes. There are a number of other isolated documents to be found in the archives, including an important collection in the Danish National Archives.

In the following pages I have illustrated a series of examples from the end of the 17th century to about 1830-1840, allowing an overview of the evolution of the decoration of frigates over the period. It must be said however that this evolution is less marked in frigates than in ships of the line (see the forthcoming book on the 64-gun ship).

HEAD. The general tendency is to reduce the projection of the head, the shape of which was modified in the 19th century through the reduction in the steeve of the bowsprit from about 32-33 degrees to 20 degrees. In the 17th century and until about 1730-40 the heads of the largest frigates had three rails, the two upper ones ending behind the cathead; this meant that the upper part of the head timbers had to be vertical. This arrangement was gradually abandoned, and by the middle of the 18th century only the upper rail finished behind the cathead, the middle rail ending against the bow of the vessel; this allowed the head-timbers to follow a continuous curve, and the head was as a result lighter in appearance. Under the Restoration it was decided to clad the whole of the head in thin boards, so that neither the rails nor the head timbers were any longer visible; æsthetically this was not a success, particularly as the handrail and netting protecting the heads were replaced at the beginning of the 19th century by a solid breastwork of planks.

Other changes were that from 1786 onwards the figure was replaced by a simple shield bearing the arms of France, this in turn being abandoned later in favour of miniature figures or even a simple bust. Thus the head finally lost all its elegance, and its decoration became insignificant.

STERN. A distinction must be drawn between the ship-frigates and the frigates of the "modern" type. The former had two decks and thus, in the majority of cases[3], a stern-gallery at the level of the upper deck (in ships of the line, the gallery was at the level of the poop). It was however only in exceptional cases that frigates were fitted with stern-galleries[4], which could only be at the level of the poop. These galleries did not turn round the quarter, so that their width was at most that of the stern, and they disappeared in any case with the abandonment of the ship-frigate[5].

The façade of the stern incorporates above the wing transom a curved counter, indispensable for the helm-port through which the rudderhead passes; there were two ports cut in the counter, but these could not be used for stern-chase guns[6].

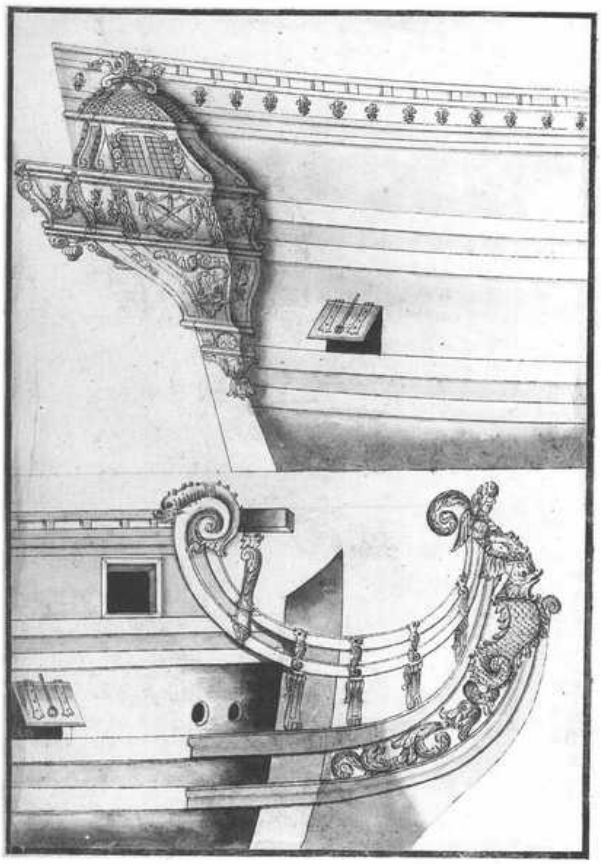
Above the counter is the lower sill of the stern-lights marking the great cabin at the after end of the upper deck. The stern-timbers form the munions of these lights and run up beyond as far as the taffarel fife-rail, forming the main vertical elements of the structure of the taffarel. The size of the taffarel varies in importance, depending on whether or not it conceals a poop or deck-cabins. These general arrangements did not alter until the somewhat tardy introduction of the round stern. The disappearance of the poop or other quarterdeck structures resulted in a diminution in the size of the taffarel, and thus of the space available for decoration, which was reduced to almost nothing in the 19th century.

The quarter-galleries are the necessary adjunct to the decoration of the stern, of which they provide the "return". These galleries, which project at most 2½ feet from the side, serve as privies for the officers; the seats of ease are situated on the level of the upper deck in ship-frigates, and on the main deck in later frigates, but in the 19th century a second level was introduced on the quarter-deck in certain frigates[7].

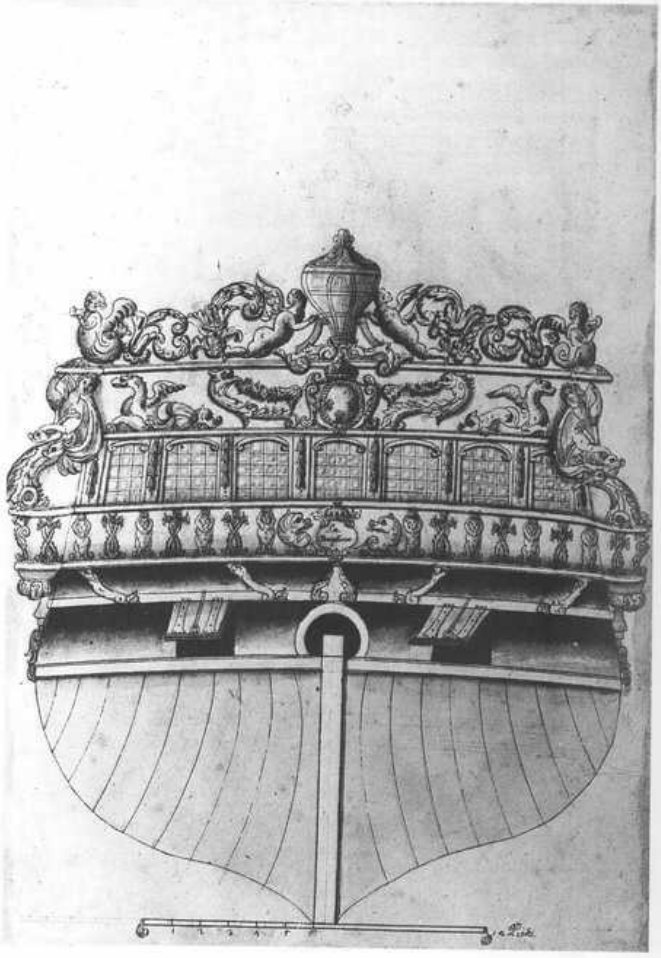
The joining of the decoration of the stern with that of the quarter-galleries is always a difficult transition, and it was more or less successfully masked by a number of ornamental artifices. It was the adoption in the 1770s of the arch of the cove or horseshoe surrounding the whole decorated area of the stern and the angles into which the quarter-galleries could be neatly fitted, which provided a happy solution to the problem, a solution which was followed right up until the introduction of the round stern.

The arch of the cove and the gradual reduction in the height of the upper works are the most significant aspects of the evolution of the decoration of the stern, apart of course from the ornamentation which reflected the same elements of taste and style to be found in decoration on land.

1. In each of the three great Royal Dockyards there was a Master-Carver on the permanent establishment and in charge of a workshop and apprentices. In some cases the carved-work gave rise to judicious haggling, the King providing at his own expense the materials, or paying for rough-carving of the timber. In theory at least the Master-Carver was also responsible for the design, but sometimes he was little more than an artisan, the design being entrusted to a better-qualified carver, as was the case for example with the two Caffiéri, father and son, carvers of exceptional merit.
2. This manuscript is mainly concerned with ships built at Le Havre, but it also includes the details of the decoration of the so-called "Versailles flottilla". Previously in the *Archives Nationales*, the papers are now preserved at the *Service Historique de la Marine*.
3. In his *Treatise on Shipbuilding* in the form of a dictionary, under the article *gallery*, Blaise Ollivier writes as follows: "such galleries are also to be found in Fourth Rates and in frigates of the 1st Order, situated at the level of the upper deck and in some Fourth Rates at the level of the quarterdeck. Frigates of the 2nd and the 3rd Orders have no gallery. There are some frigates to be seen where the gallery is not to be found at the same level as the upper deck, but 6 to 8 inches higher, in which case their deck is formed of planks running athwartships and resting on small knees." Ollivier also mentions galleries formed of gratings, thereby affording less purchase to breaking seas.
It should be remembered that Ollivier classed as frigates of the 1st Order those which were armed with between 42 and 48 guns, carried in two complete batteries.
4. The only example of which I am aware of a "modern" frigate with a stern-gallery is the *Alcmène* (see pp. 80-81), which can hardly be regarded as significant.
5. They were replaced by an iron balcony in the frigates built with round sterns in the 1830s and 1840s, the balcony being at the level of the spar-deck.
6. These opened into the gunroom on the lower deck, providing both light and ventilation. In ship-frigates, where the ports were on the level of the lower deck guns, they could be used as stern-chase ports if required.
7. This second level in the quarter-galleries was sometimes achieved by adding a sort of canvas shelter on top of the gallery, fastened round a light framework of iron, a peculiarly ugly arrangement.



These two examples are taken from manuscript SH.153. The first concerns the ship-frigate *la Dauphine* of 40-42 guns, built at Le Havre in 1696 by Chaillé and Cochois. The second is a light frigate, *l'Aurore*, also built at Le Havre and by the same Builders, in 1697. These representations have a certain charm, but the naïvety and clumsiness of the drawings call for no particular comment.



List of drawings preserved at the SHM

ALBUM D[1]68

la Renommée	1744	8-pdr frigate
la Comète	1752	8-pdr frigate
la Fleur de Lys	1754	8-pdr frigate
la Licorne	1755	8-pdr frigate
la Flore	1769	8-pdr frigate
la Danäé	1776	12-pdr frigate
la Calypso	1785	12-pdr frigate
la Gloire	1828	24-pdr frigate
la Niobé	1828	24-pdr frigate
la Dryade	1828	30-pdr frigate
la Renommée	1828	30-pdr frigate

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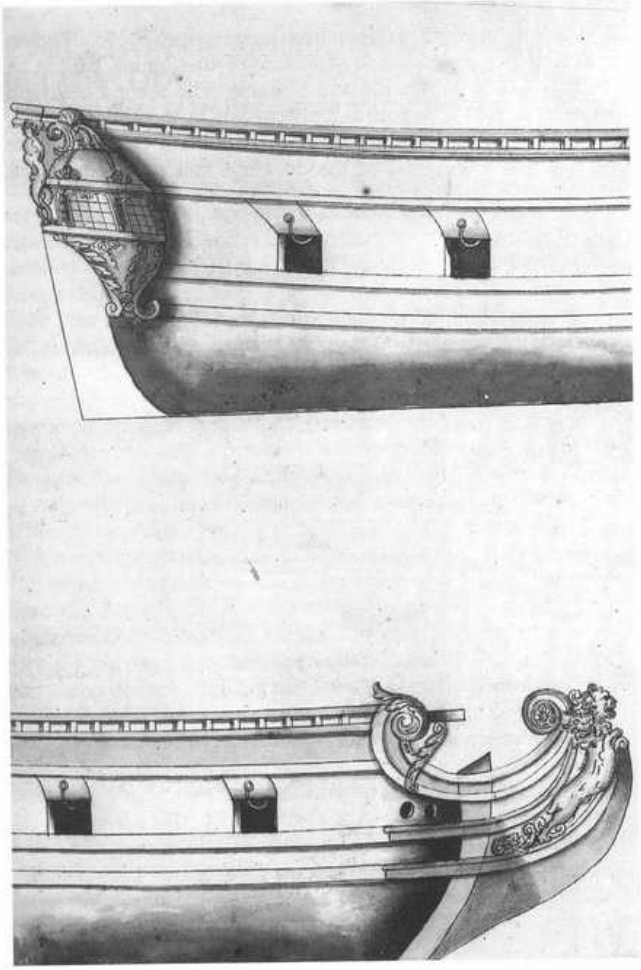
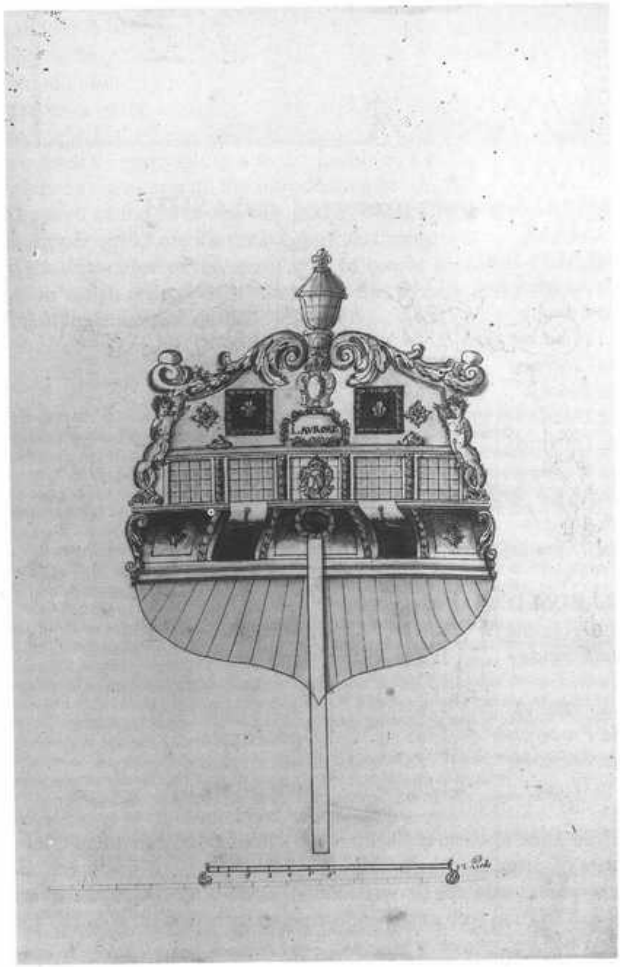
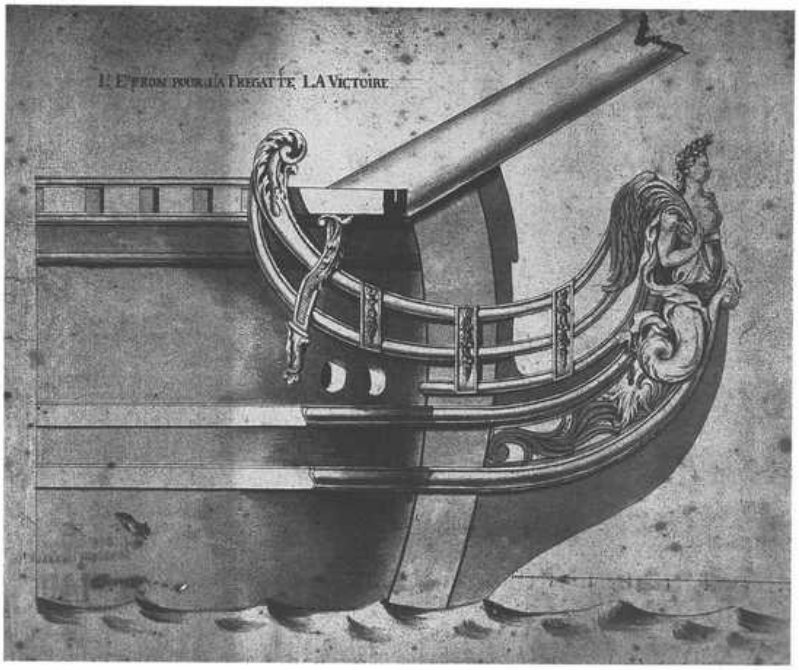
l'Argonaute	1722	ship-frigate
la Néréïde	1724	ship-frigate
la Gloire	1726	ship-frigate
la Prosélyte	1785	18-pdr frigate
la Proserpine	1785	18-pdr frigate
la Thétis	1788	12-pdr frigate
la Vénus	1779	12-pdr frigate

In addition to these collections are a number of individual drawings of carved-work for vessels of the post-Napoleonic period, also preserved at the *Service Historique de la Marine*, in the series 7 & 8 DD[1], as well as the collection under reference n° G.187 for late 17th century vessels.





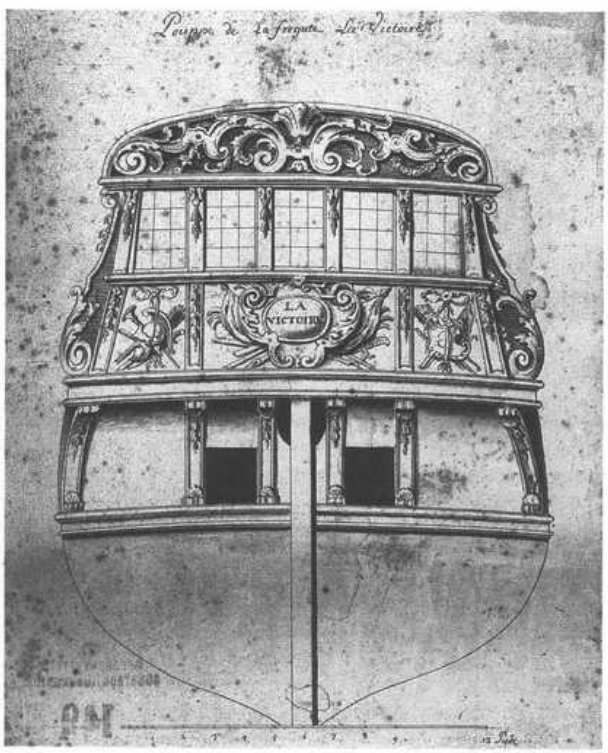
Head, quarter-gallery and stern of the light frigate *l'Aurore*, built at Le Havre in 1697.



These drawings are preserved in the Danish National Archives, and relate to the light frigate *la Victoire*, built by Levasseur at Dunkirk in 1704. The artist responsible for this design is unknown. Head: figure of Victory represented as a siren, crowned with laurel and bearing the palm which is the sign of victory and martyrdom! The outline of the head betrays the complete ignorance of shipbuilding of the designer.

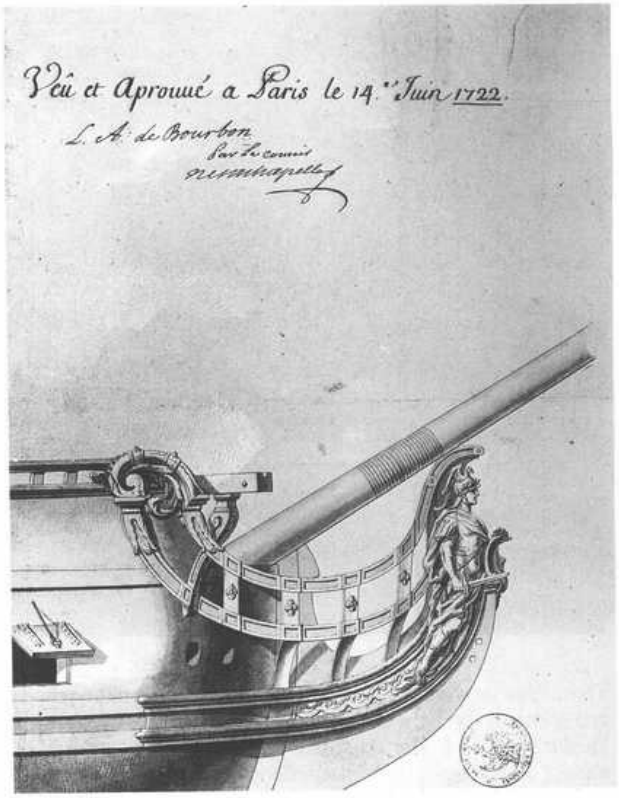
The quarter-galleries are simply badges, a carved relief fayed to the planking of the side.

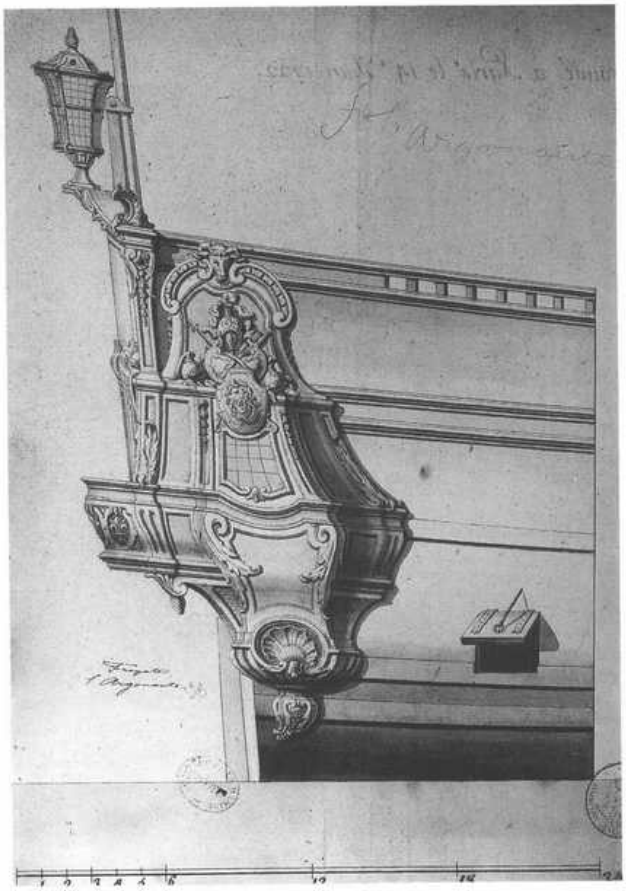
On the stern can be seen a décor of trophies appropriate to the frigate's name, but note the brackets on either side of the stern-ports and at the sides of the counter. Five stern-lights are represented, but the middle one must be a false-light since the rudderhead and hand-tiller are immediately behind. The general impression is heavy-handed, but for all not not unrepresentative of late 17th century taste.

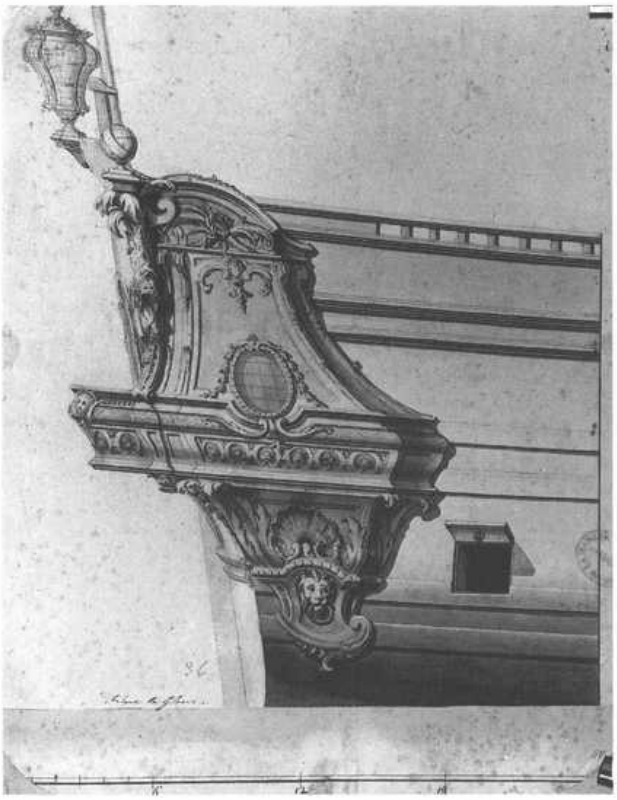


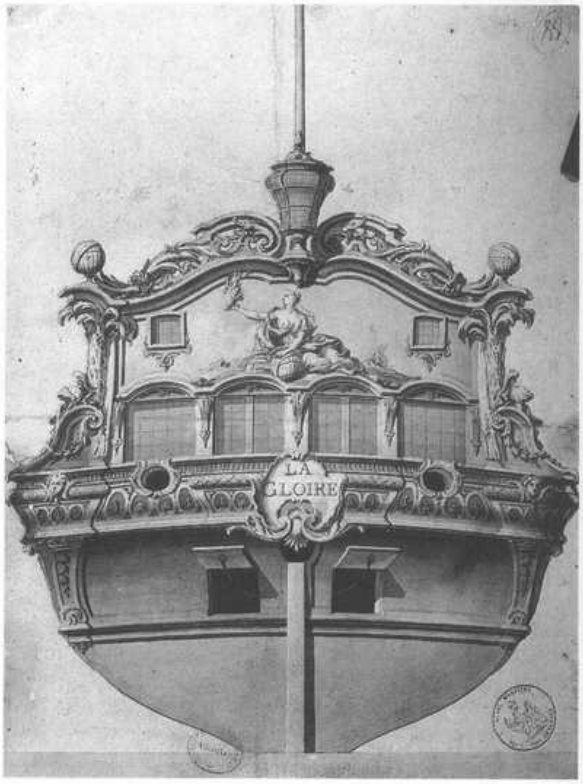
Representations of the head and quarter-gallery of the *Argonaute* of 46 guns, built by Hélie at Brest in 1722. This is a ship-frigate, although it bears a name which in principle is more appropriate to a ship of the line. The drawings are remarkably executed, and are a testimony to the talent of the "Master-Carver of the King's Ships" François-Charles Caffiéri* (1667-1729).
As we have already explained, there are only two head-rails, both of which finish behind the cathead, which rests on a supporter which looks as though it ought to be ahead of the main rail. The frieze between the cheeks of the head is of fretwork. As a tribute to the vessel's name, the figure is male, representing Jason, with a sword in his hand.
The volume of the quarter-gallery is harmonious, and the carved-work is well-placed. The side view of the stern-gallery indicates that it has a solid balustrade.

*The Caffiéri were an important family of artists for three generations. It would be interesting to bring together all the designs of carved-work undertaken by the father and son and to publish a critical study.







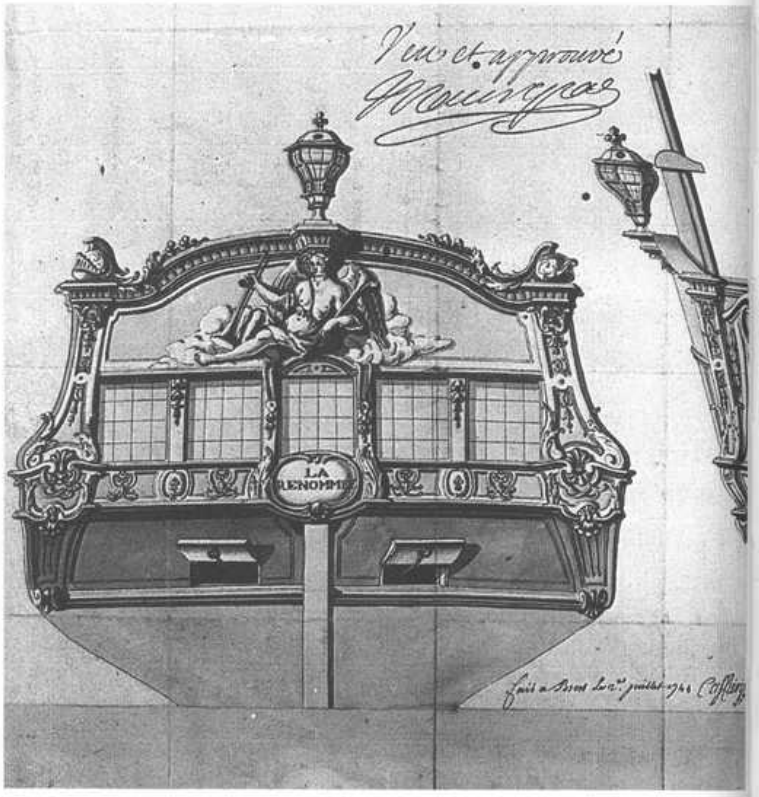


Representations of the quarter-galleries and stern of the *Gloire*, built by G. Poirier at Le Havre in 1726. This was a powerful ship-frigate of 46 guns, the carved-work for which was designed by F.C. Caffiéri. Note that there are a number of concessions to French "Regency" style in the asymmetrical treatment of the upper finishing of the quarter-galleries, the curves and reverse curves of the taffarel, and the generally exuberant style with a large number of palm leaves. The surface of the taffarel is large enough to allow the allegorical representation of a woman holding a crown and accompanied by a small figure of a winged victory. Note also the two circular ports with their wreaths, more decorative than practical, but which in principle would have allowed the use of stern-chase guns on the upper deck. Two cabins are presumably arranged against the stern, lit by small scuttles opened at the sides of the taffarel.
The absence of a qualified Master-Carver at Le Havre explains why the services of Caffiéri were called on, despite the fact that he normally resided at Brest.

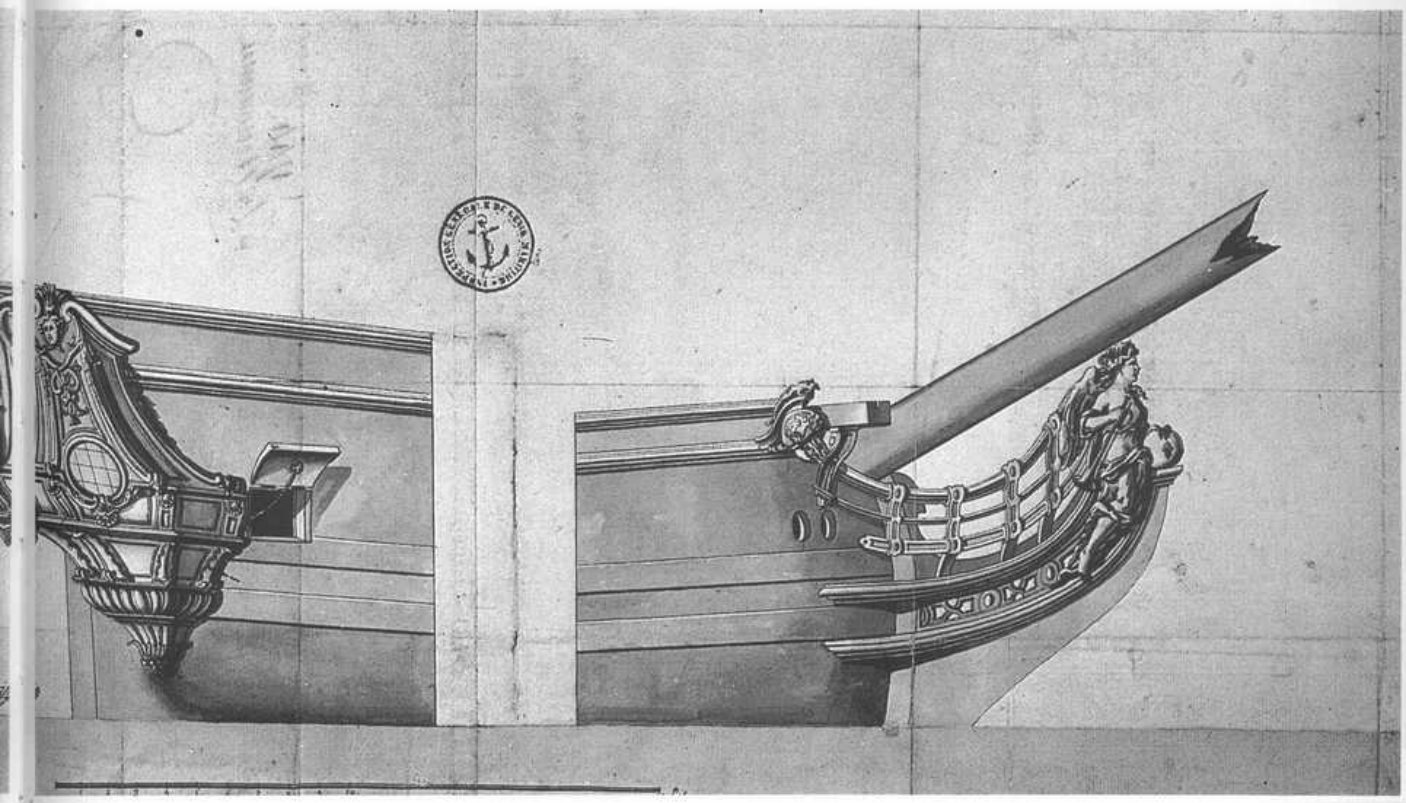
The designs for the carved-work of the *Renommée*, built at Brest in 1744, are from the hand of Charles-Philippe Caffiéri (1695-1766), who had inherited the post of "Master-Carver of the King's Ships" on the death of his father in 1729. There is a similarity in style, although perhaps with slightly less skill and care in their execution. For all that, the artistic value of these drawings cannot be denied, and it is obvious that both the Caffiéri were head and shoulders above those who were to succeed them. One is entitled to ask to what extent the execution of the carved-work was of the same high quality as the original design, since this aspect was often relegated to artisans who were more or less left to their own devices.

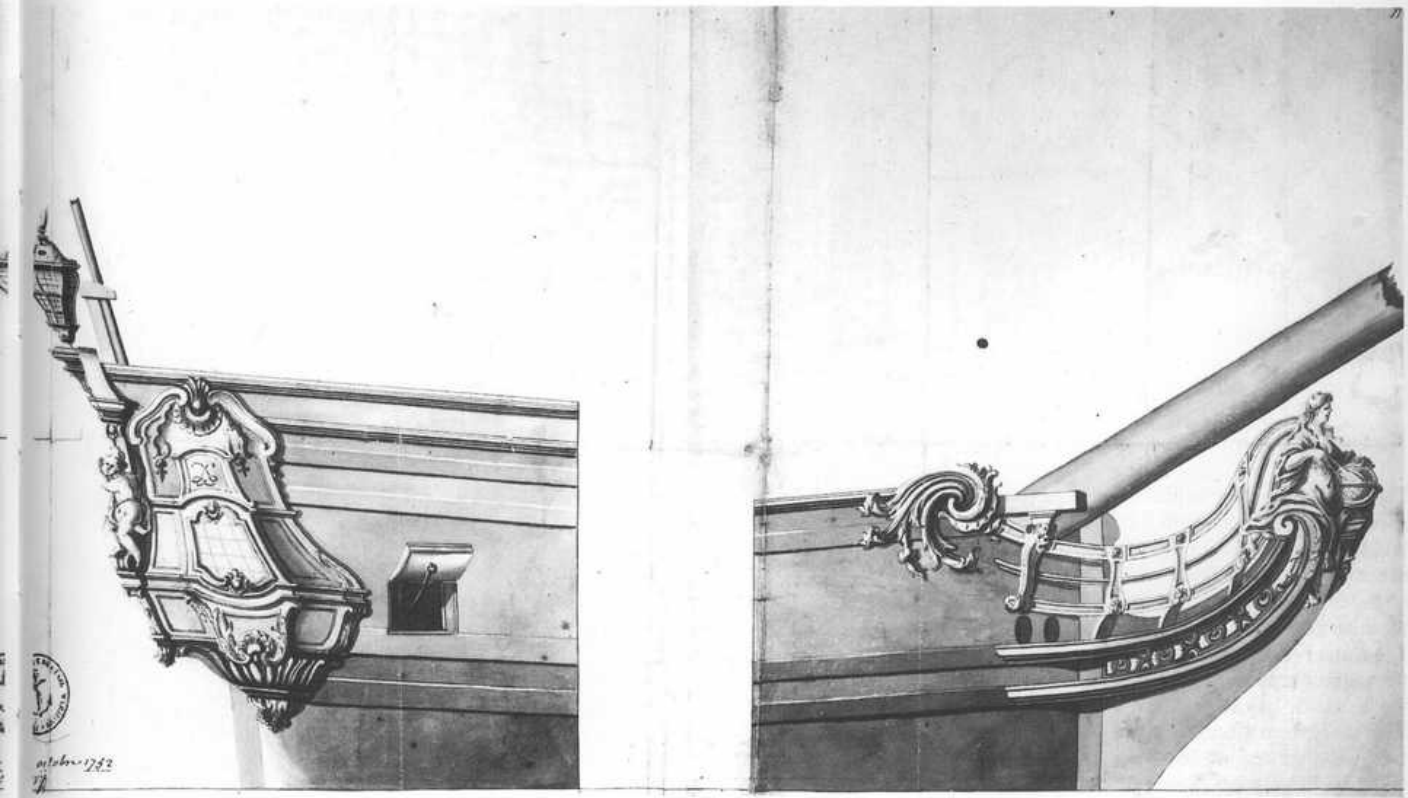
If we examine the head, we can see that only the main-rail ends abaft the cathead, with its after end masked by a classical war-helmet. The middle rail ends at the heel of the cathead-supporter. The figure represents Renown crowned with laurel-leaves, his left hand resting on an orb bearing three fleur-de-lys, and holding a trumpet in his right hand.

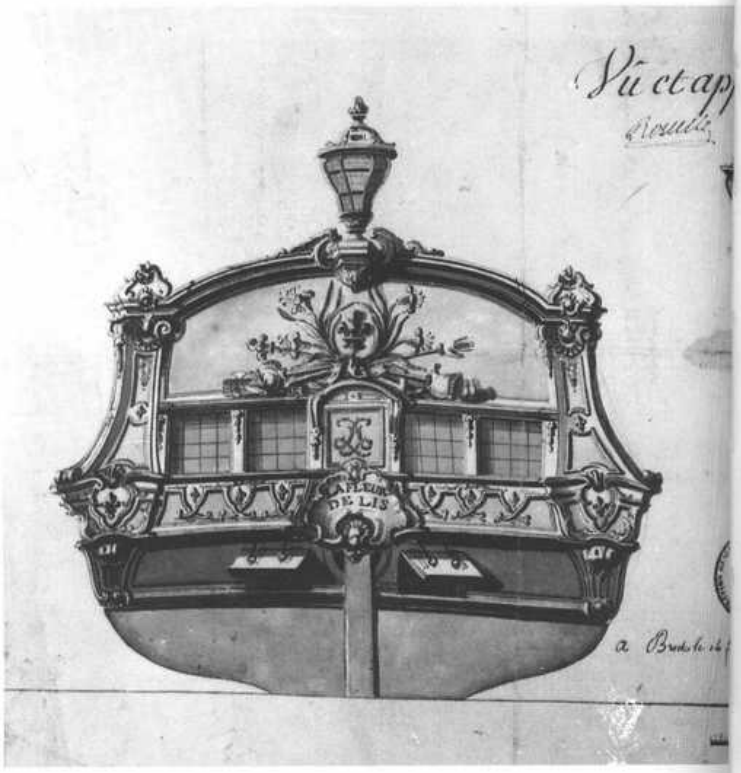
The décor of the quarter-galleries and of the façade of the stern is more sober than in either of the two previous examples. Note the gunport forward of the quarter-gallery which under normal circumstances should not have a port-lid. The taffarel is less high, but there is sufficient space to depict a winged figure of Renown, lightly veiled and bearing two trumpets against a background of clouds. There is a common feature of Caffiéri designs in the lateral pilasters masking the side-counter timbers and indicating the volume of the quarter-galleries.



There are similarities in the composition of this design of the *Comète* built in Brest in 1752, with the previous example of eight years earlier. C.-P. Caffiéri has enrichened the decoration slightly. The main rail ends in a lavish scroll. The feminine figure, with a compass in her right hand and her left hand on a terrestrial orb is very similar to the previous Renown. The taffarel is enlivened with an identical carving to that of the figure, save that she is using a telescope to observe a comet, recognisable by its tail. In addition to this indirect allusion to the subject, Caffiéri represents two putti, the one on the starboard side holding a cross-staff (Jacob's staff). The central light is replaced by a panel bearing the arms of France.

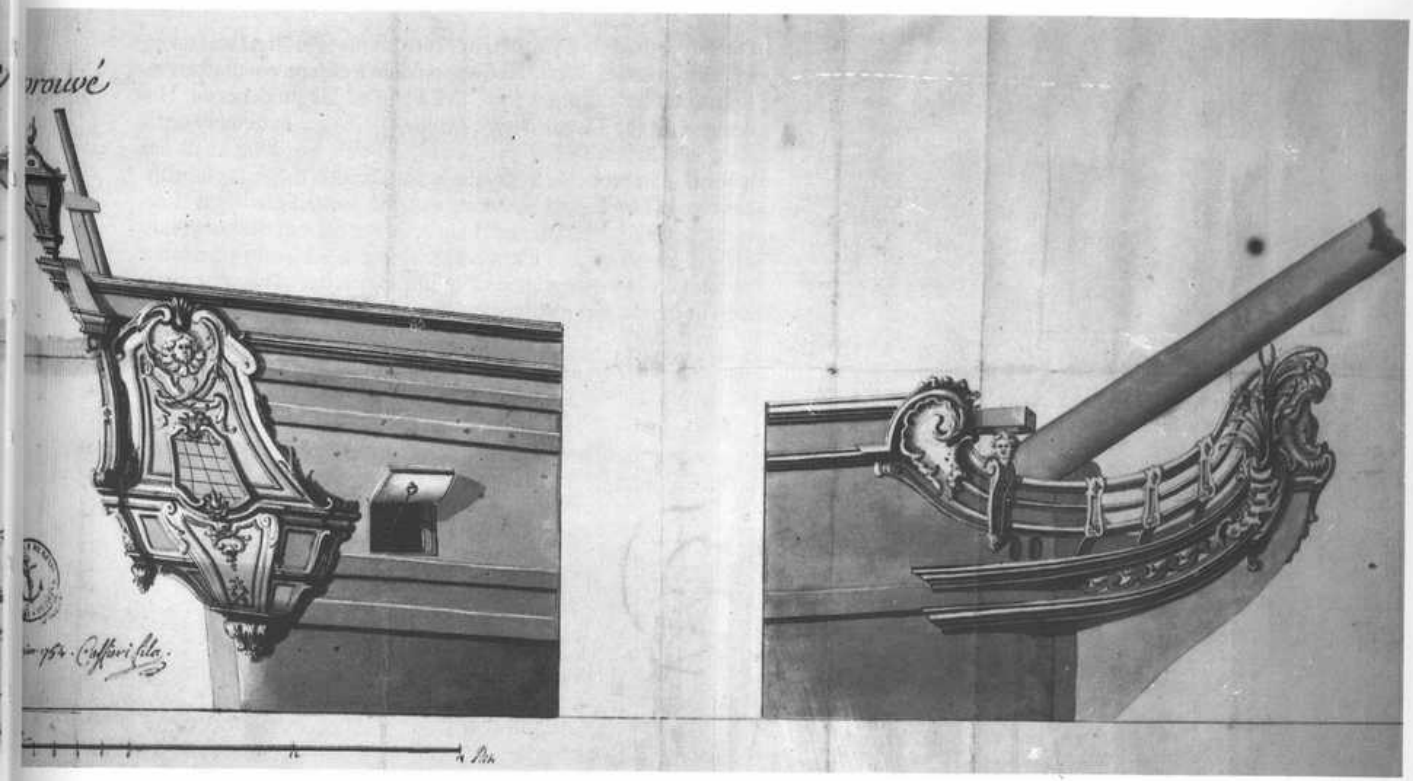


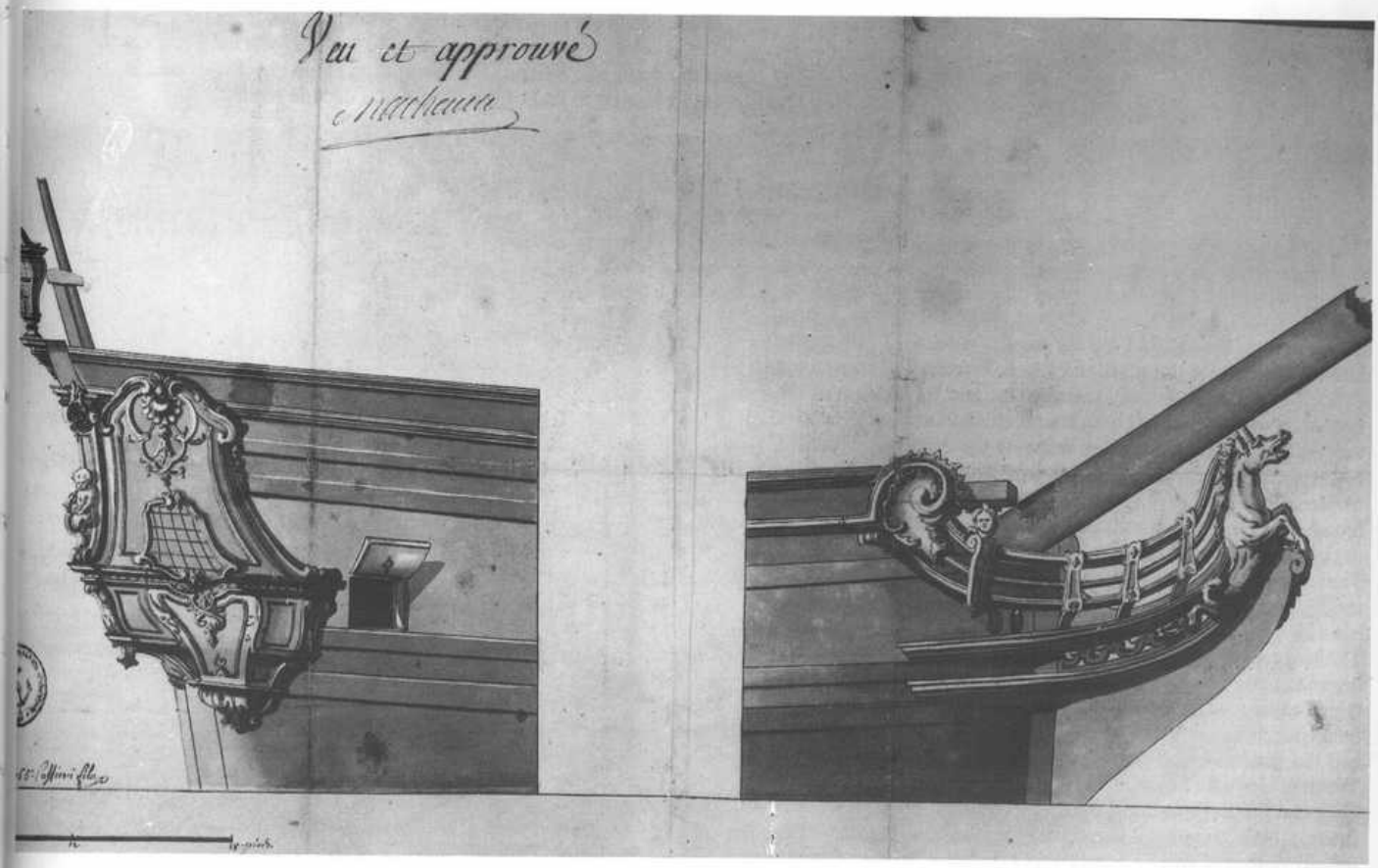




These two further examples are of the *Licorne* of 1753 and the *Fleur de Lys* of 1755, both 8-pdr frigates. C.-P. Caffiéri remains faithful to his usual composition, with only the detail of the decoration varying. Somewhat curiously he has reverted to the arrangement whereby the head-rails finish abaft the cathead, there being three in this instance.

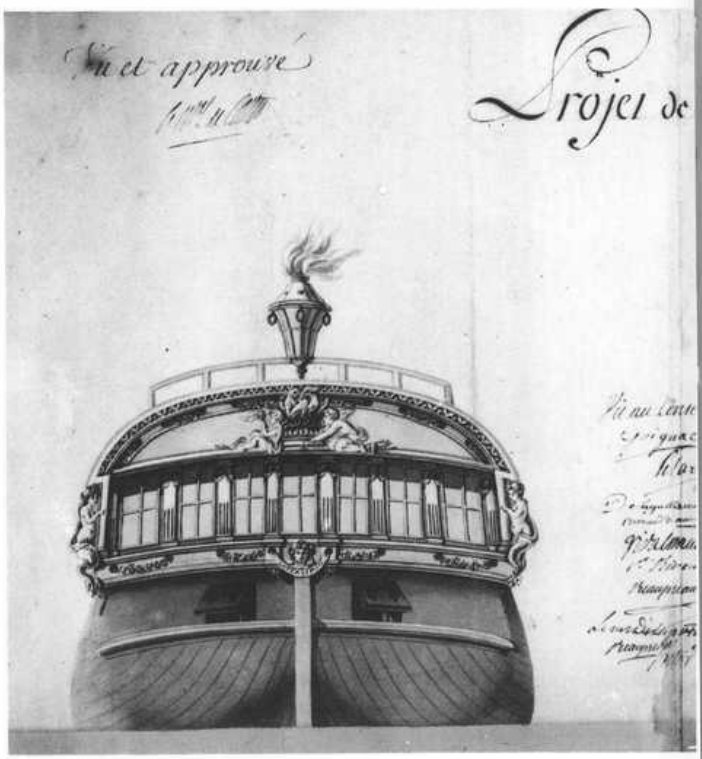
The name *Fleur de Lys* has clearly presented certain problems in terms of the representation, not entirely satisfactorily resolved for the head. In the stern, the taffarel is decorated with a large fleur-de-lys on a ground of royal emblems such as the sceptre and the hand of justice, while the central panel in place of a false light bears the Royal monogram of the interlaced double L.




Vu et approuvé
Matthieu

On the death of C.-P. Caffiéri in 1766, his place at Brest was taken by a Sieur Lubet. While he was no doubt a competent craftsman, Lubet certainly did not have the talent of his predecessor. His designs for the 12-pdr frigate *Danäé* (1776) are extremely ordinary, and the outline of the three head-rails finishing abaft the cathead is improbable to say the least. The lion figure is clumsily executed. The quarter-galleries and the stern are correct if no more, and show the changes in taste of the period; the horseshoe arch is hinted at, and chimæra mask the weak point where the decoration of the stern joins that of the quarters. The very small area of the taffarel restricts the stern decoration to very little.

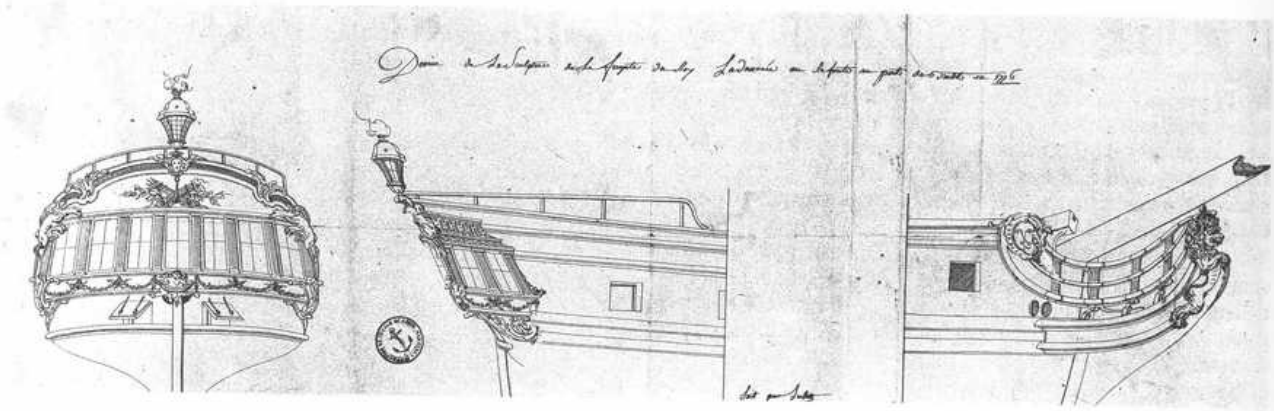
These designs would appear to have been traced from the originals. They concern the *Proserpine*, an 18-pdr frigate built at Brest to the draughts of Sané. The decoration is also by Lubet, and is not dissimilar to that of the *Danäé* of a decade earlier.

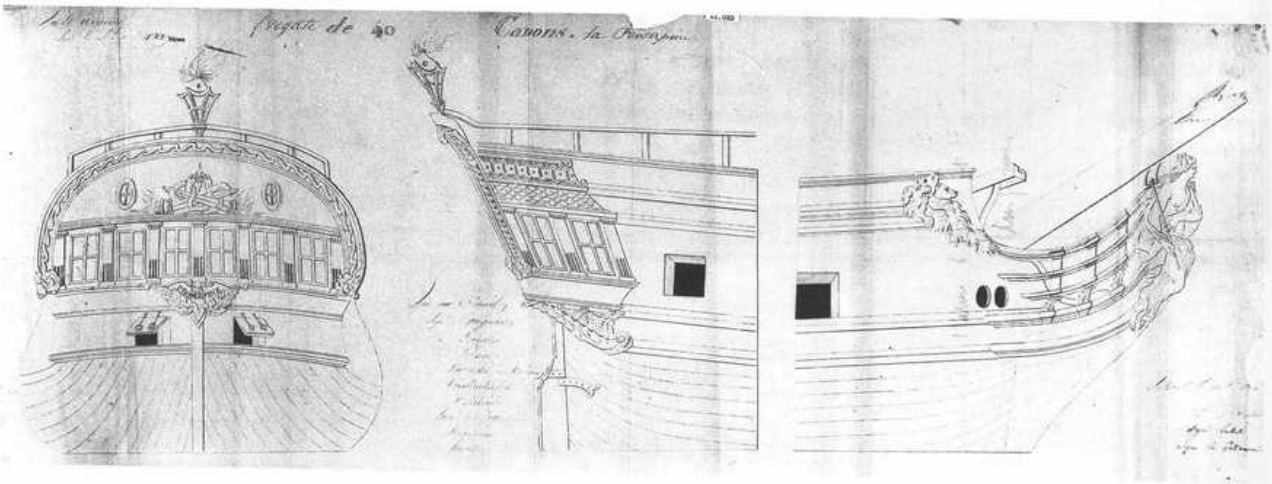


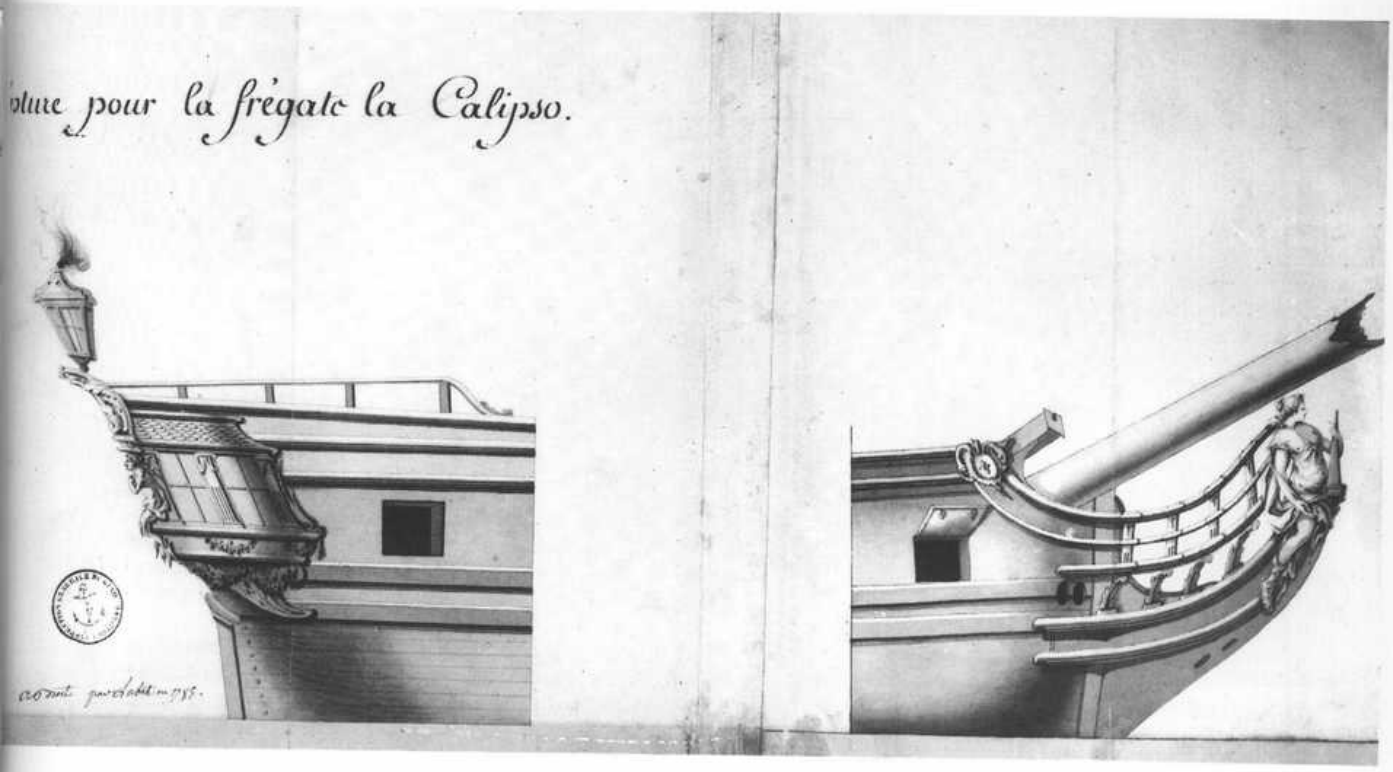
These designs dated 1785 are for the *Calypso*, a 12-pdr frigate built at Brest to the draughts of P.-A.-L. Forfait. The movement of the figure is not entirely satisfactory, and the outline of the head-rails does not accord with contemporary practice as seen in the Builders' draughts and in those at the National Maritime Museum at Greenwich. This implies that the designs of the Master-Carvers were at times somewhat theoretical, confirmed moreover by the extreme rake of the cathead and the way it rests not on a supporter but on a knee.

The quarter-galleries are smaller with the reduction in height of the upper works, and give the impression of being generously lit, but the lights are false.

The stern is characterised by a horseshoe arch, a formula which began to be adopted immediately after the Seven Years' War and which came into general use in the 1770s. The arch ends in two raked panels embellished with what appear to be little mermaids, and the general effect is not particularly successful. Calypso's "burning" love for Jason is portrayed by a brasier and a phoenix. Note that the stern-lights are made up of large panes in wooden frames; this arrangement was introduced in the 1740s, replacing the old system of small leaded panes reinforced with iron bars.



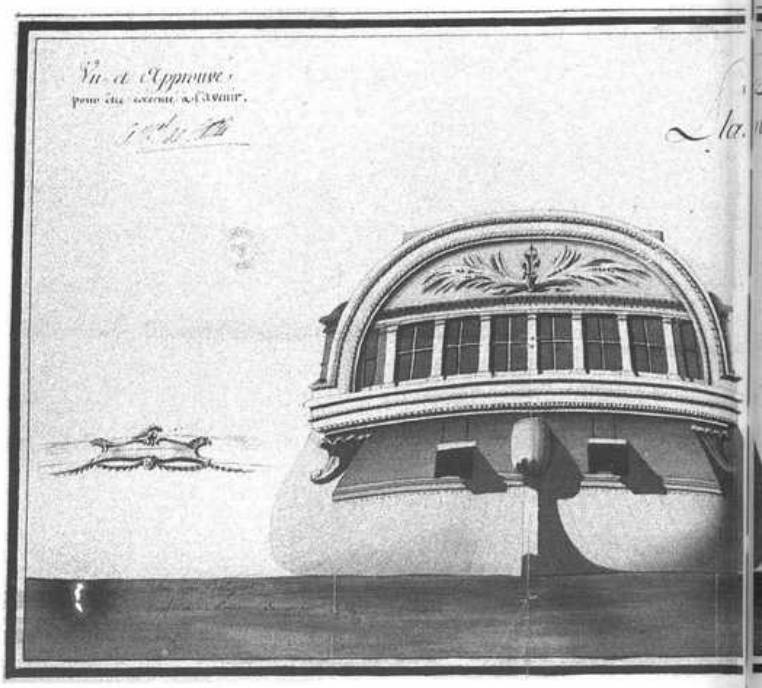



pour la frégate la Calipso.

In 1786, a ministerial instruction ordered a standard design for the decoration of each class of vessel. Reproduced opposite is that for 12-pdr and 18-pdr frigates, the design being by Lubet. In theory, all French frigates ought thereafter to have been decorated in accordance with this design*. This official document, which bears the signature of the Minister de Castries, is extremely mediocre: we are a long way from the heights attained by the two Caffiéri.

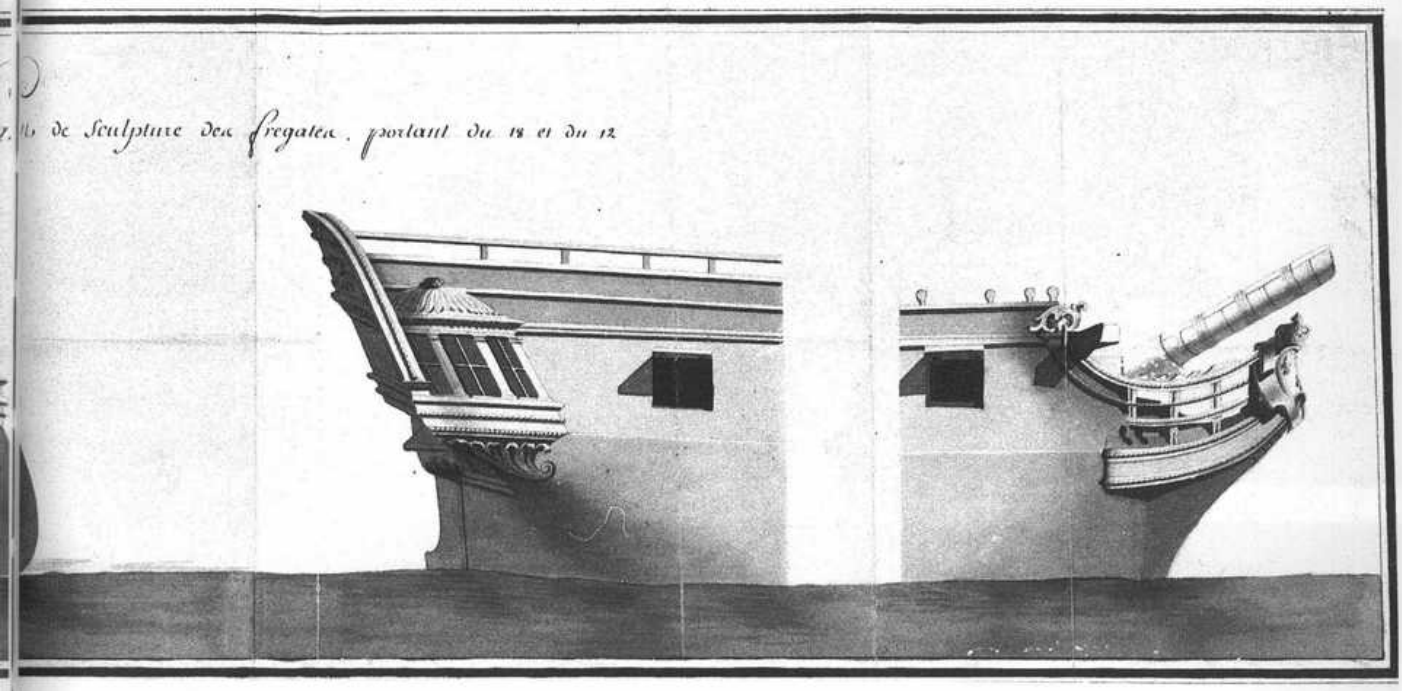
The outline of the head is hesitant and does not conform with contemporary practice; the only point worthy of comment is the replacement of the figure by a badge bearing the arms of France, a solution which was by no means universally followed. The decoration of the stern confirms the official sanction for the arch of the cove, but Lubet was no artist, as can be seen from the heavy moulding of the horseshoe and the treatment of the rails beneath the stern-lights, where no provision has been made for the frigate's name**. Rather strangely, the stern-lights return forward round the quarters, so that there is presumably a space between the arch and the stern; nor is the return of the rails beneath the lights easy to explain. In short, the design is at best mediocre, and the squat aspect of the stern looks slightly ridiculous.

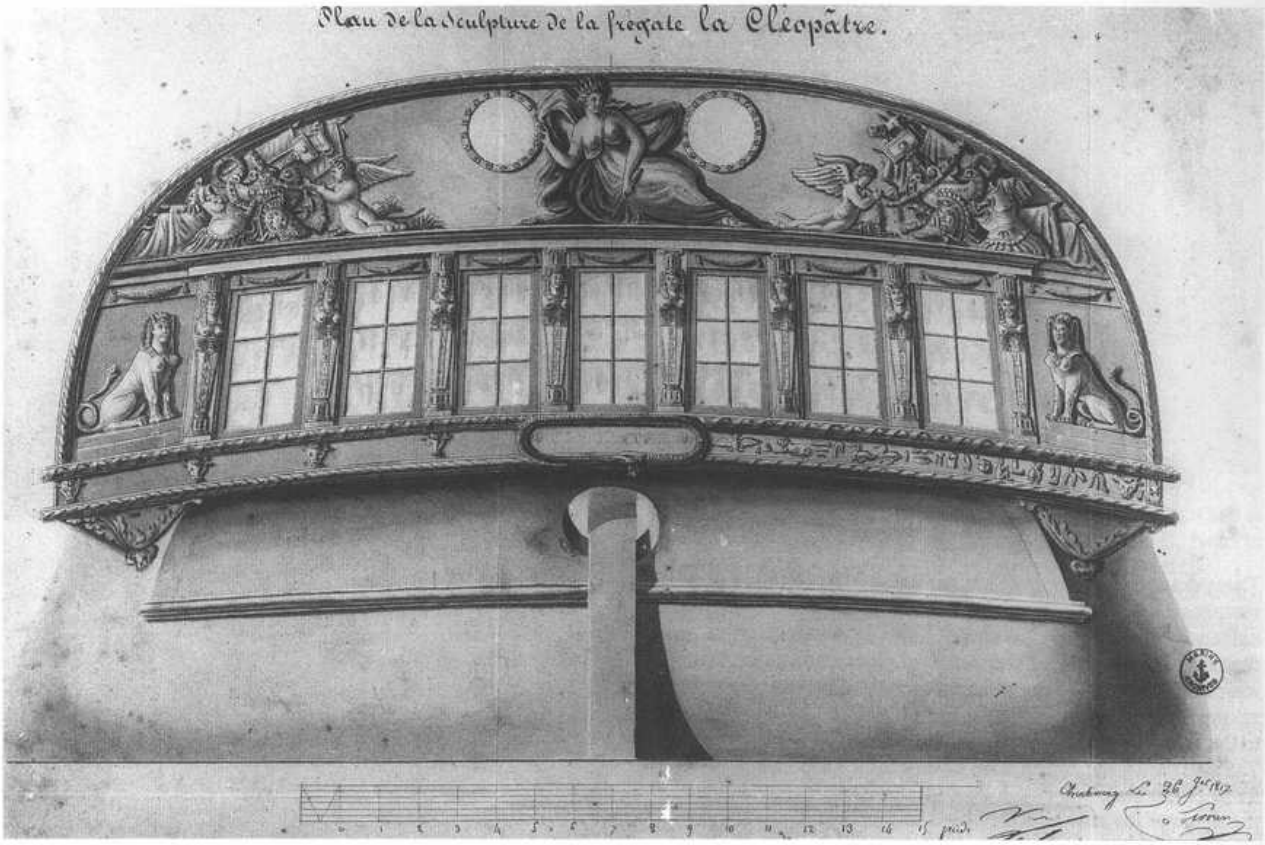
*One only has to examine the draughts at the National Maritime Museum or photographs of models to appreciate how much freedom was in fact exercised in the decoration of frigates.
**The addition of a small sketch confirms that this had been omitted by mistake.

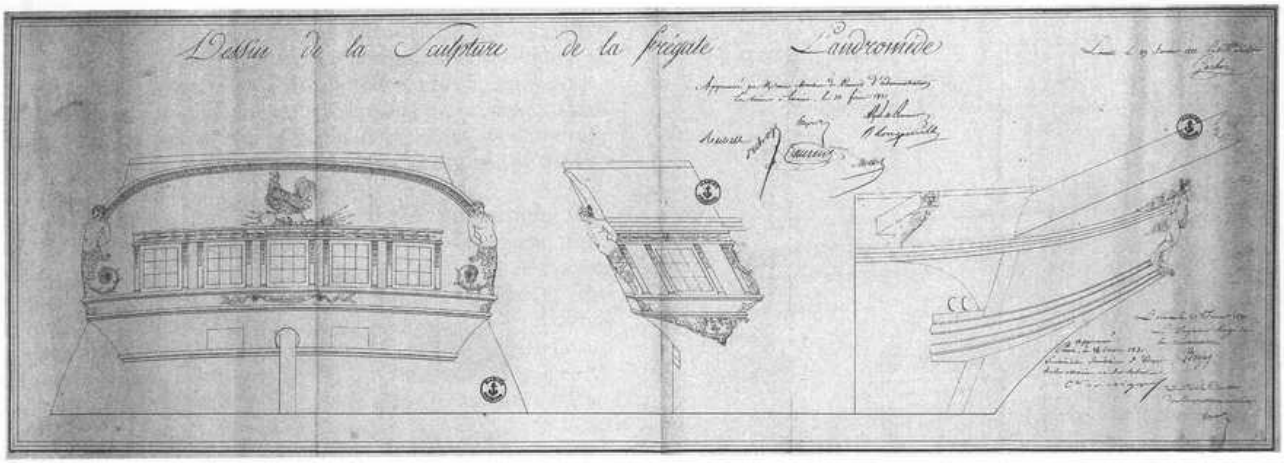


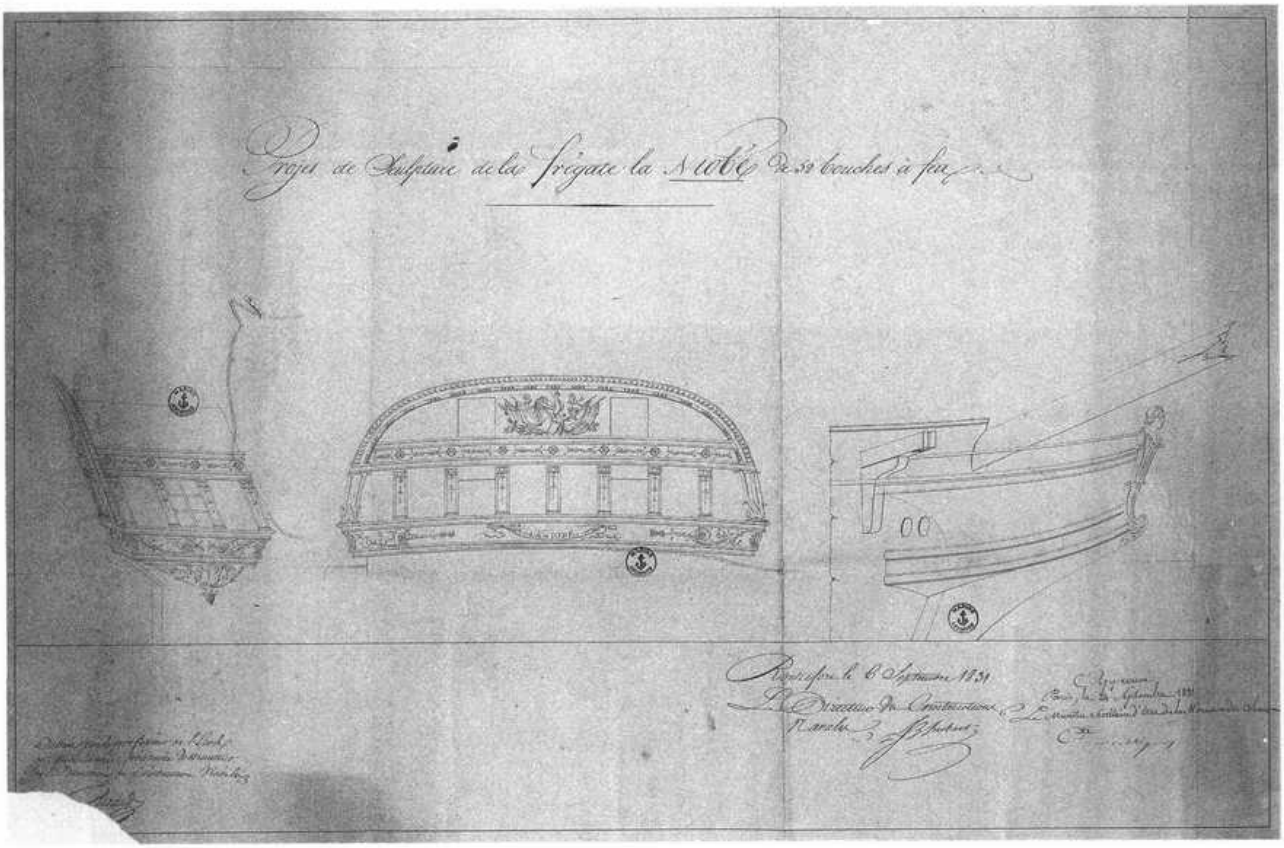
Like those on the following pages, this design for the stern-decoration of the *Cléopâtre*, which is dated 1817, confirms to what extent the horseshoe arch had become the universal motif from about 1775-1780 onwards; it was only abandoned with the adoption of the round stern, with which it was incompatible.

Egypt is evoked naïvely by hints at hieroglyphs beneath the stern-lights and the two sphinxes. In the centre of the taffarel, flanked by two stern-chase ports, Cleopatra is shown reclining, with trophies on either side suggesting Julius Caesar to port and Mark Antony to starboard.

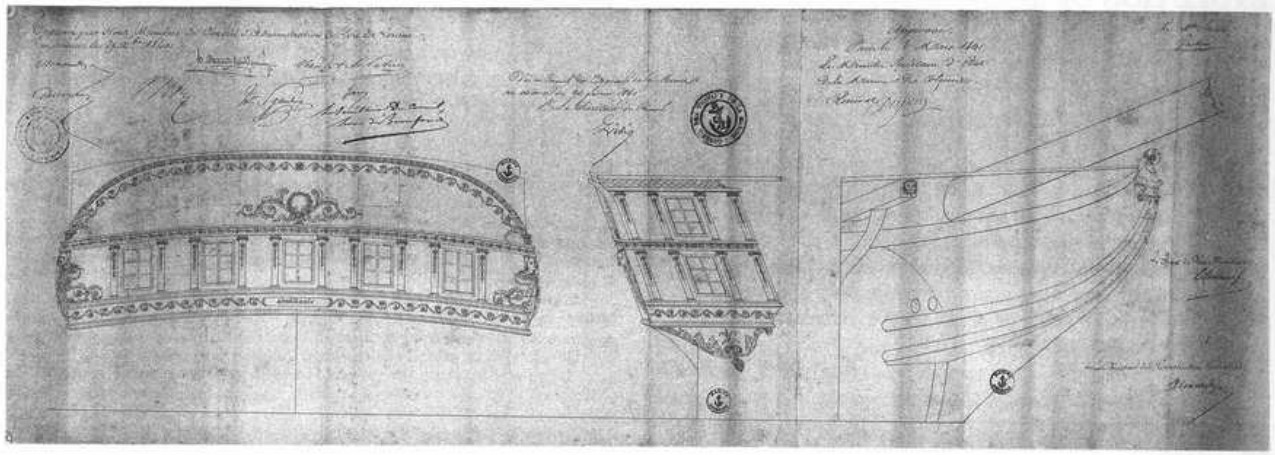

de Sculpture des frégates, portant du 18 et du 12

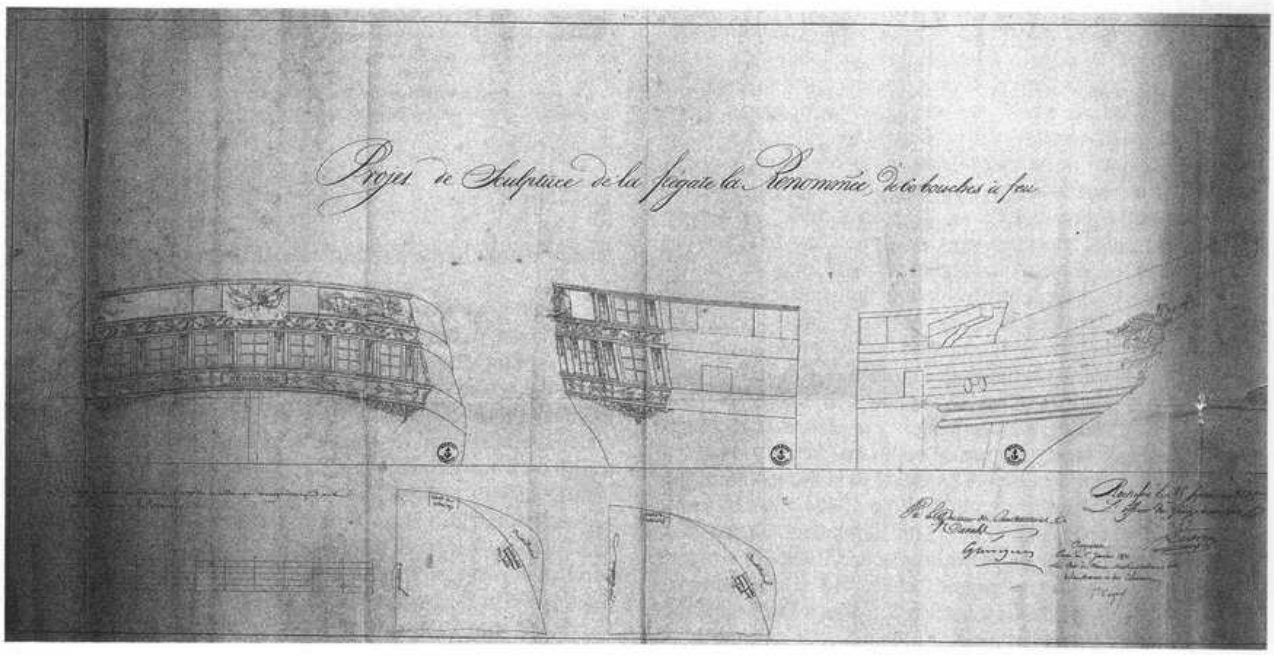

Plan de la Sculpture de la frégate la Cléopâtre.





These drawings for *Andromède* are dated 1831. Note the metamorphosis of the head, where the head-rails and timbers are hidden by planking. A discreetly nude figure personifies Andromeda, accompanied at the stern by two other feminine figures which finish modestly in a cloud of foliage! All of the mouldings are spartan and mean, while the depiction of the cockerel attests to the July Monarchy.
The designs of the *Niobé*, also dating from 1831, are similar to those of the previous example; note the quasi disappearance of the figure at the bow, replaced by a simple bust.





The dramatic wreck of the *Sémillante* in 1855 provides an excuse for reproducing her designs here, which date from 1840 (the badge with her name was recovered from the wreck site and is now in the collections of the *Musée de la Marine*). Note in particular an example of a quarter-gallery on two levels.
A large number of frigates were built with round sterns, which were incompatible with the decorative designs used hitherto.

With this design for the *Renommée*, dated 1831, we have an excellent example of the sort of adaptation which was necessary, the decoration being reduced to little more than embellishments. Note the sketches indicating the bulges on two levels for the quarter-galleries.

EVOLUTION OF MASTS AND SPARS

An examination of the chronological table on page 343 shows that there was little change in the height of the lower masts or in the length of bowsprits from the 17th to the 19th centuries[1]. The same applies to the topmasts. The height of topgallant-masts increased significantly in the last quarter of the 18th century, a trend which was to continue in the following century, with the topgallants having a pole to allow additional fair-weather sails to be bent (royals and skyscrapers). Note the disappearance of the sprit-topmast[2], complete by the second decade of the 18th century. And finally, note the experiment with topmasts and topgallants and their respective yards of equal length, introduced in 1781[3] and abandoned in 1804[4].

As for the lower yards, their spread was significantly reduced from 1781 onwards, whereas the topsail-yards and topgallant-yards were increased in length from the proportions common in the 17th century. The lateen mizen-yard was finally abandoned at the end of the 18th century, with two new spars (boom and gaff) taking its place to spread the driver which replaced the mizen-course[5]. The use of additional small sails aloft and their corresponding studdingsails called in turn for new yards and booms. Two topmasts and two topsail-yards were carried as spares. Since the crossjack-yard, spritsail-yard and main topsail-yard were all of the same length, this allowed a certain degree of interchangeability in the event of damage.

By the end of the Ancien Régime, the sprit-topsail yard was no longer in use, and the spritsail-yard had no sail bent to it, serving only to spread the jibboom and flying jibboom guys. In the 19th century there was a tendency to replace the spritsail-yard with *whiskers* – iron rods extending out from the catheads.

To summarise, the principal elements of the evolution in the sparring of frigates were the abandonment of the sprit-topsail yard in the first decades of the 18th century, the adoption of the driver in the last decade, and the tendency to increase the dimensions of the upper masts: the use of additional yards and booms for fair-weather sails resulted in an increase in the length of the topgallants. Note also the adoption in the 1740s of a bumpkin, which allowed the foretack to be spread better than the previous arrangement using the gripe. In the last decade of the 17th century, the masts of French ships were said to form "a French pyramid", with the main lower mast measuring 2.5 times the beam, the main-topmast 1.5 times and the main-topgallant 0.75 times. The figures for the respective yards were 2.2, 1.25 and 0.75. This shape was modified later[6], and by the 1820s the preferred shape was that of a trapezoid, with the base formed by the lower yard minus the yardarms (the foot of the topsails) and the upper side formed by the spread of the foot of the royals.

A word or two is called for concerning the fittings: the "English-style" mast-cap came into use after the Seven Years' War, but the French-style cap was not completely abandoned until the 1780s[7]. Circular tops fell out of use by the middle of the 18th century, being replaced by the "square" tops favoured in England and other Northern European countries. These tops were square on three of their sides, with the fore side curved. This modification enabled the topmast-shrouds to be better spread.

I should add that made-masts were strengthened in the 17th century by means of nails and wooldings, together with a small number of iron hoops. During the course of the 18th century the number of hoops was increased, with the wooldings being placed always between two hoops. By the 19th century, wooldings had disappeared completely, being replaced by a larger number of hoops set closer together on the mast.

From 1755 onwards, the French Navy began to employ long rather than short rubbing-paunches, and lateral fishes were introduced in the 19th century.

1. See the note below concerning the lower masts, and giving the respective lengths of the foremast and mizen compared to that of the mainmast.
2. The abandonment of the sprit-topmast is attested in a manuscript relating to the Navy of the Order of Malta, which can be accurately dated to 1717 and which is preserved in Toulon Dockyard Archives (Series 5 U2); see also manuscript SH 143 at the *Service Historique de la Marine*, Vincennes.
3. Table of the proportions of masts and spars, drawn up in March 1781 in the presence of the Minister, the Maréchal de Castries. Note however the use in the stormy season of *stump-top-gallants*, designed only for flying pendants and to improve the æsthetic appearance. The masts from the frigate's boats or other small spars are employed for the purpose.
4. Modification of the proportions of masts and spars, 23 Prairial An XI, concerning the abandonment of the principle of equal lengths for topmasts, topgallants and their respective yards.
5. An intermediate step occurred in certain frigates with the use of a gaff-mizen.
Some officers were to regret the abandonment of the old lateen mizen-yard, since they claimed that it made it easier to back the mizen when putting about. Moreover, the long yard was interchangeable with the fore-yard when required.
6. It was generally felt that topmasts were too long, making them very difficult to replace at sea. When they were eventually shortened, this was made up for by a lengthening of the lower masts.
7. The same comment applies to the heelings of the topmasts and topgallants, with an "English-style" pattern being introduced towards the end of the 1770s.

Note concerning the lower masts

The length of the mainmast determines those of the foremast and of the mizen. In the 17th century the rule was that the upper face of the fore lower mast-cap should be level with a point half way above the hounds of the main lower mast, and the upper face of the mizen-mast cap should be level with the lower face of the mainmast crosstrees. In the course of the 1740s the difference in length between the main and fore lower masts was reduced, so that the cap now reached the upper third of the mainmast head above the hounds. There was however no change to the rule applied to the height of the mizen.

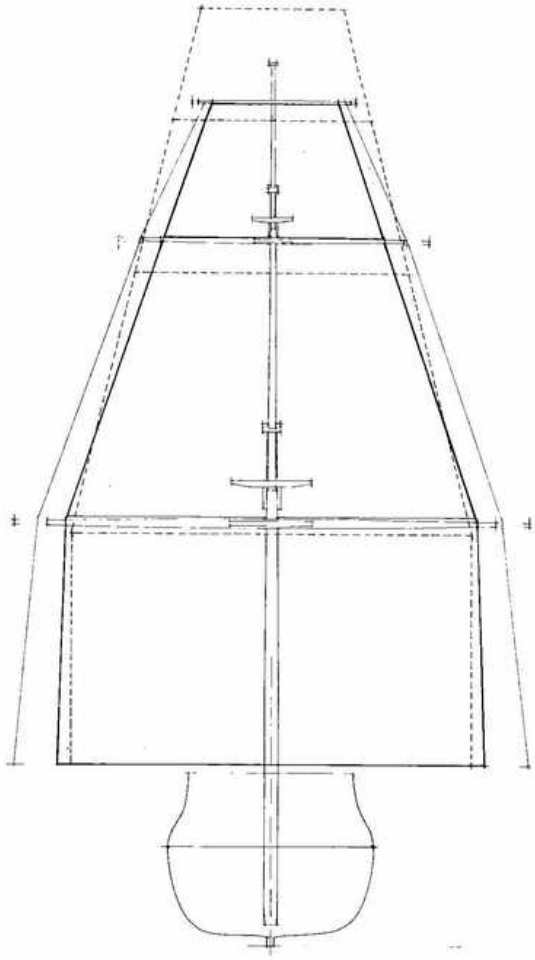
Most authors set the height of the main lower mast at 2 1/2 times the breadth at the midship beam (to inside of plank). In theory this dimension was then measured from the upper face of the keel, although in practice the heel of the mast rested on the keelson, so that in order to obtain the true length as opposed to the theoretical value it is necessary to subtract the thickness of the keelson, the floor timber and the rising-wood.

From the middle of the 18th century onwards the Sailing Reports provide (when correctly completed) the dimensions of the masts and spars, so that it is possible to know the precise length of the main lower mast.

It may be noted in this context that in a manuscript (J.2362) by a certain Sieur Colomb*, the author recommends that in Fifth Rates a further six feet should be added to the traditional multiple of 2.5 times the midship beam. He sets the multiples for Fourth Rates at 2.62, for Fifth Rates at 2.66, and for light frigates at 2.75.

Pierre Morineau, on the other hand, writing some forty years later, adopts a multiple which might vary from 2.58 to 2.66, for ship-frigates and single-decked frigates.

*The original manuscript belonged to Commandant Sizaire, but a photograph copy is preserved at the *Musée de la Marine*. Colomb was a Lieutenant in the Sea Artillery, and his manuscript is in two parts, the first relating to rigging and the second to sea ordnance. The manuscript is dated 1719.



Using the breadth at the midship beam as the basis for the calculation, a number of different profiles emerge for the mainmast and its yards, depending on the period. The thick line indicates the so-called "French pyramid", as applied in the 17th century. The thin line shows the proportions adopted during the 1770s: the spread of the yards is greater, resulting in a diminution of the pyramidal effect. Finally, the dotted line shows the shape in accordance with the practices of the 1830s: a pyramid is still respected, but the royals have been added.

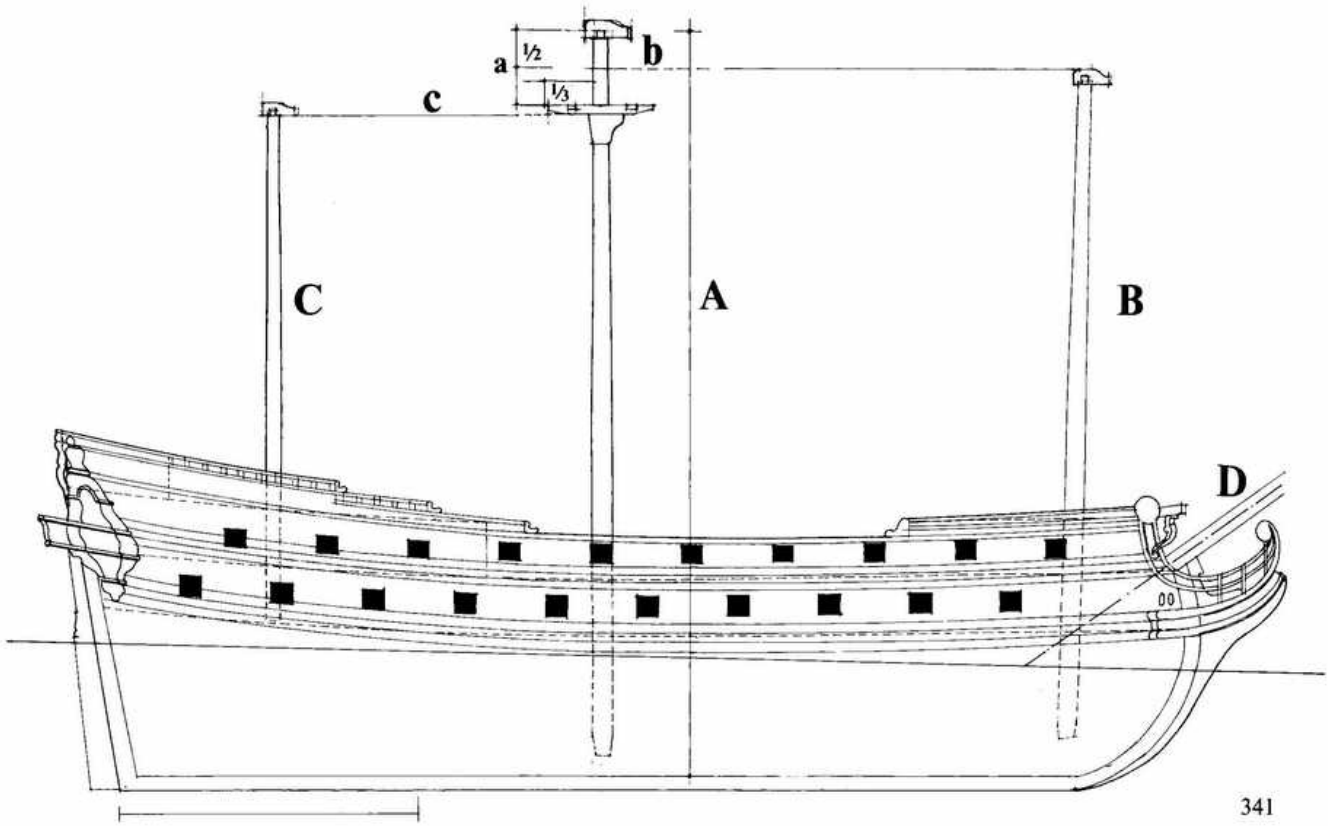
The mainmast **A** measures 2.5 times the beam at the midship bend, a purely theoretical dimension since it is taken from the upper face of the keel; in order to obtain the actual dimensions, one must first deduct the thickness of the rising-wood, the floor-timber and the keelson. One tenth* of the true length is taken as the value of **a**, the masthead measured from the upper face of the crosstrees above the tenon.

The length of the foremast **B** should be such that the upper face of its lower mast cap is level with a point half-way** up the masthead of the main lower mast (**b**).

The length of the mizen-mast **C** should be such that the upper face of its lower mast cap should be level with the lower face of the main lower mast crosstrees (**c**). The crosstrees measure one third of the beam in length, their height one twelfth of their length.

The bowsprit **D** steeves 30 to 35 degrees above the load waterline.

*This value generally reduced to one ninth in the 18th century.
**Reduced to one third in the 18th century.



Proportions of masts and spars:

ship-frigates and light frigates, 17th century.

Masts (lengths and given diameters Ø)

Mainmast	beam x 2.5 + 2 + 3 1/2 + 4 ft. (Ø 1/36th)
Foremast	length mainmast - 7 1/2 - 7 - 6 1/2 ft. (Ø 1/36th)
Mizen-mast	3/4 length mainmast (Ø 2/3 Ø mainmast)
Bowsprit	2/3 length mainmast - 2 ft. (Ø = Ø foremast - 1 in.)
Main-topmast	2/3 length mainmast - 2 1/2 - 3 - 3 1/2 ft. (Ø = 2/3 Ø mainmast - 1 in.)
Fore-topmast	2/3 length foremast - 2 1/2 - 3 ft. (Ø = 2/3 Ø foremast - 8 lines)
Main-topgallant	1/2 length fore-topmast. (Ø = 1/2 Ø fore-topmast)
Mizen-topgallant	ditto main-topgallant + 2 1/2 + 2 ft. (Ø = Ø main-topgallant)
Fore-topgallant	ditto main-topgallant - 3 - 2 1/2 - 2 ft. (Ø = Ø main-topgallant - 8 lines)
Sprit-topmast	1/2 main-topgallant (Ø = Ø main-topgallant)

Yards (lengths and given diameters Ø)

Mainyard	beam x 2.25 + 6 + 5 1/2 ft. (Ø 1/48th) – light frigate: beam x 2.00 + 5 ft.
Foreyard	beam x 2.00 + 5 1/2 + 5 + 4 1/2 ft. (Ø 1/48th)
Mizen-yard (lateen)	beam x 2.00 (Ø = Ø main-topmast + 9 lines (light frigate: + 6 lines)
Main topsail-yard	1/2 mainyard + 6 + 5 1/2 + 5 ft. (Ø 1/48th)
Spritsail-yard	ditto main topsail-yard (Ø = Ø fore topsail-yard)
Fore topsail-yard	1/2 foreyard + 5 1/2 + 5 + 4 1/2 ft. (Ø 1/48th)
Main topgallant-yard	1/2 main topsail-yard (Ø 1/48th)
Fore topgallant-yard	1/2 fore topsail-yard (Ø 1/48th)
Sprit topsail-yard	ditto main topgallant-yard + 2 + 1 1/4 ft. (Ø 1/48th)
Crossjack-yard	ditto main topsail-yard (Ø 1/96th + 1 ft + 9 ins.)
Mizen t'gallant-yard	ditto main topgallant-yard + 1 ft + 9 ins. + 6 ins. (Ø 1/48th)

Explanations

The figures which follow the **lengths of the yards** correspond to the lengths of the yardarms; thus, for the mainyard of a ship-frigate of the 1st Order, each yardarm is 3 feet long.

The lower main **studdingsail-booms** are 1.00 times the beam in length, and of a diameter equal to that of the main topgallant-yard. The lower fore studdingsail booms are 2 feet and 9 lines less, and their diameter is the same as that of the fore topgallant-yard. The topmast studdingsail booms are one third the length of the lower yards, and also one third of their diameter.

These data derive from a manuscript (SH 144) preserved at the *Service Historique de la Marine* at Vincennes, and which I believe to date from about 1670. It is thus relatively early, but it contains very full information concerning the proportions of masts and spars for all Ranks of ships and for light frigates. I have only used the material relating to ship-frigates (4th and 5th Rates) and to light frigates, on which no information is to be found elsewhere in other 17th century texts dealing with masting.

The same manuscript also provides information on *mast furniture*: the length of *mast-caps*, for the fore- and mainmasts, is equal to twice the given diameter of the mast, the breadth equal to the length, and the thickness one third of the length. The caps of the bowsprit, mizen-mast and main-topmast are half the size of the mainmast-cap; the fore-topmast cap is half the size of the fore-mast-cap; the main and fore topgallant-mast caps are half the size of their respective topmast-caps, while the mizen-topmast and sprit-topmast caps are identical to the main topgallant-mast cap.

The *bibbs* are up to two thirds of the length of the masthead, their breadth being equal to three quarters of their height.

The *crosstrees* of the maintop measure one third of the midship beam plus 10 inches, the foremast crosstrees one third only, and the topmast crosstrees are half the length of their lower mast equivalents. The mizen crosstrees are half the size of the main, and the same rule applies to the sprit-topmast crosstrees. In all cases, the height of the trees is equal to 1/12th of their length, and their thickness equal to 1/24th.

*

* *

Notes

The length of the mainmast is equal to 2.5 times the breadth at the midship bend, taken *to inside of frame*. Thus, in contrast to the usual notion of the breadth measured to inside of plank, it is necessary to deduct the thickness of the futtock (moulded dimension) at the height of the lower deck, and also the thickness of the clamp, to arrive at a figure equivalent to 92.7% of the breadth to inside of plank.

The **lengths of the masts** given above are followed in each case by a number of figures in feet to be added to or deducted from the first figure given; where there are three figures, these apply to ship-frigates of the 1st Order, of the 2nd Order, and to light frigates; where there are only two figures, these apply to the two last types of vessel only. Thus, for example, the mainmast is shown as 2.5 times the beam, plus 2 feet for ship-frigates of the 1st Order, plus 3 1/2 feet for those of the 2nd, or plus 4 feet for light frigates.

The **diameters** indicated are the "given" or maximum diameters; for the lower masts, the minimum diameter or "small" is equal to 2/3rds of the given diameter, and 1/2 for the bowsprit. For the topmasts the small is equal to half the given diameter. The length of the masthead is 1/9th of the overall length in the case of the lower masts, 1/10th for the topmasts. The hounds of the topmasts are equal to half the length of their lower masthead, and where the lower masts have hounds, they are equal to 3/5ths of the length of the masthead.

All of the figures in the table opposite are calculated from the maximum breadth of the frigate to inside of plank equal to 1.00.

EVOLUTION OF THE PROPORTIONS OF MASTS & SPARS

	1670	1695	1725	1750	1775	1781	1804	1820	1830
Mainmast	2.50	2.50	2.50	2.50	2.35	2.40	2.42	2.42	2.42
Foremast	2.25	2.25	2.22	2.22	2.20	2.15	2.16	2.16	2.23
Mizen-mast	1.73	1.75	1.80	1.85	1.75	1.75	1.72	1.72	1.70
Bowsprit	1.50	1.50	1.40	1.40	1.40	1.45	1.42	1.54	1.44
Main-topmast	1.50	1.50	1.56	1.60	1.60	1.45	1.56	1.57	1.44
Fore-topmast	1.33	1.40	1.38	1.40	1.45	1.45	1.42	1.43	1.30
Mizen-topmast	0.80	0.75	1.00	0.90	1.00	1.45	1.15	1.17	1.00
Main-topgallant	0.70	0.62	0.78	0.75	1.00	1.00	1.23	1.27	1.25
Fore-topgallant	0.65	0.50	0.69	0.70	0.90	1.00	1.15	1.17	1.13
Mizen-topgallant		0.45	0.50	0.60	0.65	pole	1.09	0.95	0.88
Sprit-topmast	0.50	0.40							
Jibboom			1.00	1.00	1.00	1.10	1.09	1.50	1.20
Main skyscraper-mast								1.00	
Fore skyscraper-mast								0.87	
Mizen skyscraper-mast								0.60	
Jib-topsail pole						0.73	0.75	0.76	1.07
Mainyard	2.20	2.20	2.25	2.33	2.30	2.17	2.19	2.16	2.09
Foreyard	2.00	2.00	2.00	2.13	2.00	1.97	1.91	1.93	1.89
Crossjack-yard	1.30	1.25	1.50	1.33	1.35	1.45	1.50	1.50	1.68
Spritsail-yard	1.27	1.25	1.50	1.66	1.45	1.50	1.50	1.50	
Sprit topsail-yard	0.55	0.75	0.80	0.95	1.00	1.10	1.06		
Main topsail-yard	1.25	1.25	1.50	1.66	1.66	1.50	1.58	1.53	1.68
Fore topsail-yard	1.15	1.20	1.33	1.52	1.50	1.50	1.39	1.43	1.52
Mizen topsail-yard	0.62	0.75	0.90	0.95	1.00	1.10	1.23	1.23	1.14
Mizen topgallant-yard		0.45	0.60	0.66	0.66	0.65	0.79	0.82	0.75
Main topgallant-yard	0.62	0.75	0.75	0.95	1.00	1.00	1.04	1.04	1.07
Fore topgallant-yard	0.55	0.66	0.66	0.87	0.90	1.00	0.91	0.95	0.96
Main royal-yard						0.40	0.76	0.76	0.75
Fore royal-yard						0.40	0.71	0.71	0.68
Mizen royal-yard							0.54	0.61	0.53
Main skyscraper-yard								0.40	0.40
Fore skyscraper-yard								0.40	0.40
Mizen skyscraper-yard								0.32	0.32
Mizen-yard	1.95	2.00	2.00	2.00	2.00	1.97			
Gaff						0.66	1.17	1.23	1.09
Boom							1.48	1.48	1.53
Mizen-staysail gaff								0.65	0.70
Main-staysail gaff								1.00	1.00
Gaff-topsail gaff								0.32	0.35

In addition to the chronological table on the preceding page covering the proportions of masts and spars, various other details follow.

The **circumference** of spars is calculated from the number of feet of the midship beam, expressed as inches (i.e. 36 feet of beam give 36 inches as the basis for the subsequent calculation). In the table below, the first figure indicates the fraction to be applied to the beam to obtain the larger circumference, the second the smaller.

Circumference of masts			Circumference of yards		
Mainmast	3/4	1/2	Mainyard	2/3	2/9
Foremast	7/10	7/15	Foreyard	5/8	5/24
Mizen-mast	7/16	7/24	*Mizen-yard	2/9	1/9
Bowsprit	7/36	7/72	Spritsail-yard	1/3	1/9
Main-topmast	5/12	5/24	Main topsail-yard	1/3	1/9
Fore-topmast	7/18	7/36	Fore topsail-yard	7/24	7/72
			Crossjack-yard	1/6	1/18
Mizen-topmast	7/16	7/32	Mizen topsail-yard	1/6	1/9
Main-topgallant	5/24	5/48	Main-topgallant	1/6	1/18
Fore-topgallant	7/36	7/72	Fore-topgallant	7/48	7/144
Mizen-topgallant	7/36	7/72	Mizen topgallant	1/9	1/15
Sprit-topmast	11/15	11/30	Sprit topsail-yard	7/48	7/144

*Lateen yard; the value for the diameter at 2/3rds of its length is 1/3.

Booms: main-topmast studdingsail boom, length 13/18 of the beam, diameters 2/9–2/15 of the beam reduced to inches. Fore-topmast studdingsail boom, length 2/3, diameters 5/24–1/8. Jib-boom, length 7/8, diameters 1/4–3/20.

Ensign staff, length 1.0, diameters 7/36–7/48. Jackstaff, length 0.5, diameters 1/9–1/12.

The **yardarms** of the main- and foreyard represent 1/12 of their total length. For the main and fore topsail-yards, the yardarms measure 3/5 of those of their respective lower yards. The figure for the mizen topsail-yard is 1/7 of its length, and 1/12 for the spritsail-yard, sprit-topsail yard, topgallants and crossjack-yard.

Mast furniture.

Mast-caps. Length 3 times the given diameter of the topmast, breadth equal to the length, thickness one third of the length. The sprit-topmast cap is the same size as the fore-topmast cap. These proportions apply to the so-called "French-style" mast-caps. For the proportions of "English-style" mast-caps, see *74-G.S.*, vol. III.

Tops. Diameter of the foretop 1/3 of the beam. Diameter of the maintop 1 foot greater, mizen-top half that of the maintop, sprit-topmast top 6 inches greater than the mizen-top.

Crosstrees. Topmast crosstrees 1 foot shorter in length than the diameter of their respective tops. Thickness one inch for each foot of their length, breadth 2/3 of the thickness. The topgallant crosstrees are half the length of the topmast crosstrees, with their section in the same proportions.

Bibbs. Length equal to one third of the masthead, breadth the same, thickness equal to that of the crosstrees.

Paunches. Of the short pattern, measuring 2 1/2 to 3 times the length of the bibbs.

EVOLUTION OF THE SAIL PLAN

In the 17th century and up to the first decade of the 18th, frigates had the following sail plan: maincourse, forecourse, spritsail-course, lateen mizen, main-, fore- and mizen-topsails, sprit-top-sail. In addition, there were studdingsails for the main- and fore-courses and topsails. *Bonnets* might also be laced to the foot of the maincourse and the forecourse.

Between the main- and foremast were two triangular sails, the *main staysail* and the *main-topmast staysail*. Between the main-mast and the mizen were two further staysails, the *mizen-staysail* and the *mizen-topmast staysail*. Between the foremast and the bowsprit were the *fore-topgallant staysail*, bent to the stay of the same name, and the *fore-topmast staysail* bent to its stay. The two layouts overleaf illustrate this basic sail plan, of which we will now examine the evolution.

At some point around 1710[1] the sprit-topmast was abandoned, or rather it became the jibboom; the sail carried by the fragile spar was bent to the end of the jibboom, but kept its original name of *sprit-topsail*. The jibboom allowed a better arrangement of the fore-topgallant staysail, which became the *standing* or *outer jib*, its tack being made fast at the outboard end of the jibboom; the fore-topmast staysail was retained, but sometimes called the *storm jib*. By the middle of the century a third jib was introduced, its tack made fast half-way along the jibboom, and it took the name of the *inner jib*. The storm jib was then bent to the forestay, and was reserved as a foul-weather sail.

By now, the surface area of all the staysails was significantly greater than in the 17th century. In the following decades a third staysail, the *topgallant staysail*, was introduced; true, its use was not unknown in the 17th century, but its use was by now more general.

By the middle of the 18th century, the mizen-course had lost its triangular shape, with the part of its surface area afore the mizen-mast being done away with; it thus became a sort of "bermudoes sail", but was called the "English-style mizen". By the 1760s, some frigates were rigged with a *gaff mizen*, the lateen yard being replaced by a gaff with jaws round the mizen-mast.

In the 1770s there was a further increase in the number of the staysails; moreover they lost their triangular shape to become trapezoidal; between the main-topmast staysail and the main-top-gallant staysail a new sail was rigged, the *middle staysail*, so that there were now four staysails between the mainmast and the foremast; likewise, the addition of a *mizen-topgallant staysail* brought to three the number of staysails between the mainmast and the mizen. The surface area of the studdingsails increased, and new sails were rigged: *mizen-topmast* and *main- and fore-topgallant studdingsails*, occasionally even *mizen-topgallant studdingsails*. Bonnets had by now long been abandoned, and the use of the sprit-topsail was a rarity. The American War encouraged the introduction of other fair-weather sails, and confirmed the adoption of the gaff mizen in frigates.

On occasions, a triangular sail might be laced to the mizen to increase its surface area, spread by a spar rigged over the stern; alternatively, a spar extending the gaff made it possible to rig an additional rectangular sail[2]. The use of a boom, made fast to the mizen-mast and running out far beyond the taffarel fife-rail, made it possible to rig a much larger mizen called the *driver*[3]. Above the gaff was rigged a further sail, sometimes bent to its own small yard, called the *gaff-topsail*.

The increase in surface area of the sails at the stern made it necessary to seek a balance with other head-sails, resulting in the addition of the *flying jibsail*, which resulted in an increase in the

length of the jibboom, achieved through the fitting of a *flying jibboom*. This in turn demanded a new item of rigging, the *dolphin-striker*, the purpose of which was to provide better support for the succession of spars extending the bowsprit. *Topgallant-royals* or *royals*[4] made their appearance on the mainmast and foremast, the sprit-topsail had all but disappeared, and the sprit-sail could no longer be bent because of the dolphin-striker and its associated guys.

During the course of the first decades of the 19th century, there was a tendency to increase the number of fair-weather sails, some of which touched on the fantastic. Royals were bent to all three masts, and *skyscraper sails* above them, a *gaff topgallant-sail* was added, the staysails were increased in number with the introduction of a *mizen-topgallant staysail* and *royal staysails*, so that there were now four staysails between the main and the mizen and six between the main and the fore: storm staysail[5], main staysail, main-topmast staysail, middle staysail, main-topgallant staysail, and main-royal staysail.

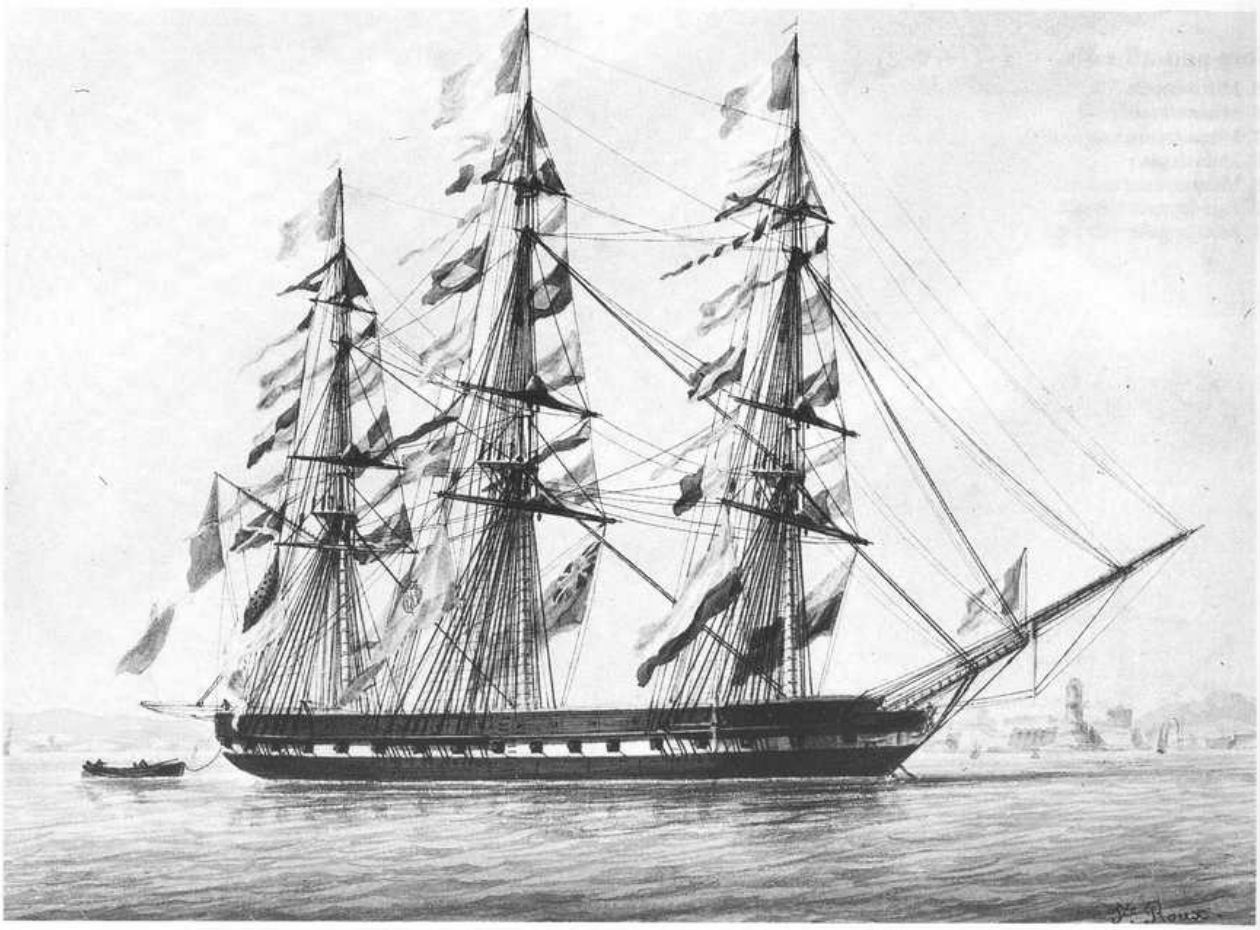
A fifth jib was added, the *jib-topsail*. Both topgallants and royals had their studdingsails. A triangular *water-sail* might be rigged beneath the driver-boom, while a *ringtail* spread by a spar might extend the driver aft.

For the sake of completeness, I ought also to mention the *storm staysail*, a jib bent to the forestay and used in foul weather[6]. In the 1820s a number of the fore-and-aft sails were bent to gaffs (the gaff-topsail, mizen-staysail, mizen-topmast staysail, main staysail, main-topmast staysail).

It is possible to simplify the evolution of the sail plan of frigates by concluding that it arose through the abandonment of the sprit-topmast, thereby allowing the head-sails to be increased in number, which in turn demanded an equivalent increase in the sail area aft, characterised by the gaff mizen; this in turn brought about an increase in the number of jibs; finally, the number of fair-weather sails was greatly increased during the last quarter of the 18th century.

Nevertheless, whatever the evolution, the "motor" of the sailing frigate remained the four principal sails: maincourse and fore-course, main- and fore-topsails, all the other sails were no more than fair-weather additions or efforts to improve handling.

1. It is impossible to give an exact date, but manuscript sources suggest that it occurred in about 1710.
2. The *driver*. This sail could also be used when running before the wind; also known as the *spanker*.
3. See the monograph on the cutter *Le Cerf*. In rough weather the smaller mizen was retained and used as a storm-mizen.
4. Some frigates were already rigged with topgallant-royals in the Mediterranean as early as 1765-70.
5. Smaller than the earliest versions of this sail, but rigged in the same place. The positions of the staysails in the 19th century call for some explanation: the main storm staysail was rigged parallel to the main- and main springstay, and was only used in foul weather. The main staysail was bent to the main-topmast springstay, which was made fast under the foretop. The middle staysail was bent to a staysail-stay running from the main-topmast crosstrees to half-way up the fore-topmast. The topgallant and royal staysails were bent to the main-topgallant stay and to the main-topgallant pole stay.
6. The function of the storm staysail remained unchanged, although it was rigged differently. In merchant ships it came to be bent to the forestay rather than to the fore-topmast stay.



17th century. The sprit-topmast is the most characteristic element of the sail plan of this period. From manuscript sources we learn that the length of this spar varied from half the length of the main topgallant-mast or 0.31 to 0.35 times the beam, up to a maximum of 0.5 times the beam, with an average length of 0.4 times being recommended. The spread of the sprit topsail-yard varied between 0,55 and 0,75 times the beam.

The existence of this curiosity has tended to obscure the fact that there were also true jibs used simultaneously with the spritsail and the sprit-topsail; indeed, some authorities would seem to be ignorant of their presence. These sails were the *fore-topmast staysail**, a little smaller than the main-topmast staysail, and the *fore-topgallant staysail*, which was much larger (more than twice the surface area). The latter sail was a fair-weather sail, and was bent to the fore-topgallant stay, which ran down either to the cap or the truck of the sprit-topmast.

As a rule, there were no more than four staysails between the masts, triangular in shape. Studdingsails were restricted to the four principal sails, the fore- and main- courses and topsails. These additional sails were characterised by a very short head and a foot which never exceeded three times the width of the head, giving a very deep sail of small surface area. In addition to the studdingsails, bonnets were laced to the foot of the maincourse and forecourse (they are not illustrated below).

*It is bent to the fore-topmast springstay or preventer-stay.
**The fore- and main-topsail have two or three reef-bands, the mizen-topsail one or two.

I have appended a key to each of the two drawings below illustrating 17th sail plans, but have not thought it necessary to repeat it for those depicting the 18th and 19th century sail plans on the following pages, where I will only comment on any additions or modifications. This has the advantage of highlighting the evolution of the sail plan of the frigate. On the other hand, I thought it might be useful to conclude this section with some notes concerning the various names attributed to jibs and staysails over the years, since this is a subject which frequently causes confusion.

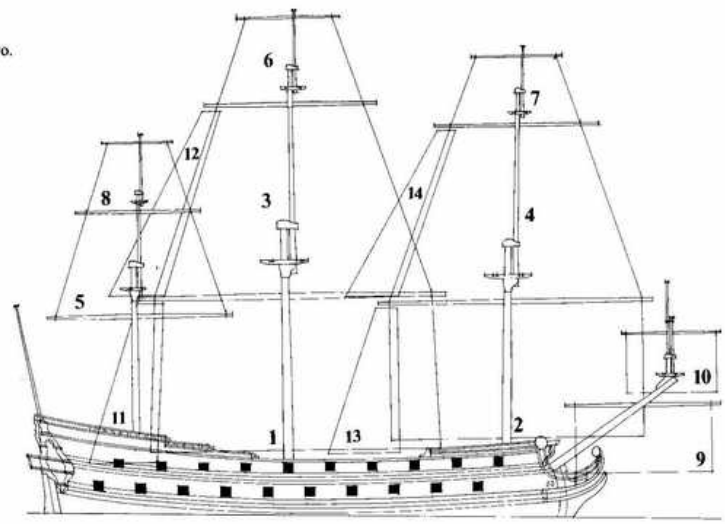
Square sails.

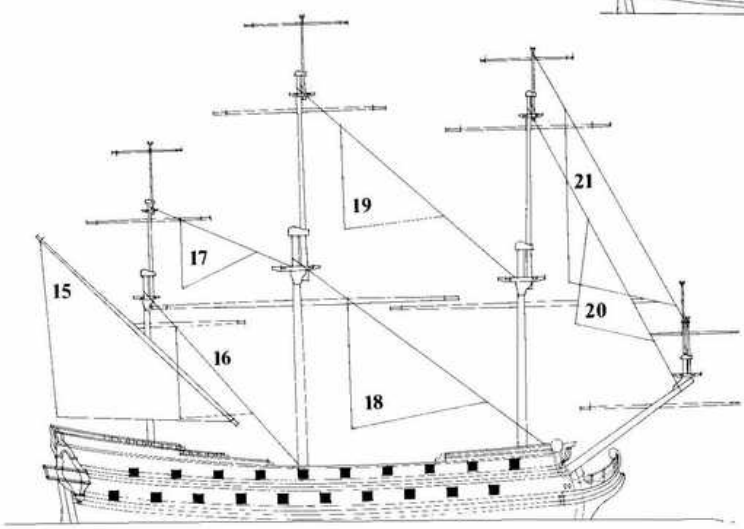
1. Maincourse
2. Forecourse
3. Main-topsail**
4. Fore-topsail**
5. Mizen-topsail**
6. Main-topgallant
7. Fore-topgallant
8. Mizen-topgallant
9. Spritsail-course
10. Sprit-topsail
11. Lower main studdingsail
12. Main-topmast studdingsail
13. Lower fore studdingsail
14. Fore-topmast studdingsail

Although I have illustrated a mizen-topgallant, in practice its use was far from general.

Fore-and-aft sails.

15. Mizen-course
16. Mizen staysail
17. Mizen-topmast staysail
18. Main staysail
19. Main-topmast staysail
20. Fore-topmast staysail
21. Fore-topgallant staysail





1730. The second decade of the 18th century was marked by the disappearance of the sprit-topmast; a faint reminder of its earlier existence continued with the presence of the jackstaff and its standard, which survived until the end of the century.

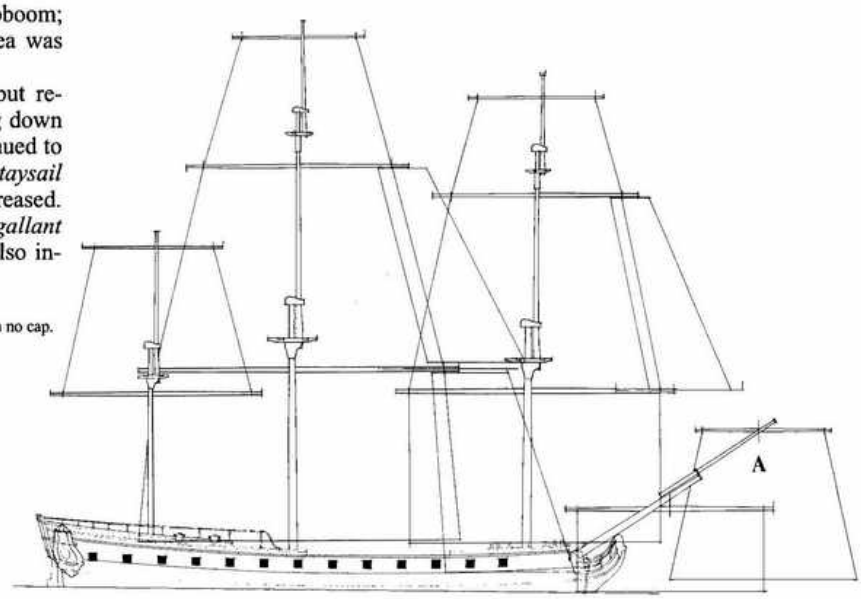
The major change which followed had already been heralded by the existence of the two triangular fore-and-aft sails forward of the foremast, and the change which took place was essentially that the sprit-topmast was laid horizontally rather than vertically, becoming the *jibboom*; the length of this spar was equal to the beam, and while its projection forward varied, it was never greater than two thirds of its overall length. The presence of the jackstaff standard and the stay collars on the bowsprit made it necessary to rig the jibboom asymmetrically to starboard; it was secured by means of a heel-lashing and an iron cap consisting of two rings, since the French-style mast-cap could not be employed in this position*.

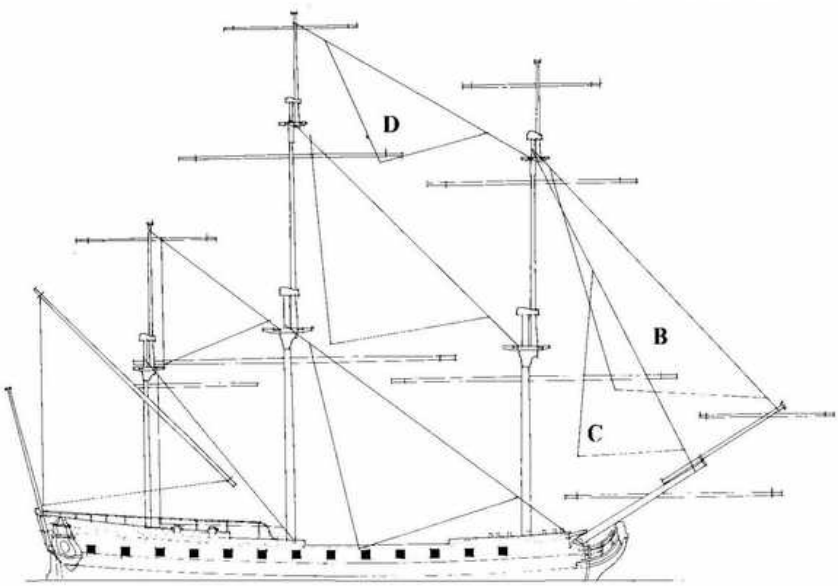
One consequence of the disappearance of the sprit-topmast was that the sprit-topsail was now rigged at the end of the jibboom; although the name remained unchanged, its surface area was increased.

The fore-topgallant staysail became the *standing jib*, but remained a fair-weather sail; it was bent to a stay running down from the foretop to the end of the jibboom, or else continued to be bent to the fore-topgallant stay. The *fore-topmast staysail* retained its name, but the surface area of both sails was increased. Elsewhere, a third staysail was introduced, the *main-topgallant staysail*, and the surface area of the studdingsails was also increased.

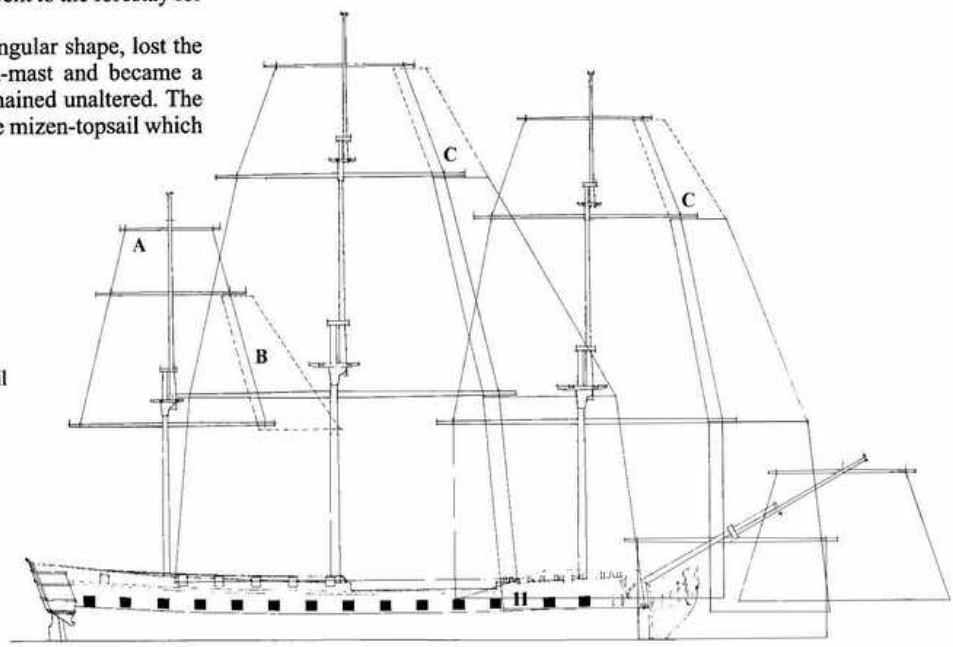
*Initially the jibboom was made fast to the bowsprit by three of four lashings, with no cap.

A. Sprit-topsail
B. Standing jib
C. Fore-topmast staysail
D. Fore-topgallant staysail

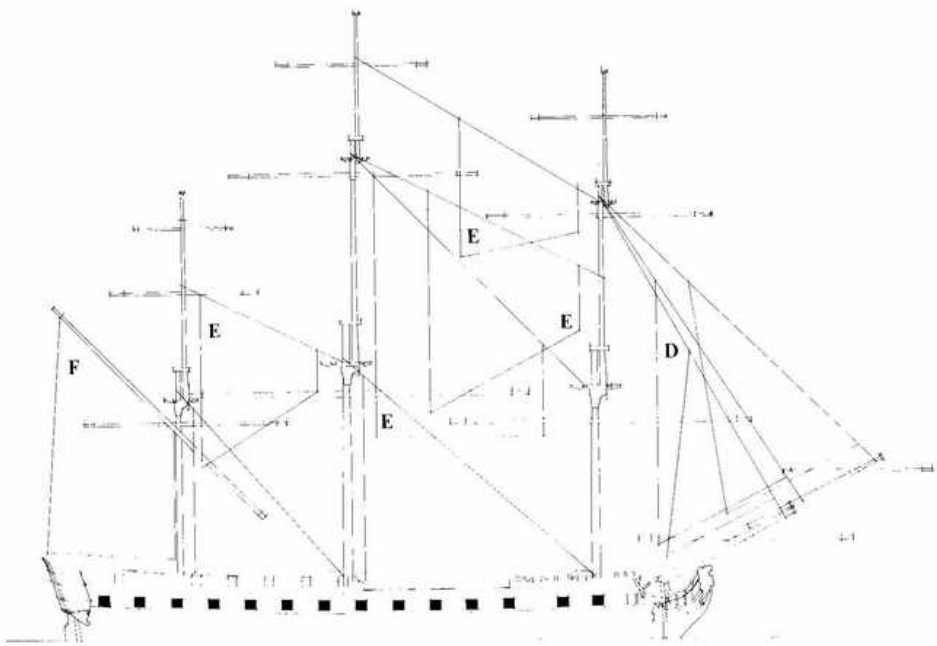




1760. By now the mizen-mast frequently had a topgallant, a sail which was not unknown in the 17th century but was by no means in general use. The surface area of the studdingsails was further increased, and the use of *mizen-topmast* and *fore-* and *main-top-gallant studdingsails* was becoming more widespread.
A third jib was adopted, called the *inner jib*, rigged between the standing jib and the fore-topmast staysail; it was bent to the fore-topmast preventer-stay. The two other jibs could be moved up and down the jibboom. A *storm jib* was bent to the forestay for when the vessel was hove-to or trying.
The lateen mizen, characterised by its triangular shape, lost the part of the canvas forward of the mizen-mast and became a quadrilateral fore-and-aft sail; its yard remained unaltered. The topsails had three reef-bands, except for the mizen-topsail which only had two.



A. Mizen-topgallant
B. Mizen-topmast studdingsail
C. Topgallant studdingsails
D. Inner jib
E. Main storm staysail – Main-topmast staysail
Middle staysail – Topgallant staysail
F. "English-style" gaff mizen

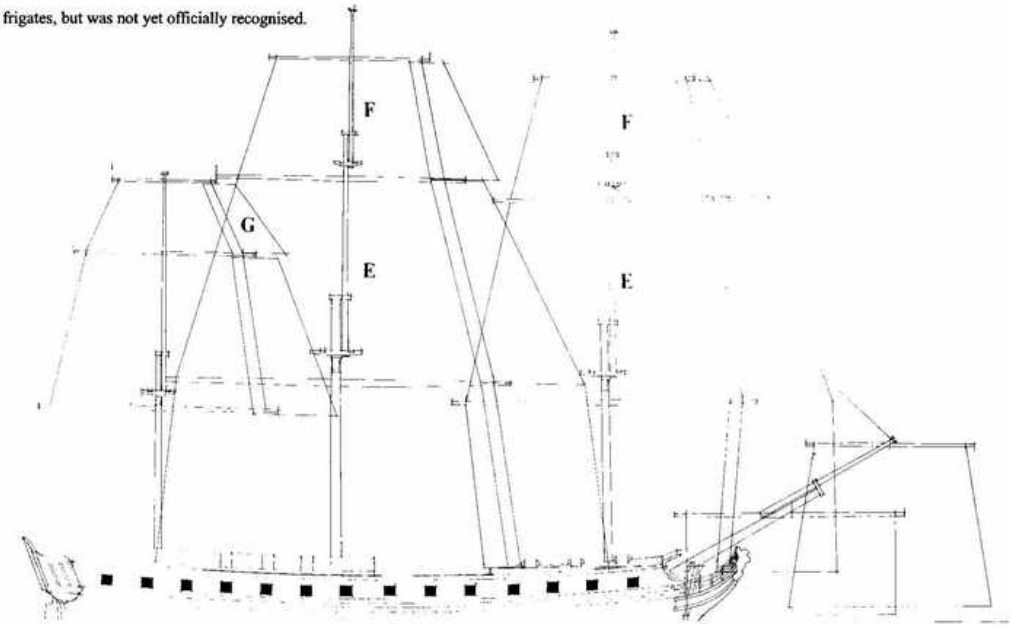


1781. Marked by the first Regulations fixing the proportions of masts and spars* for all the various classes of vessel in the French Navy. The principal innovation was the *equalisation* or *interchangeability* of the topmasts and topgallants, and their yards, crosstrees and caps.

The topgallant-sails are thus identical**; as for the topsails, while they are the same size in their head and drop, they differ in the foot, since the lower yards are not of identical size. Note also that the spritsail-yard was interchangeable with the fore and main topsail-yards and the sprit topsail-yard with the mizen topsail-yard.

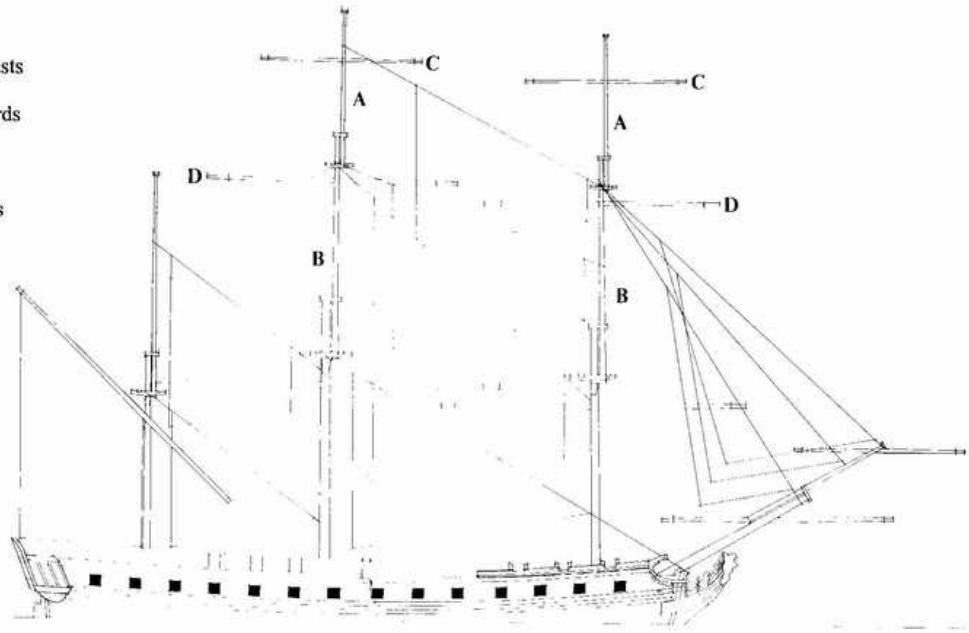
By now studdingsails were very commonly employed, and mizen-topgallant studdingsails had made their appearance.

*The gaff-mizen was already in use in some frigates, but was not yet officially recognised.
**As were their studdingsails.



A. Interchangeable topgallant-masts
B. Interchangeable topmasts
C. Interchangeable topgallant-yards
D. Interchangeable topsail-yards
E. Interchangeable topsails*
F. Interchangeable topgallants
G. Mizen-topgallant studdingsails

*Apart from differing lengths at the foot.



1804. New Regulations were adopted, and the principle of interchangeability between topmasts and topgallants was abandoned.

The sprit-topsail, already declining in use by the end of the 18th century, was abandoned, and the yard now only served as support for certain items of rigging, no sail being bent to it.

A fourth tier of sails was added with the *royals* (third tier in the case of the mizen).

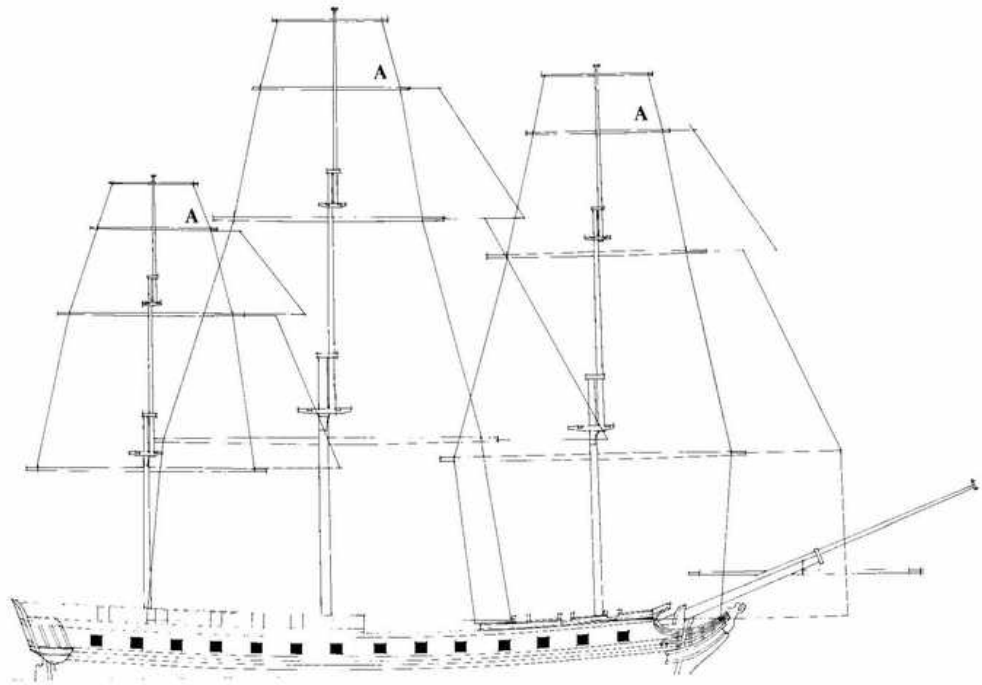
A fourth jib was added, in the shape of the *flying jibsail*, rigged either to an extended jibboom, or else to a *flying jibboom*.

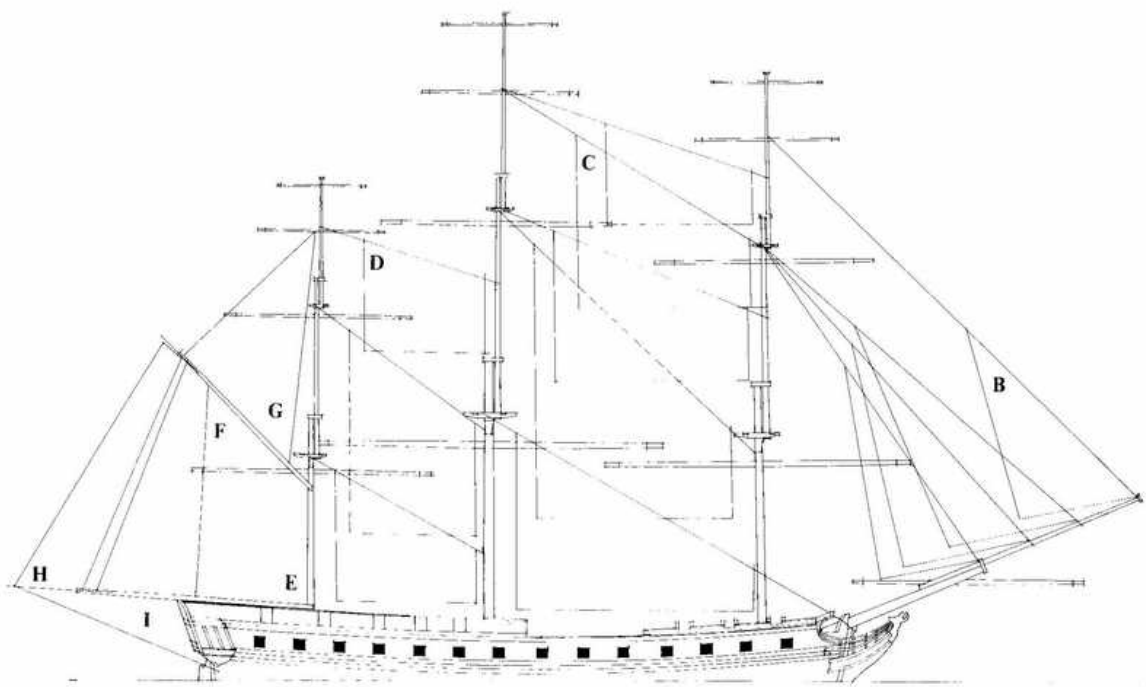
Two further staysails were adopted, one an *upper middle staysail* bent between the middle staysail and the topgallant staysail, the other a *mizen-topgallant staysail*.

Although commonly employed in the years following the collapse of the Ancien Régime, the gaff-mizen was now sanctioned by Regulations, with a *storm mizen* for bad weather. A *gaff topsail*, a *driver* and a *save-all* or *water-sail* were added to the gaff-mizen.

The fore- and main-topsails now had four reef-bands, the mizen-topsail three.

A. Royals
B. Flying jibsail
C. Upper middle staysail
D. Mizen-topgallant staysail
E. Gaff-mizen
F. Storm mizen
G. Gaff topsail
H. Driver
I. Water-sail





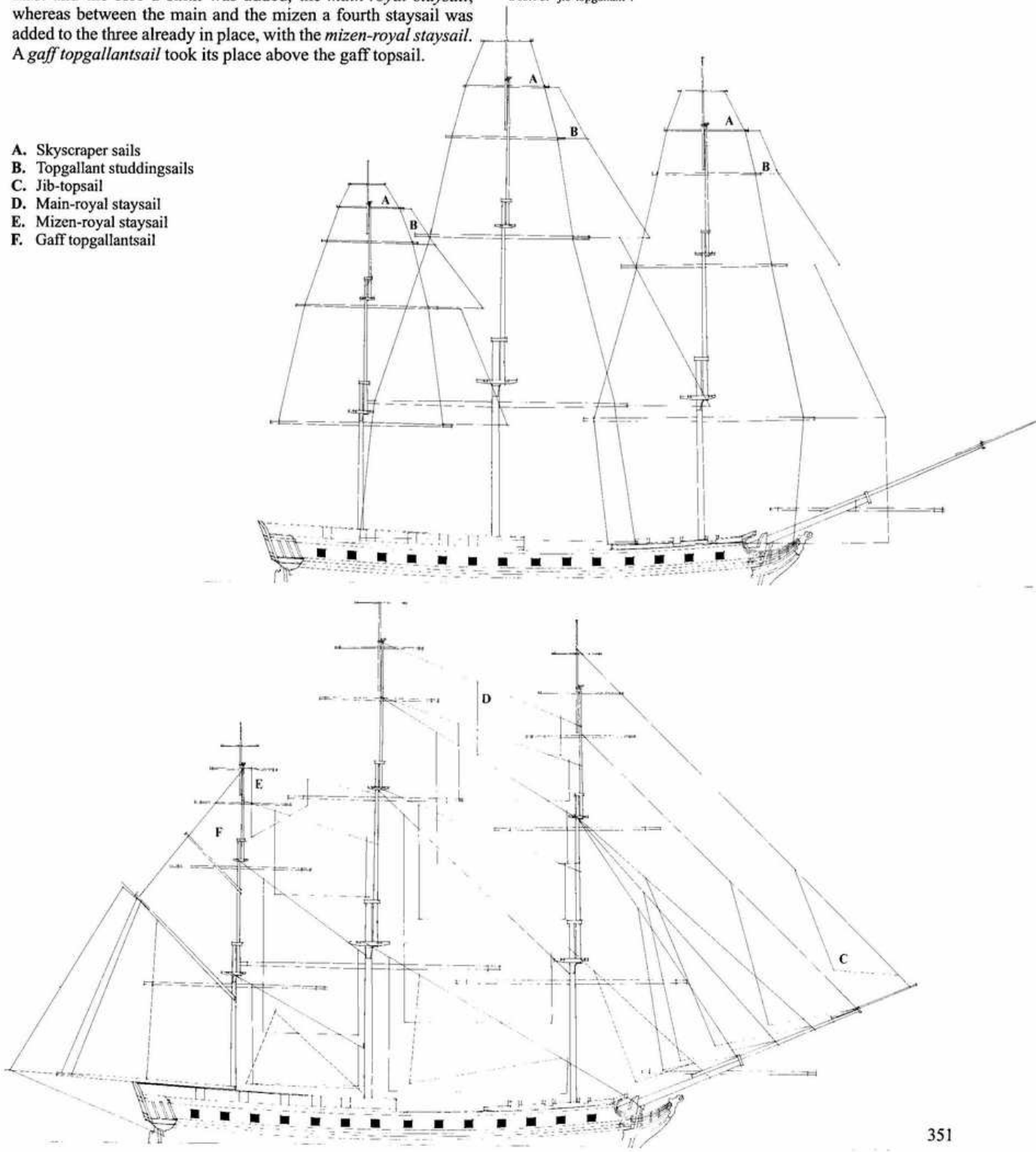
1830. The multiplication of secondary sails, some of which can only be described as touching on the fantastic, was characterised notably by the adoption of a fifth tier of sails on the foremast and main, and a fourth on the mizen. These small sails were called *skyscrapers* or *skysails*[1], hoisted on a pole-mast placed on the after side of the topgallant-masts and extending them upwards. Likewise, there were *royal studdingsails*.

The flying jibboom was extended by a pole in order to rig a *jib-topsail*[2]. To the five staysails already set between the main-mast and the fore a sixth was added, the *main-royal staysail*, whereas between the main and the mizen a fourth staysail was added to the three already in place, with the *mizen-royal staysail*. A *gaff topgallantsail* took its place above the gaff topsail.

The plan of the fore-and-aft sails shows in dotted outline the storm sails: storm jib, main storm staysail and the storm mizen staysail. There was a tendency to rig some of the staysails to gaffs, and the same applied to the gaff topsail.

1. Alternatively, these diminutive square sails might be replaced by two triangular sails on either side of the pole, their foot spread by the royal-yard; they were called *ailes de pigeon* ("pigeon's wings") in French. [Note that English skyscrapers were commonly triangular, and the quadrilateral version might best be called *save-all royals*, by analogy with save-all topsails. Trans.]
2. Another occasional jib called the *foc en l'air* might be hoisted over the jib-topsail, forming a sort of "jib-topgallant".

A. Skyscraper sails
B. Topgallant studdingsails
C. Jib-topsail
D. Main-royal staysail
E. Mizen-royal staysail
F. Gaff topgallantsail



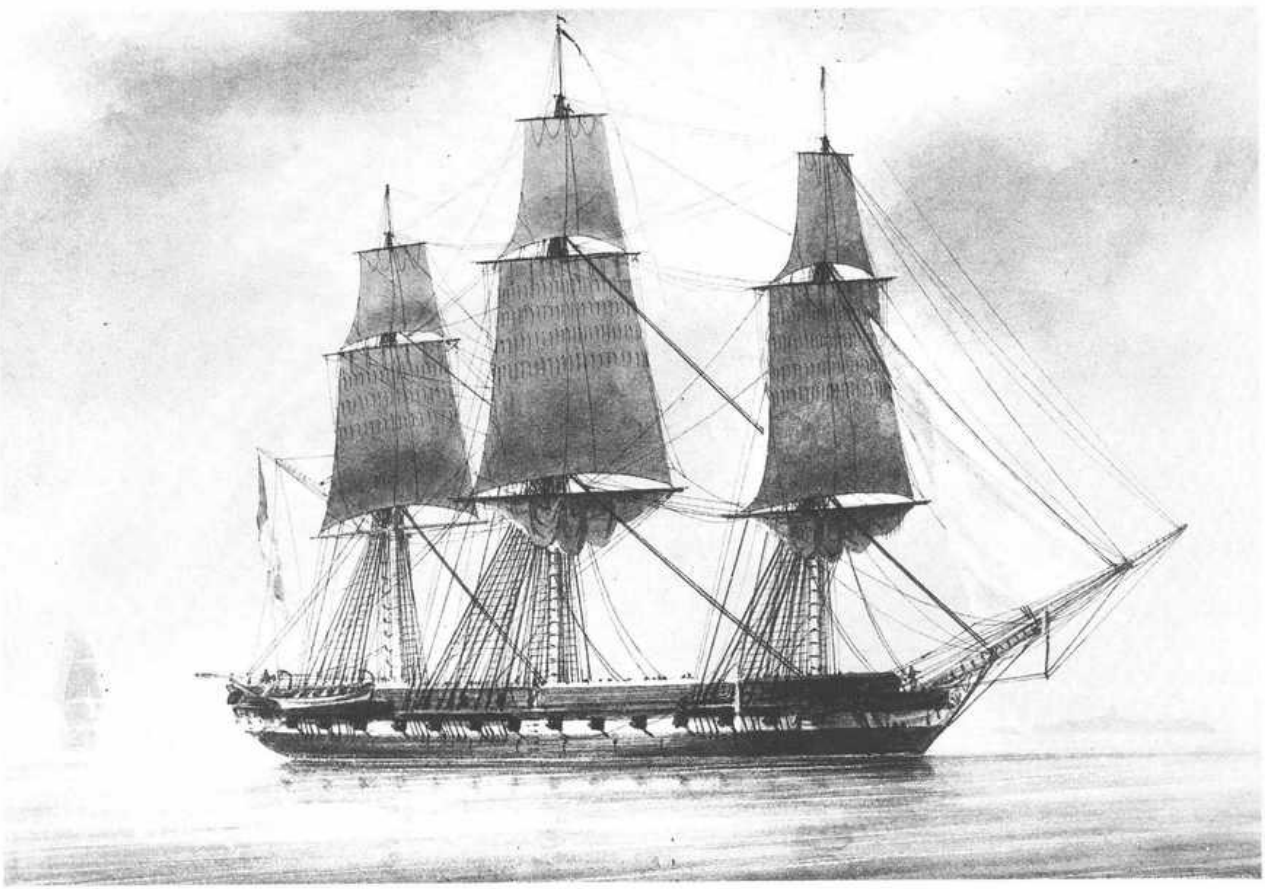
Identification of the head-sails. Starting at the foremast, the first of the head-sails is the *storm jib** bent to the fore springstay; next, the *fore-topmast staysail*, bent to the fore-topmast springstay; the *inner jib* which is not bent to a stay but left flying; the *standing jib* or *outer jib*, bent to a staysail stay made fast at the fore-topmast head, can be moved fore-and-aft along the jibboom by means of a traveller (as can the inner jib); the *flying jibsail*, bent to a stay running down from the fore-topgallant masthead, and which can also be moved fore-and-aft by means of a traveller; the *jib-topsail* has no stay; its halliard runs down from the fore-topgallant pole and its tack is made fast to the forward end of the pole extending the flying-jibboom.

Identification of the staysails. The first of the staysails is the *lower staysail*; its halliard follows the mainstay and main springstay*, and there is smaller foul-weather version; next, the *main staysail*, bent to the main-topmast springstay; the *middle staysail*, bent to a staysail stay running down from the main-topmast head to a parrel on the fore-topmast; the *upper middle staysail*, on a staysail stay made fast at the main-topgallant head and running down to the fore-topgallant crosstrees or cap; the *main-topgallant staysail*, running on the main-topgallant stay; the *main-royal staysail*, bent to a stay running down from just below the mainmast truck to the bottom of the pole of the fore topgallant-mast.

The staysail stay which serves the *mizen staysail* is made fast at the lower masthead and runs down to the mainmast a few feet above the mizen-stay (the *storm mizen staysail*, which is smaller, runs on a stay which follows the mizen-stay); the *mizen-topmast staysail* uses the mizen-topmast stay; the *mizen-topgallant staysail* is bent to a stay made fast to the pole of the mizen topgallant-mast and running down to a parrel on the main-topmast; the *mizen-royal staysail* is bent to a stay which runs down from the mizen-truck to just below the main-topgallant crosstrees.

*This can cause confusion in its appellation.

Frigate of the 2nd Rank, by François Roux.



Observations on the rigging of frigates

The rigging in the true sense of the word (standing and running rigging), followed the evolution of the sail plan, gradually becoming more complex as the number of sails increased. Nevertheless, the basic principles remained unaffected by minor details of arrangements.

Until the end of the Ancien Régime, there is relatively little to report: the abandonment in the middle of the 18th century of the heavy lifting apparatus[1] for the lower yards, replaced by simple jeer-blocks; twenty years or so earlier, the adoption of the bumpkin; and, in the 1770s, modifications to the stays of the mainmast. It would of course be possible to quote a large number of detailed changes, but that would extend beyond the scope of this book.

If the 17th and 18th centuries were relatively static, the 19th century was to see considerable innovation in the art of rigging: first of all, in 1820, the introduction of new methods of laying rope[2] made it possible with ropes of equal strength to reduce the section by 10%, with resultant weight savings in blocks.

During the 1840s: the laniards used to set up rigging began to be replaced by screws or racks[3]; chains were used for slings, bobstays, etc.; the introduction of wire rigging; new methods were adopted for bending the sails to the yards and for reefing them[4]; the abandonment of jeer-blocks for the lower yards, and likewise of pendants, etc. The list is a long one, but the photographs in the following section show many details of improvements to the rigging of frigates introduced in the post-Napoleonic period. A complete encyclopædia of rigging in the French Navy of the great age of sail has as yet never been published, and while the subject is of remarkable interest, such a project would demand a prodigious amount of research, and above all, of illustration.

1. See J. Boudriot: *le Mercure* and *la Renommée* (details on the jacket of this work).
2. Thanks to the efforts of P. Lair, an engineer in the service of the Navy.
3. Various systems were introduced, including one invented by Painchaut and improved by Huau.
4. One of which was invented by Lieutenant Béléguic.

DEVELOPMENTS BETWEEN 1820 AND 1840

The adoption of the round stern. The invention of the round stern must be credited to the English Royal Navy, and more especially to the genius of Sir Robert Seppings. This new arrangement, which is illustrated by several photographs of models in the concluding section of this book, came into general use in England in the 1820s. It was not unknown in France*, and was first employed in the frigate *La Dryade*, launched at Rochefort in 1828. This first experiment was no doubt what inspired the Minister of the Navy to instigate a competition, in February 1831, the purpose of which was described as follows: "To present the best method of internal and external arrangements and the best system of timbering for round sterns in ships and frigates, in such a manner as to reconcile the proper conditions of defence with solidity and lightness; the distribution of weight, taking into account the displacement of each part of the underwater hull; the handling of the rudder, the use of the quarter-galleries and the convenience of the apartments.

"To dispose these arrangements such that the Captain of the vessel may readily see what is happening on deck, without being obliged to appear there himself.

"To indicate the type of decoration which would be best adopted, both for the head and for the stern of the new vessels to be built. Competitors must bear in mind that no important disposition must be allowed to be sacrificed to such decoration.

"Competitors should give to the stern the same thickness as is to be found elsewhere in the vessel; they should endeavour to arrange the gunports in such a manner that on each of the decks and on the quarterdeck guns may be easily established in the stern and on the quarters as may serve in a stern chase, covering the angles which the other guns cannot reach.

"Competitors are free to place the rudder externally, or to adopt an internal rudder with a round head and a cranked main-piece, giving the reasons for their choice. They should also explain their reasons for adopting, or rejecting, either quarter-galleries, or an external stern-gallery."

In the event, only four competitors submitted proposals. A commission composed of six people (shipwrights and sea officers), after examination of the papers, decided that none of them was satisfactory, and recommended to the Minister that the deadline should be extended until 1833, in the hope of encouraging new competitors to appear; however, the proposal was in vain. Matters rested there, but it did not prevent shipwrights from building vessels with round sterns, of which some examples are illustrated later.

The two principal advantages of the round stern were that by continuing the structure of the sides of the vessel all the way round the stern, there was a continuity and equal degree of resistance to enemy fire, where previously the weak structure of the square or flat stern had made vessels extremely vulnerable to enfilading fire (see *74-G.S.*, vol. IV). The other advantage was that it considerably reduced the blind angles, since the gunports of the broadside could be extended round the quarters to the stern, and armed when required with guns moved from the broadside.

This new form of stern gave rise to a number of problems with regard to the installation of the rudder, since there was no longer a counter, and also of the quarter-galleries. However, in due course these were resolved, and by the 1830s the round stern came into widespread use in the French Navy in all classes of vessel.

In volume I of the *Annales Maritimes* for 1831, there appeared a translation of an English text** dating from 1824 and describing the comparative trials carried out in the Royal Navy between round and square sterns; a number of sketches accompanied the text, emphasising the difference in the size of the blind angles on the quarters depending on whether the stern was square or round.

*The shipwright Boucher proposed a round stern in a memorandum written in 1821, proposing a new method of timbering (see below); however, in 1821 no vessel in the French Navy had been built with a round stern.

**George Harvey: *Results of experiments relating to comparative means of defence afforded by ships of war having square and curvilineal sterns*, William Clowes, London, 1824. 12mo, 23 pp., 2 Plates.

The period from 1825 to 1845 was a particularly fertile one for new developments, such that a detailed study would be required to do it justice; however, that goes beyond the scope of this work, and I will restrict my comments to a brief presentation of the most important aspects, using to advantage the various plates of the *Atlas du Génie Maritime*.

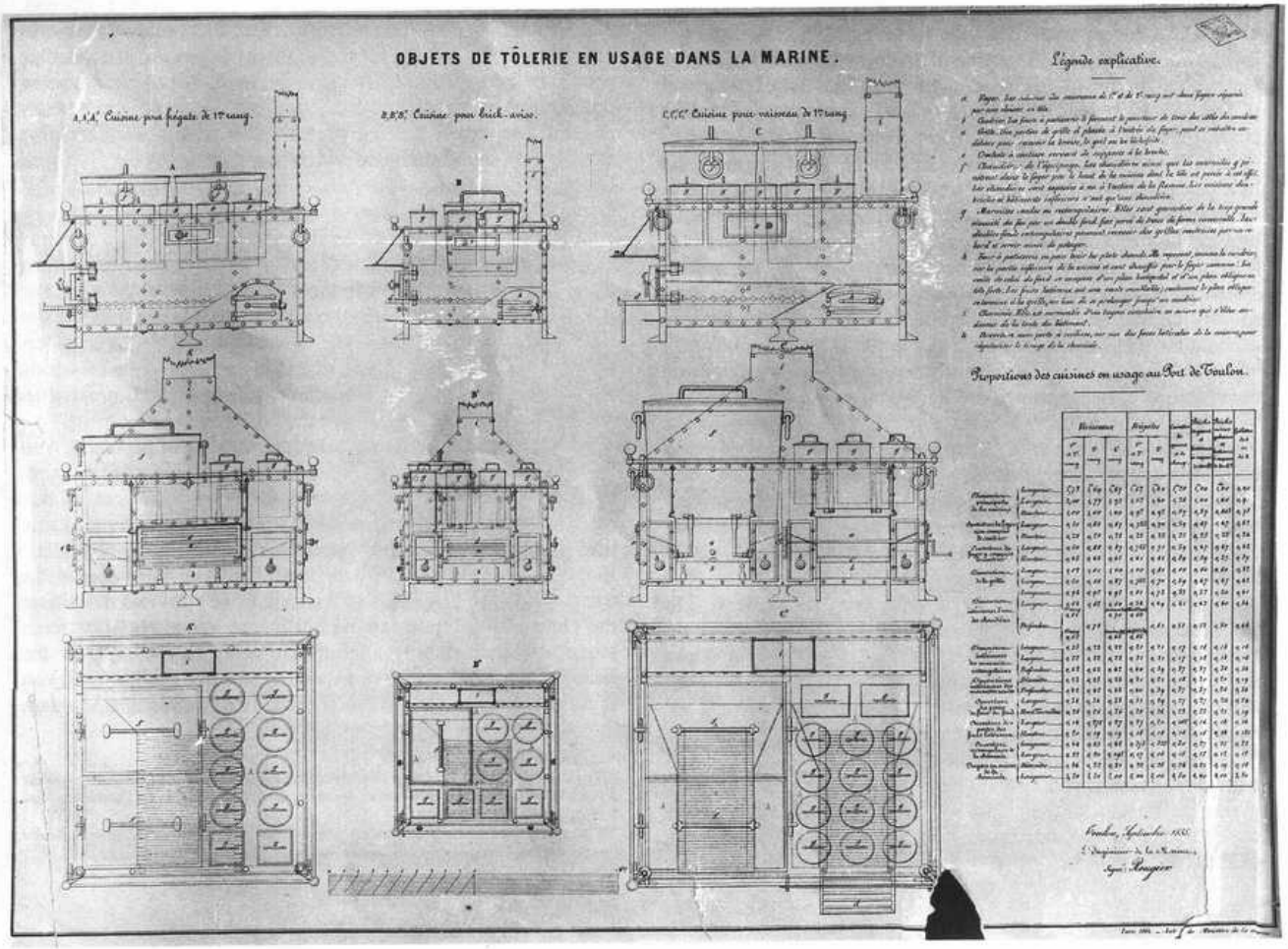
It is immediately obvious that during the last days of the sailing navy there was a rapid increase in mechanisation; the number of items made of metal increased, and the simplicity verging on rusticity of the 18th century navy gave way to the industrialisation of more and more pieces of gear, a phenomenon already apparent in the English navy in the last decades of the 18th century. The great age of sail was drawing to a close, and the modern age was dawning.

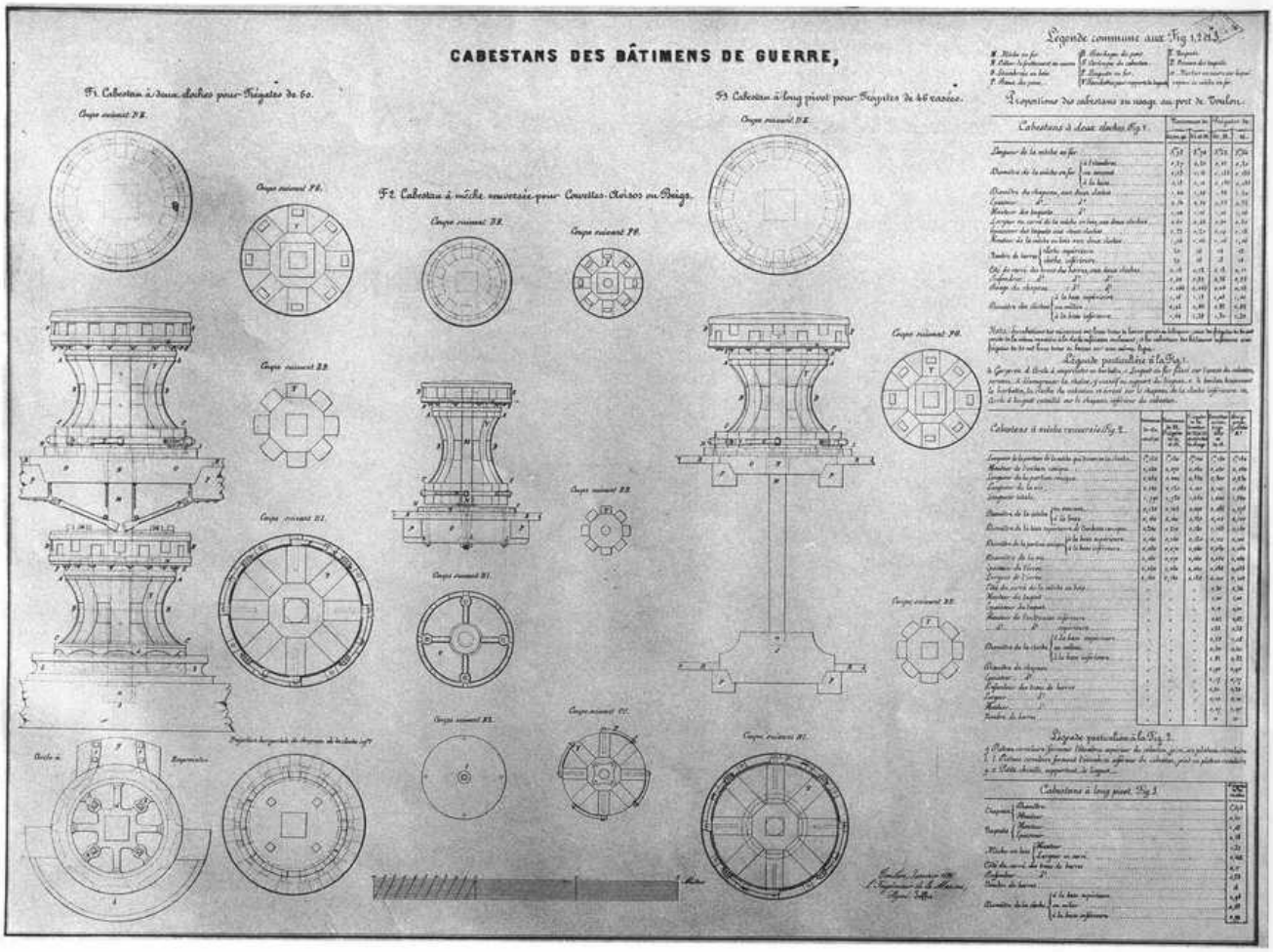
The adoption of chain-cables was to impose the introduction of new items of gear, notably the *Barbotin capstan*, named after the inventor of a sort of crown-wheel, who was a Captain in the Navy. The base of the capstan incorporated a cast-iron crown into which were moulded the shape of a series of half-links of chain, alternately flat and at right-angles to the previous link, so that the anchor chain fitted itself automatically into the crown, and as the capstan was turned it was fed directly into the chain-locker; there were two iron pawls at the fore side of the capstan, allowing the chain to be disengaged from the crown when required. This was a considerable improvement, since it allowed the abandonment of the clumsy messenger and nippers (see *74-G.S.*, vol. IV).

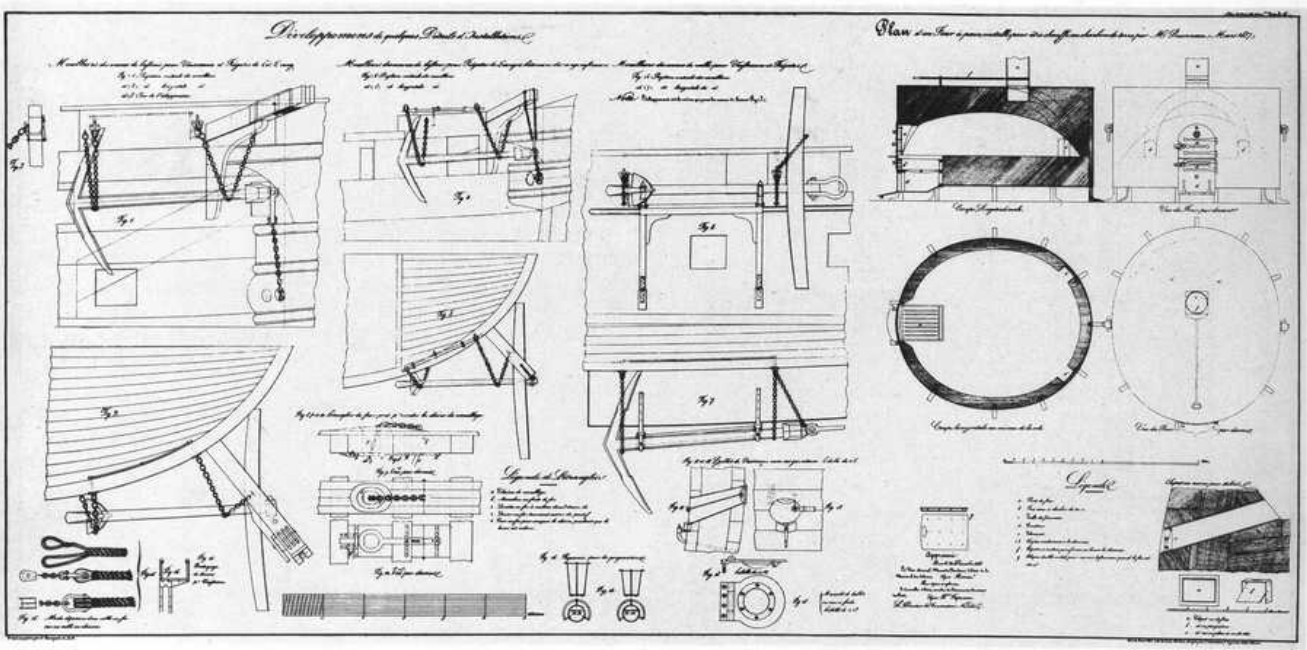
There was another set of pawls acting on the trundlehead (lower drumhead). These were *drop-pawls*; made entirely of iron, they were hinged to the deckhead beams, and engaged in an iron pawl-band let down into the head. This disposition of the pawls was an entirely English invention, having already been favourably reported on by Blaise Ollivier in 1737 (see *18th Century Shipbuilding*, Jean Boudriot Publications, 1992). With the introduction of the Barbotin capstan, the use of drop-pawls offered a tidy solution. They could not be used on the upper barrel, since there was no deckhead to hang them from*, so instead the pawls were fitted to the capstan itself, and engaged automatically in a notched pawl-rim let down into the partners. Close examination of the plate opposite, especially figure 1, shows how these new arrangements functioned.

- The use of chain-cables called for other accessories, apart from the Barbotin capstan, notably the *chain-cable controller*, designed to act immediately to prevent the cable from running out. Developed in France by Captain Béchameil, it was later improved by the engineers F.-I. Joffre and Legoff.
- While the controller prevented the chain from running out, it allowed it to be hauled in when the capstan was turned. Another invention, the *chain-cable compressor*, blocked the chain in both directions; it was fitted close to the main-hatch or to the chain-locker, while the controller was placed in the hawse. One such device is illustrated on the lower of the two plates opposite.

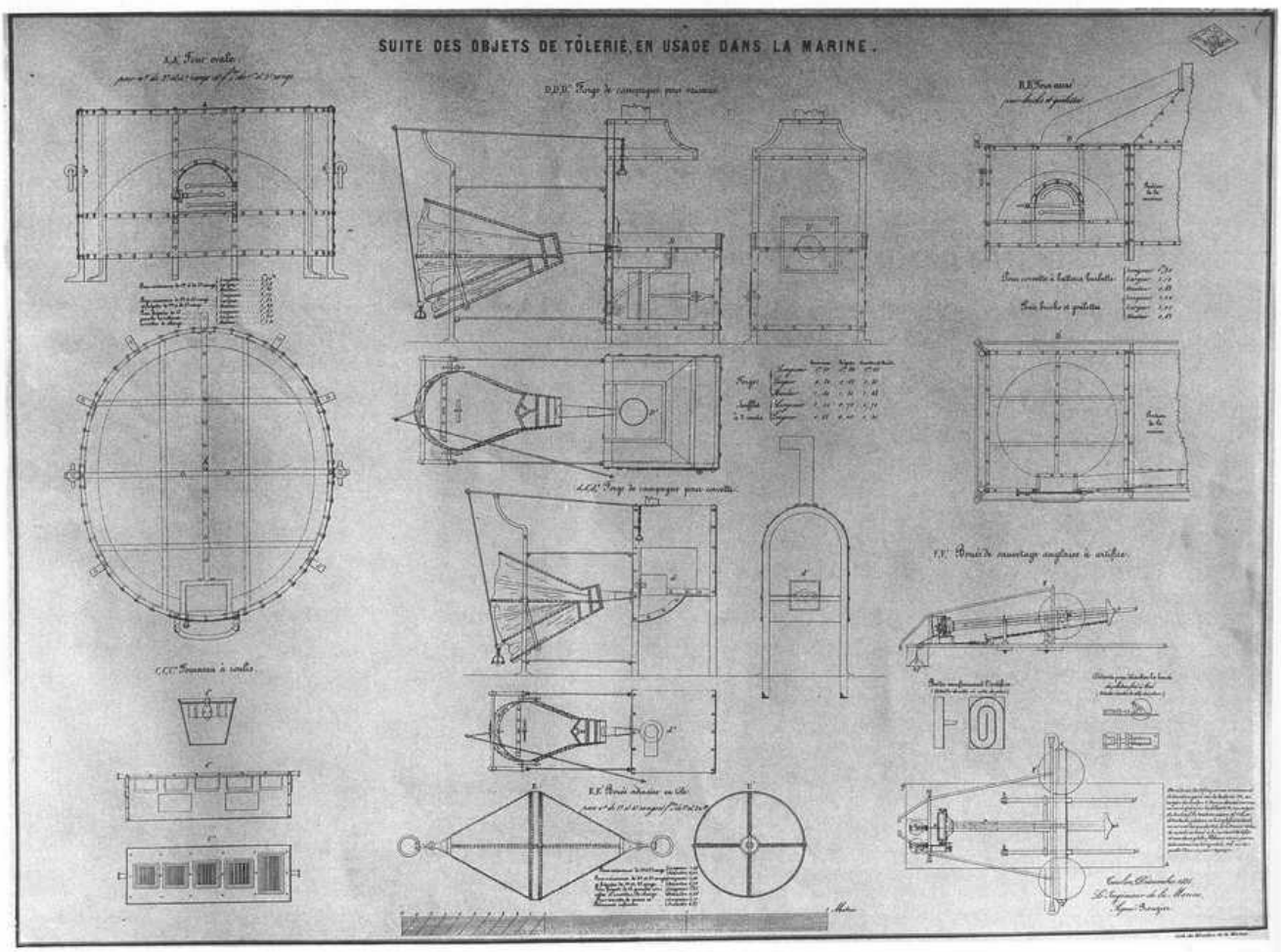
*Chain-cables were handled on the main deck, so that only the lower barrel of the main capstan was fitted with a Barbotin crown.

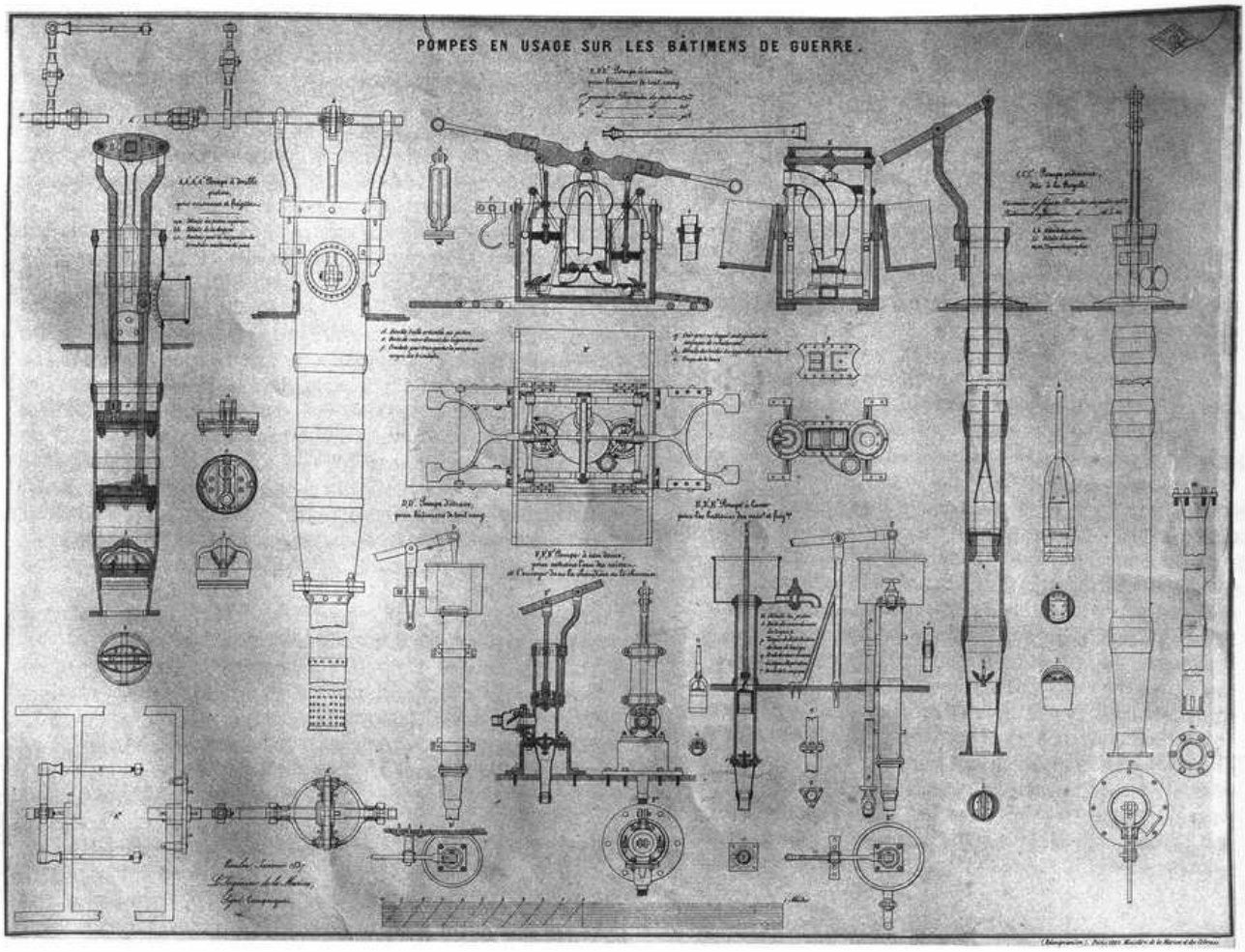



CABESTANS DES BÂTIMENS DE GUERRE,



• The stowage of the anchors and above all their release was simplified by the use of *tumblers* (simultaneous release gear), which made it unnecessary to cockbill the anchor (see *74-G.S.*, vol. IV). This was a horizontal iron bar with a sort of lug or catch at either end, into which fitted the rings of two chain-stoppers made fast to ringbolts in the ship's side. The lugs were held vertically; as soon as a lever was pushed over, allowing the bar to pivot, the lugs dropped and released the stoppers.
The use of chain-cables led to other modifications to the hawse-holes and to the bitts.
• Considerable progress was made in the storage of gunpowder, always very sensitive to deterioration from damp, through the introduction of *copper powder chests*, which replaced the earlier barrels and their outer cases (see *74-G.S.*, vol. II).
There were four sizes of chest for storing filled cartridges (their characteristics are described in J.-J. Lafay, *Aide-Mémoire d'Artillerie Navale*, 1850).
• The use of casks for stowing water was abandoned, *iron tanks* being substituted; made of sheet-iron, the tanks were varnished on the inside and painted on the outside, roughly oblong in shape and with rounded corners; their capacity varied from 1,000 to 4,000 litres; other, shortened models existed to make the most of available space.
Some vessels were provided with a *distiller* or *condenser* which burned coal, and which had an output of about 7 litres of fresh water in 12 hours per kilo of coal. One such engine was designed by P.-C. Sochet.





• The use of coal to replace firewood, both for the galley fires and the bread oven, meant that *iron hearths* could be used, examples of which are illustrated on p. 354.
Note that the iron casing was lined with bricks or refractory tiles. The new fires were designed by the engineer J.-B. Pironneau.
• The 1830s saw the introduction of *double-acting pumps**, in place of the traditional bronze-barrelled "Royal" pumps (see *74-G.S.*, vol. II). These new pumps were made entirely of iron, and consisted of two pistons one above the other, with the shaft of the lower piston passing through the upper one, both pistons being fitted with clap-valves. As one of the pistons descended, the other rose, opening the valve of the lower one at the same time; as it descended again, the lower piston rose, discharging the water above the upper one. These were continuous-action suction pumps. They were worked by horizontal levers on which the men heaved, replacing the old system of the brake and the whip; despite the improvements, the labour remained intensive and tiring.
The total number of pumps on board was increased, as the plate reproduced above shows, and note that all the pumps were now made of iron.
• Wire rigging began to make its first appearance, for the standing rigging.

*Trials had already been made in Napoleonic times.

New methods of timbering ships

(Competition of 1820)

The shortage of timber of the larger scantlings encouraged the Minister, Baron Portal, to arrange a competition in July 1820, with the following subject:

"What would be the best manner of arranging the timbers of a ship, in order to use but a very small quantity of timber of the first quality*, without prejudice however to the solidity of the structure, or to any of the qualities essential to the sailing and fighting of the ship."

The programme published on this subject demanded:

1° That the arrangement of the timbers be sufficiently simple not to complicate the draughting process;

2° That it must be possible to carry out repairs very quickly in order to save the ship, should any damage place it in danger of being lost;

3° That the interior of the hold and of the between decks should not be in any way obstructed in such a way as to complicate the installation of internal bulkheads or the fitting of gear;

4° that the total weight of the timbers should not exceed an amount proportionate to the volume of the underwater hull;

5° Finally, that major repairs might be carried out without risk that the replacement of parts damaged by rot would result in the sacrifice of too great a quantity of sound timbers.

Eleven memoranda were submitted, and judged by a special panel composed of flag officers or senior sea officers and shipwrights. The prize was awarded to the shipwright M. Boucher, whose system was tried out on the 60-gun frigate *La Surveillante*, which was also designed by him. Launched at the end of July 1825, she was immediately fitted out for a series of long commissions overseas. Paid off in October 1830, the *Surveillante* was carefully examined at Brest by a commission appointed for the purpose by the Minister. It was unanimously concluded that conditions 1, 3 and 4 of the programme had been fulfilled, and that there was insufficient evidence to pass judgement on the second and fifth conditions. More importantly, it was ascertained that after five years at sea the frigate had hogged no more than 10 centimetres, a significant testimony to Boucher's design.

The text below briefly summarises the key elements of his system, which, it must be admitted, owed much to the ideas developed by Sir Robert Seppings in England, with the principle of diagonal bracing to which reference has already been made in the context of Gobert's system of diagonal planking of the hold in the 1720s.

"Keel, stem and post all in three strakes; reduction of the scantling of the timbering of the bottom below the lower deck; fillings effected with short lengths of timber joined end-to-end; floors made in two layers one on top of the other; horizontal planking of the hold replaced with diagonal planking; increase in the number of pillars in the hold, and the addition of diagonal braces; replacement of the riders with five solid bulkheads; beams made of five timbers in the central part of the ship and in the lower deck only; all hooked scarphs replaced by coaked scarphs; grown timber knees replaced by iron knees; external planking of the upper works worked diagonally between the ports; hull sheathed to allow the use of iron bolts almost throughout."

These lines are taken from the *Annales Maritimes*, which is a fascinating source of information on the post-Napoleonic navy. Readers are directed in particular to the volumes for 1820, 1822 and 1832.

*See *74-G.S.*, vol. I.

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* *

COLLECTION OF PHOTOGRAPHS OF FRIGATE MODELS

In the collections of the *Musée de la Marine* there are a number of models of frigates, a list of which is given below; examination of the close-up photographs which follow reveals many improvements and modifications introduced into the French Navy in the first half of the 19th century.

The absence of any frigate models from pre-Revolutionary times in the collections of the museum has obliged us to limit these examples to the first four decades of the 19th century, which was however a particularly fertile period of technological innovation, following the fall of the Empire. The large number of photographs which conclude this chapter thus furnish an excellent illustration of the new techniques and new inventions of the period.

Models of frigates (Musée de la Marine)

La Sultane	1764-65	13 MG 29	rigged model
La Flore	1768	13 MG 11	rigged model
La Dédaigneuse	1766	13 MG 23	rigged model
L'Égyptienne	1799-1801	15 MG 2	hull model
L'Égyptienne	1799-1801	17 MG 34	rigged model
18-pdr Frigate	1800	17 MG 11	rigged model
La Flore	1804-1806	17 MG 9	rigged model
La Renommée	1806	17 MG 8	rigged model
18-pdr Frigate	1805	17 MG 10	rigged model
La Louise (never built)	1820	21 MG 20	rigged model
La Vestale	1820-1822	21 MG 18	hull model
La Didon	1822-1828	27 CN 29	hull model
La Terpsichore	1824-1827	21 MG 15	rigged model
Frigate of the 2nd Rank	1825-1830	27 CN 65	hull model
La Surveillante	1825-1844	21 MG 14	rigged model
Frigate (never built)	1825	21 MG 17	rigged model
La Poursuivante	1827-1844	27 CN 32	hull model
La Poursuivante	1827-1844	18 MG 6	hull model (lower masts)
La Belle-Poule	1828-1834	21 MG 16	rigged model
L'Alceste	1829-1846	21 MG 19	rigged model
La Charte	1830-1842	19 MG 8	hull model

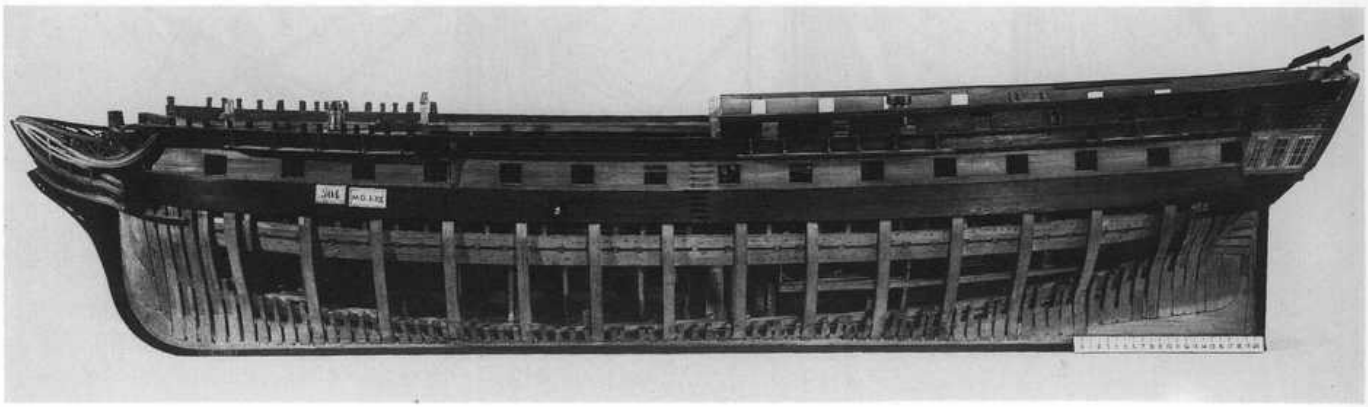
In addition to these models, there are three others (refs. 21 MG 21-22-23) of no archaeological interest and of crude execution.
The frigate *La Sultane*, which is a large-scale model, has been extensively modified.
The model which is said to represent the *Dédaigneuse* has been extensively "restored", and is moreover lacking its guns, boats, spare spars, etc.
The model which is said to represent the *Flore* of 1768, while a most attractive object, bears little resemblance to frigates of the period.

From the full list of frigates given in the opposite column, we have elected to examine in particular the following. The numbers in the last column are those of the close-up photographs reproduced in the final part of the chapter.

1825-30	**Frigate, 2nd Rank**	27 CN 65	2, 8
1827-44	***Poursuivante***	27 CN 32	1
		19 MG 6	12, 16, 36, 41, 55
1830-42	***Charte***	19 MG 8	3-6, 37
1847	***Vincent****	25 CN 20	7
1800	**18-pdr Frigate**	17 MG 11	9, 22-4, 32, 34, 41b, 44, 58-9, 64-7
1829-46	***Alceste***	21 MG 19	10, 13, 15, 31, 38, 48, 52, 57, 61-3
1828-34	***Belle-Poule***	21 MG 16	11, 14, 18, 26-30, 39-40, 47, 49-51, 53, 56
1804-06	***Flore***	17 MG 9	17, 19, 20-21, 25, 33, 35, 42-3, 45, 54, 60

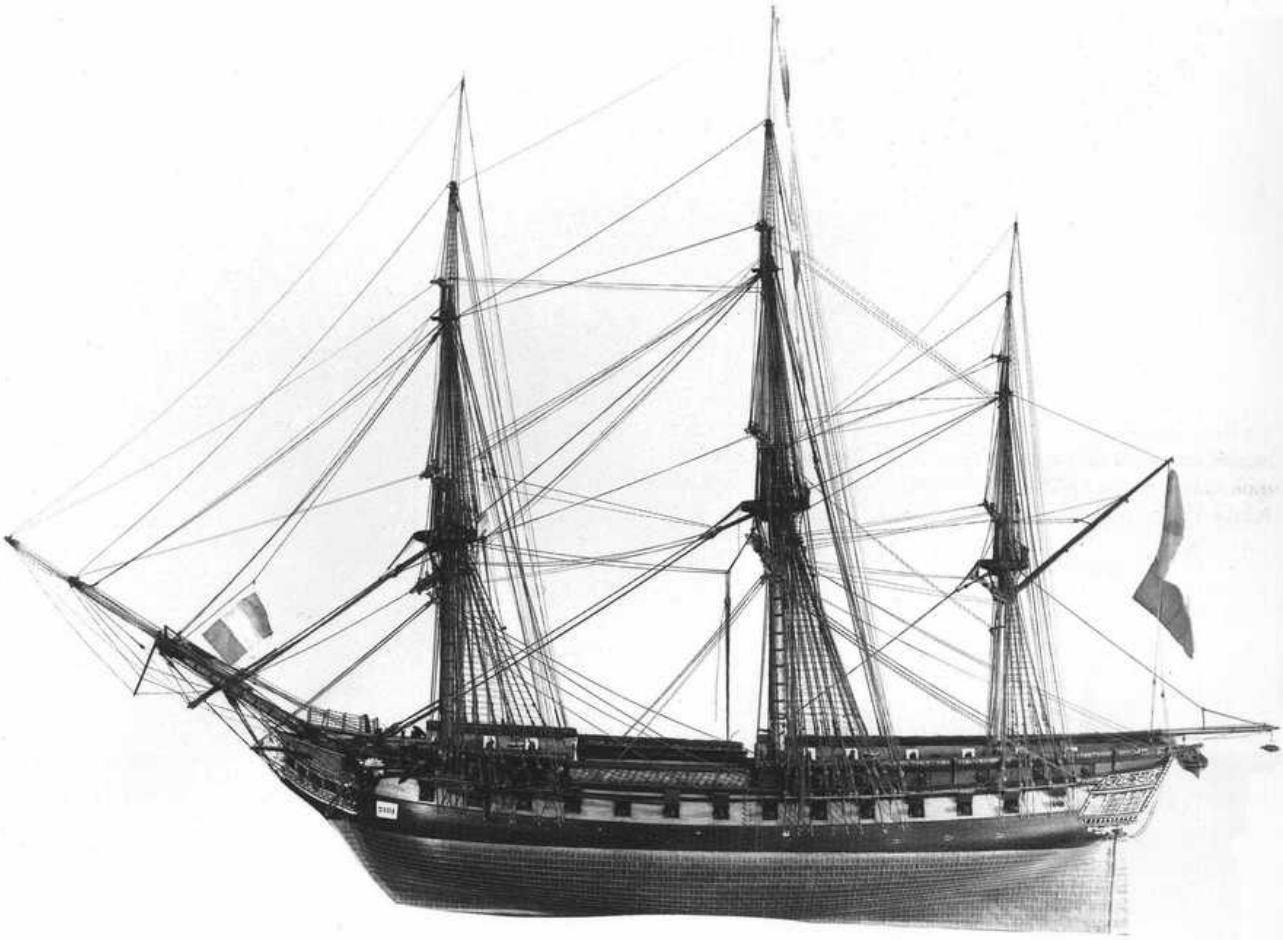
*The *Vincent* is a converted ship of the line, not a frigate.

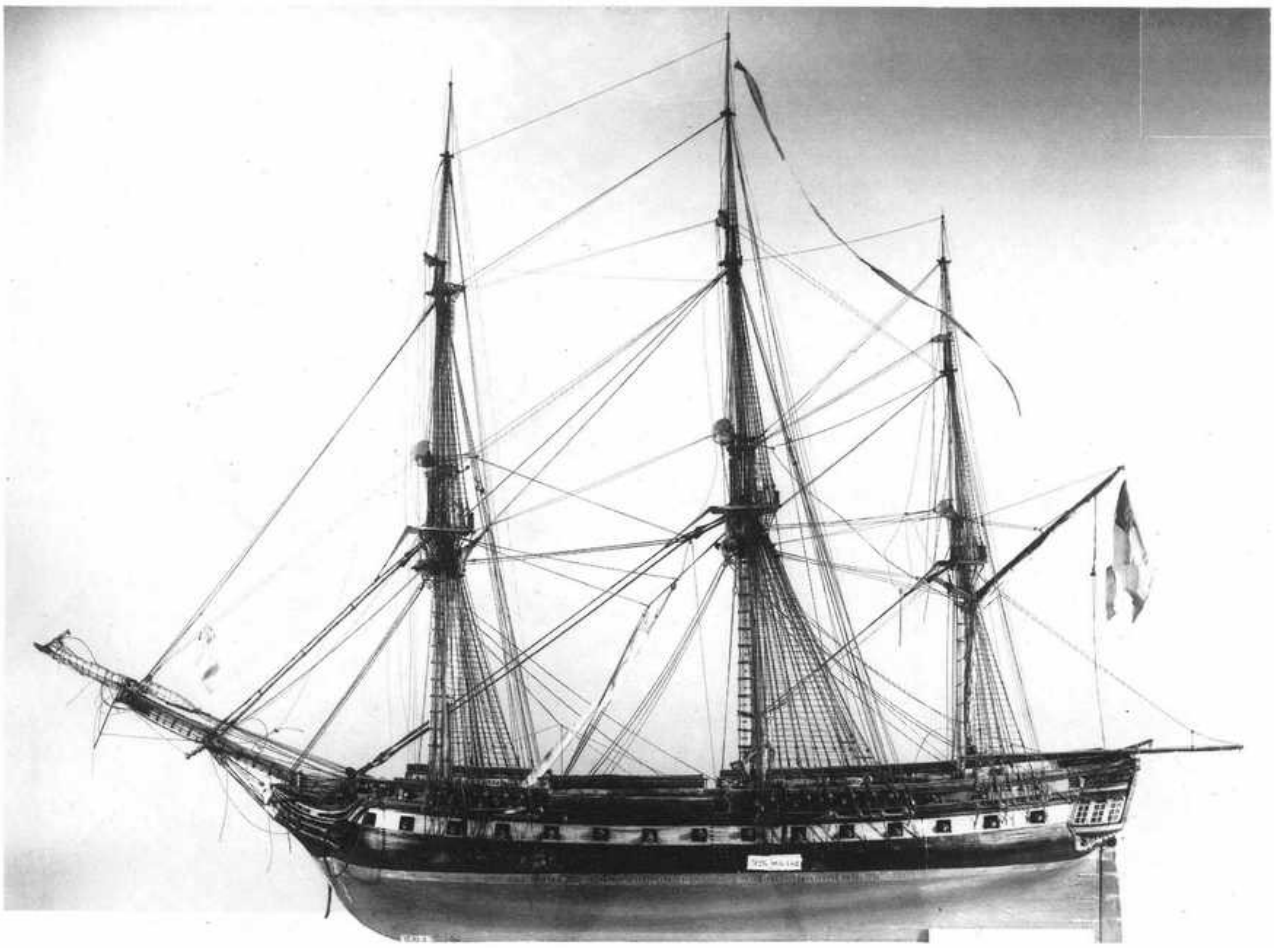
L'Égyptienne 1799. This model provides clear evidence of the elegance of the hull lines, the decoration of the upper works and the internal arrangements. This hull model (Ref. 15 MG 2) is complemented by another, fully-rigged model which is however less well built. Note that the starboard davit at the stern has been damaged, and the port davit has disappeared.



Model of an 18-pdr frigate. This anonymous model may be approximately dated to the beginning of the 19th century, since there are no carronade ports or emplacements. (Cat. ref. 17 MG 11.)

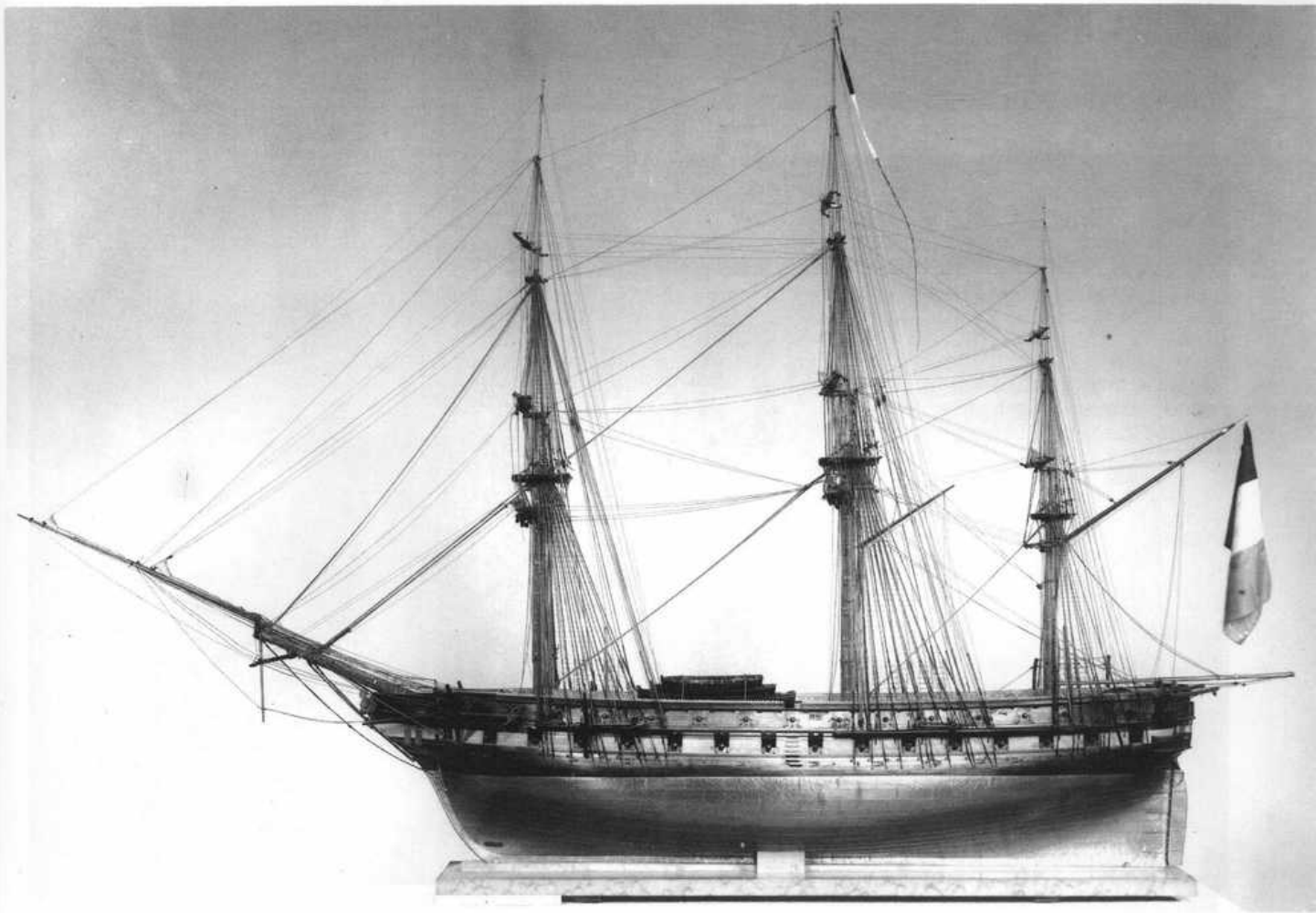
La Flore 1804. This model is built in a style of which we have other examples dating from the end of the Ancien Régime, notably that of the *Océan* (*États de Bourgogne*). It is built with meticulous attention to detail, and even includes a representation of a lightning conductor. (Cat. ref. 17 MG 9.)





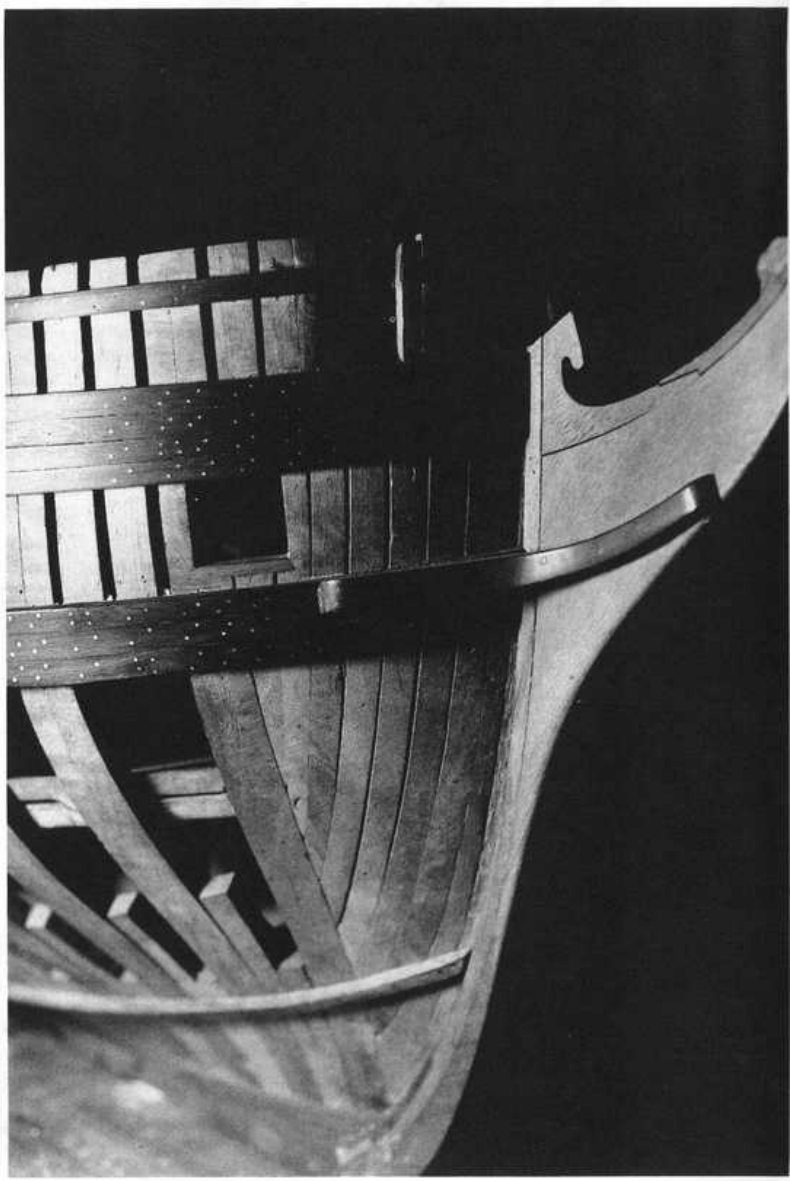
La Renommée 1806. Although less well built than the previous model, this nevertheless provides an attractive complement to it with its furled sails and a rare representation of a ventilator. (Cat. ref. 17 MG 8.)

L'Alceste 1829. There are a large number of close-up views of this model later, which indicate that it was made not when the frigate was laid down but rather when it was launched in 1846. (Cat. ref. 21 MG 19.)

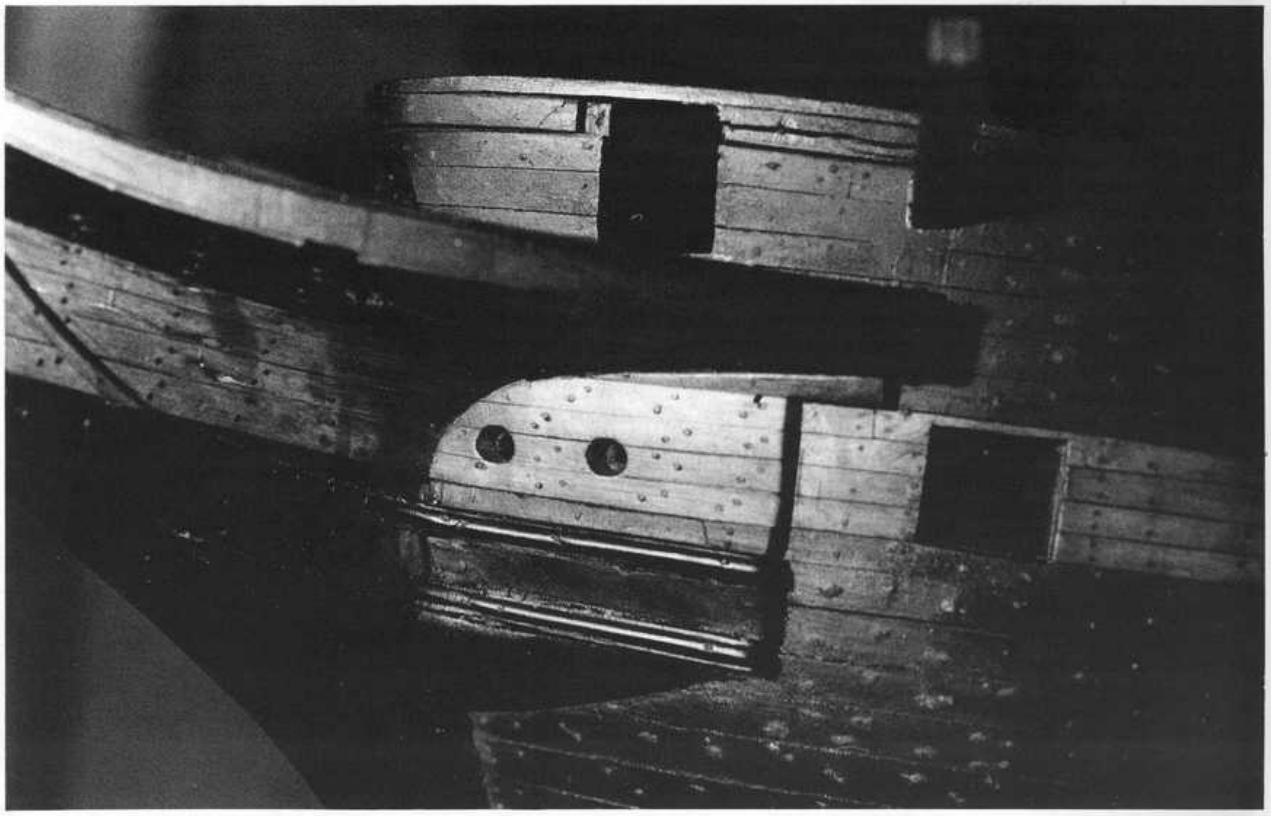


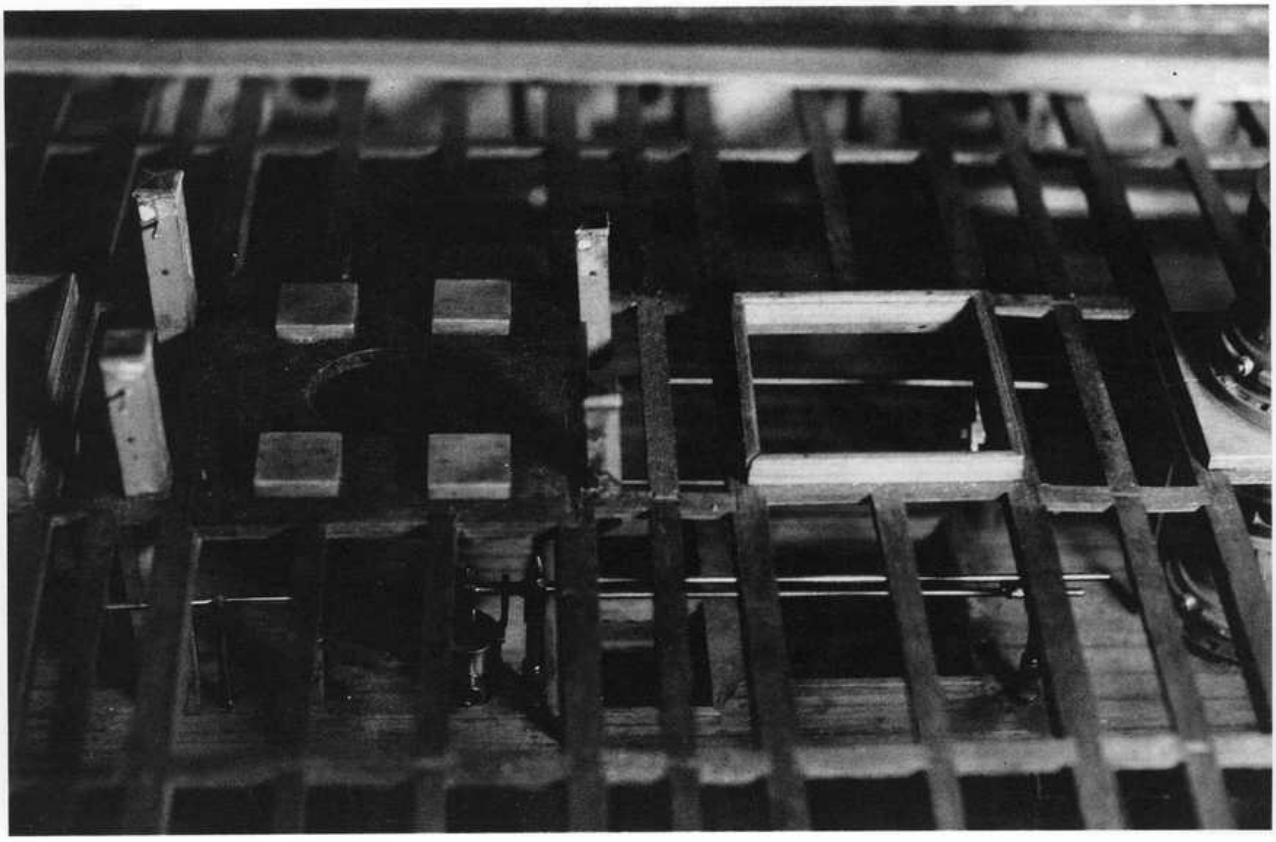
2. (*Unnamed frigate of the 2nd Rank, ca 1835*). Example of the cladding or berthing up of the head, covering the rails and the head-timbers. The hawse-bolsters have been replaced by an extra thick lining.

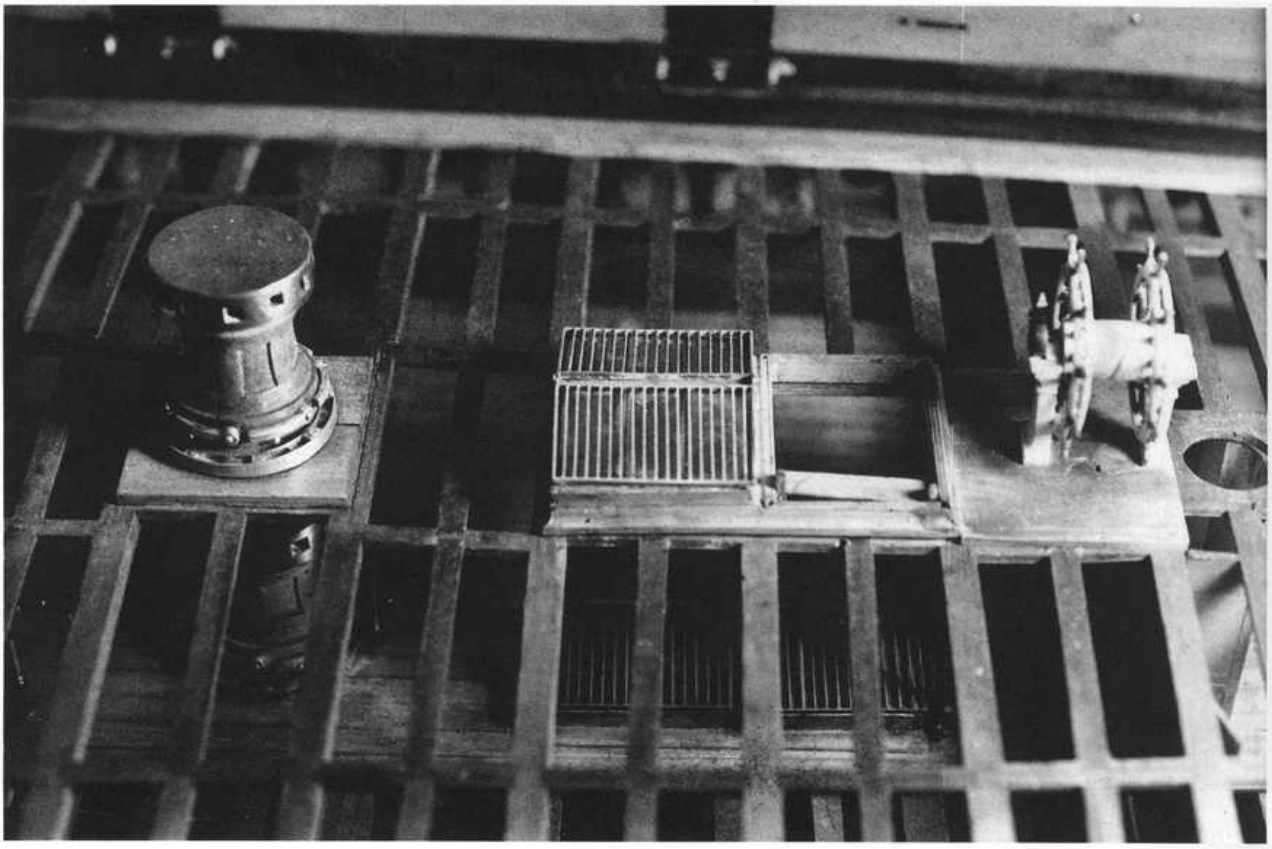
3. (*La Charte*). The grating of the head has been replaced by light planks covered in lead. A coaming surrounds the holes for the gammoning. Two lead basins serve shipboard needs (washing, steeping, etc.). The latrines are closed, but still placed in the corners of the head, where they are shielded by a full breastwork, while a scuttle in two parts allows for easier handling of the anchors or for other items of rigging.
In the middle of the small topgallant forecastle can be seen a number of "double-decker" fowl-coops.



1. (*La Poursuivante*). Note in this photograph the arrangement of the hawse-pieces which are laid essentially parallel to the longitudinal axis of the frigate; this arrangement became common in the 19th century: previously they had radiated outwards.
Examine also the gammoning knee and its ekeing piece, the bowchase port, and the lower cheek of the head which clearly serves to support the bumpkin. Visible at the bottom of the photograph is the slight broadening of the gripe.



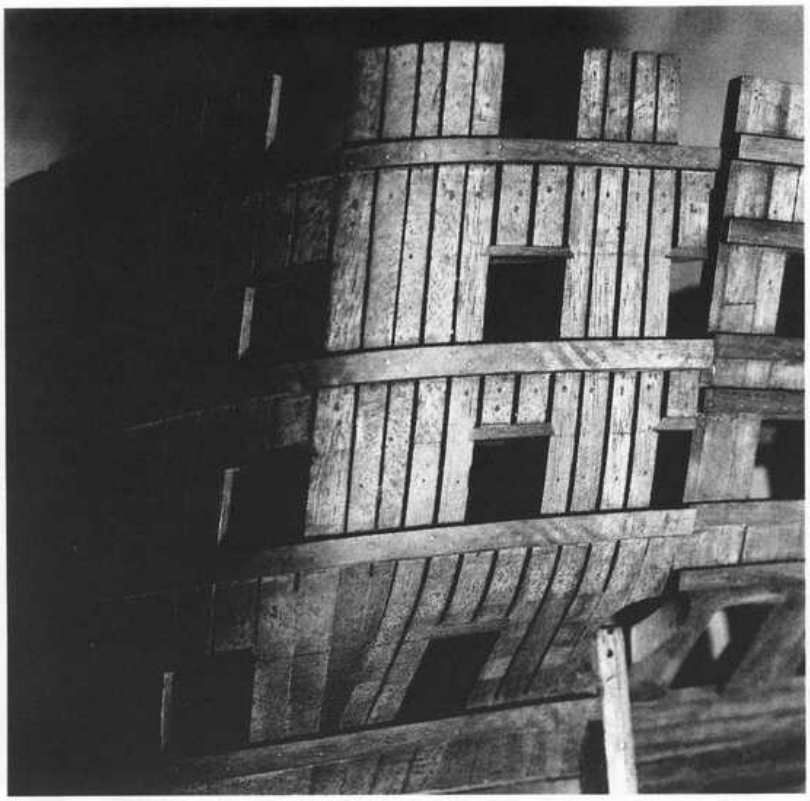




4. (*La Charte*). Following on from the previous photograph, this view of the forward part of the spar-deck shows the riding bitts on the main deck below, which are equipped for the handling of chain-cable (see J. Boudriot, *La Créole* for details). A short distance forward of the bitts are the galley stoves, while the foremast partners are between the bitt-standards. At spar-deck (forecastle) level can be seen the pins of the fore topsail-sheet bitts; the cross-piece has been replaced by iron pins; beyond the bitts can be seen the foremast partners again, the fore jeer capstan of conventional construction, and the chimneys of the galley stoves.

5. (*La Charte*). The main interest of this photograph is to illustrate the installation of the pumps on the main deck. These are of the double-acting type, operated by half a dozen or so men heaving on the long levers, replacing the earlier brake. Also visible are the hatchways of the double ladderway for the crew and the after hold.
On the upper level can be seen the edge of the main-hatch, the pins of the main topsail-sheet bitts, the mainmast partners and the small scuttles for installing the pumps, the stanchions for the pin-rail and the coaming of the after hatch.

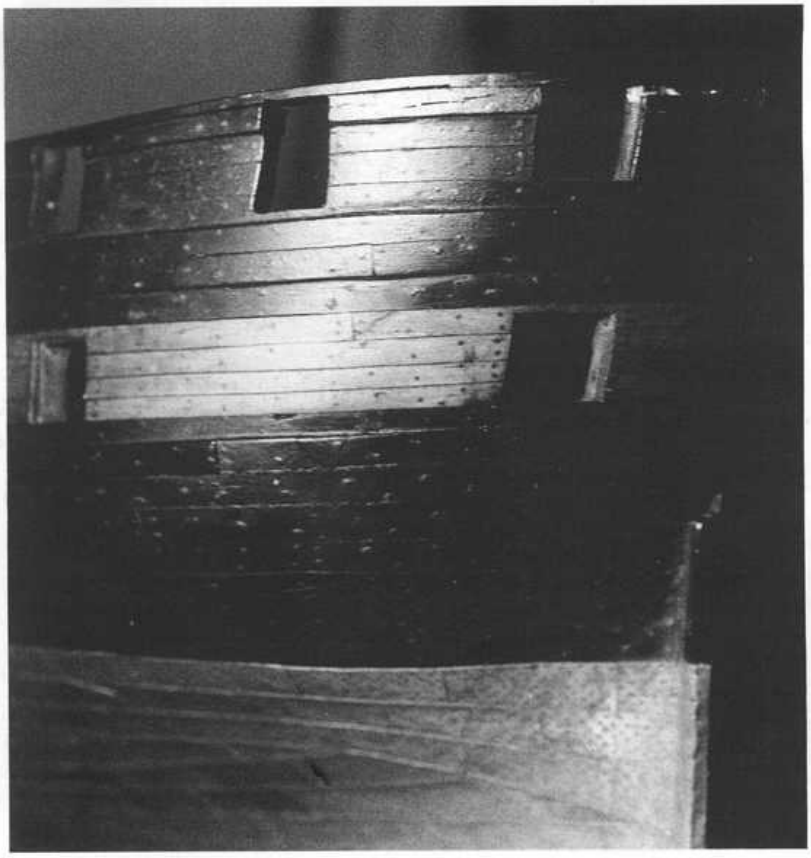
6. (*La Charte*). At the level of the main deck can be seen the lower barrel of the main capstan, on which can be seen the Barbotin crown for the chain-cables. Just abaft it can be seen the lower skylight providing indirect light to the wardroom on the berth deck.
On the spar deck is the upper barrel of the main capstan, with the pawls and pawl-rim clearly visible; there is no Barbotin system at this level, since the anchor-chains are handled on the main deck. The upper skylight (damaged), and the double wheel forward of the mizen-mast partners.



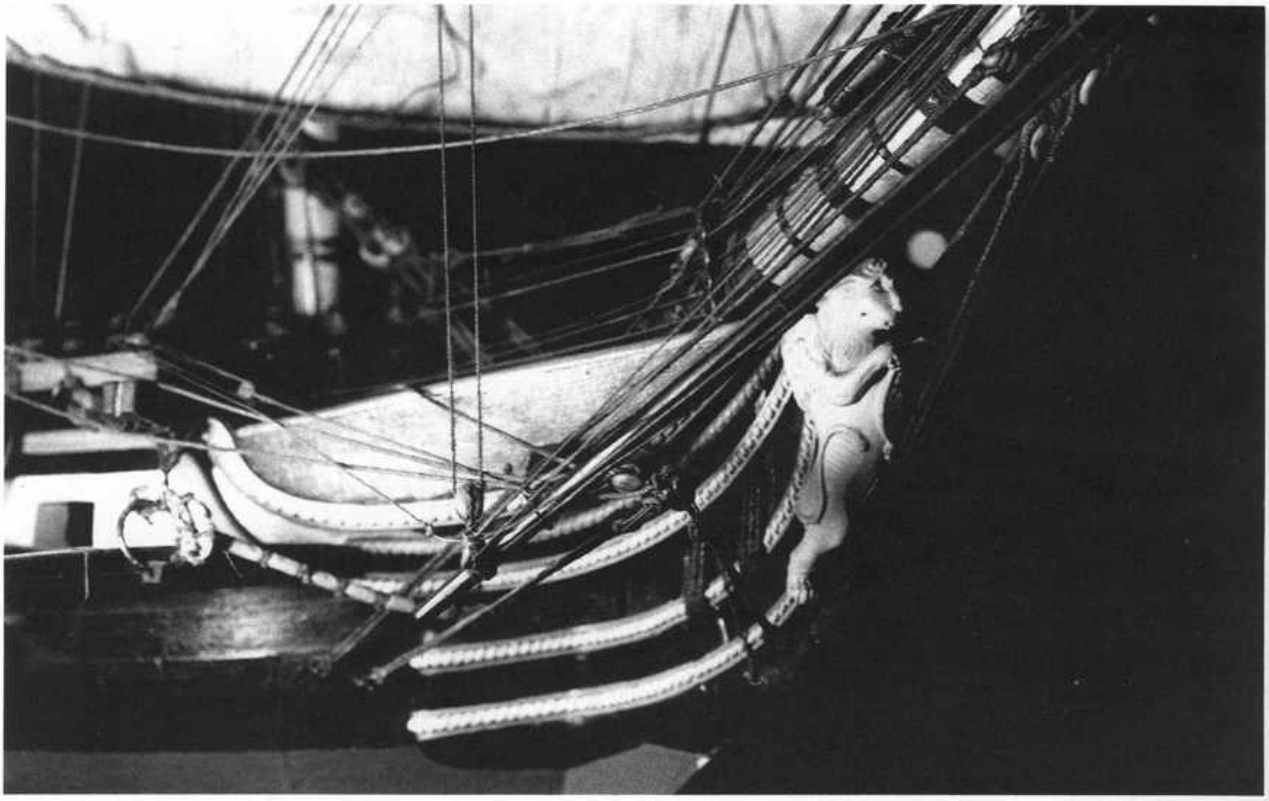
7. (*Le Vincent, circa 1835*). In the absence of a suitable model of a frigate, we have taken the liberty of illustrating here a model of a ship of the line, which clearly shows the principle of the timbering of the round stern, ensuring that this part of the structure is as solid as the broadside.

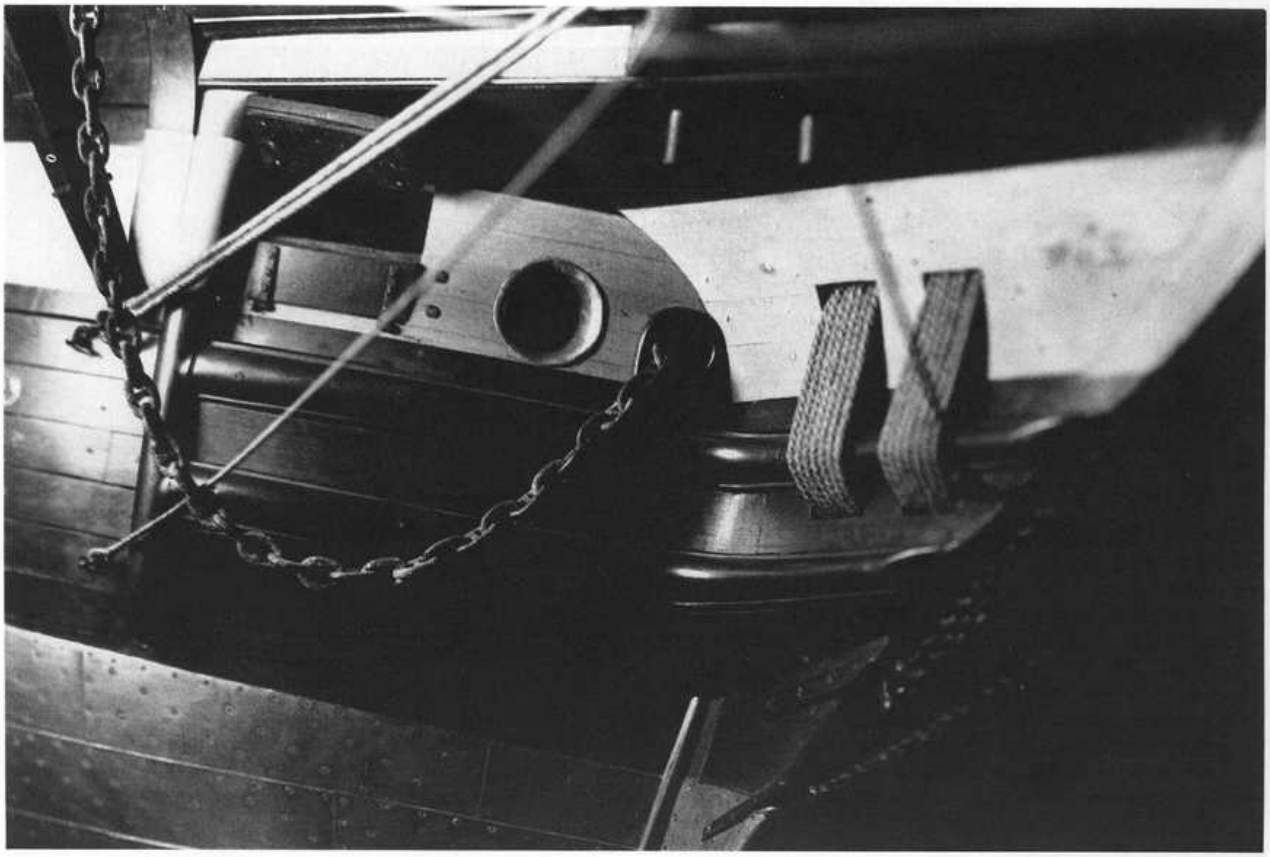
9. (*18-pdr frigate, early 19th century*). This view of the head shows the upper rail finishing afore the cathead, with the cathead supporter running more or less parallel to it. Looking carefully, it is possible to make out the puddening of the cable which has been wrapped round with old sailcloth held on by lashings of twine.

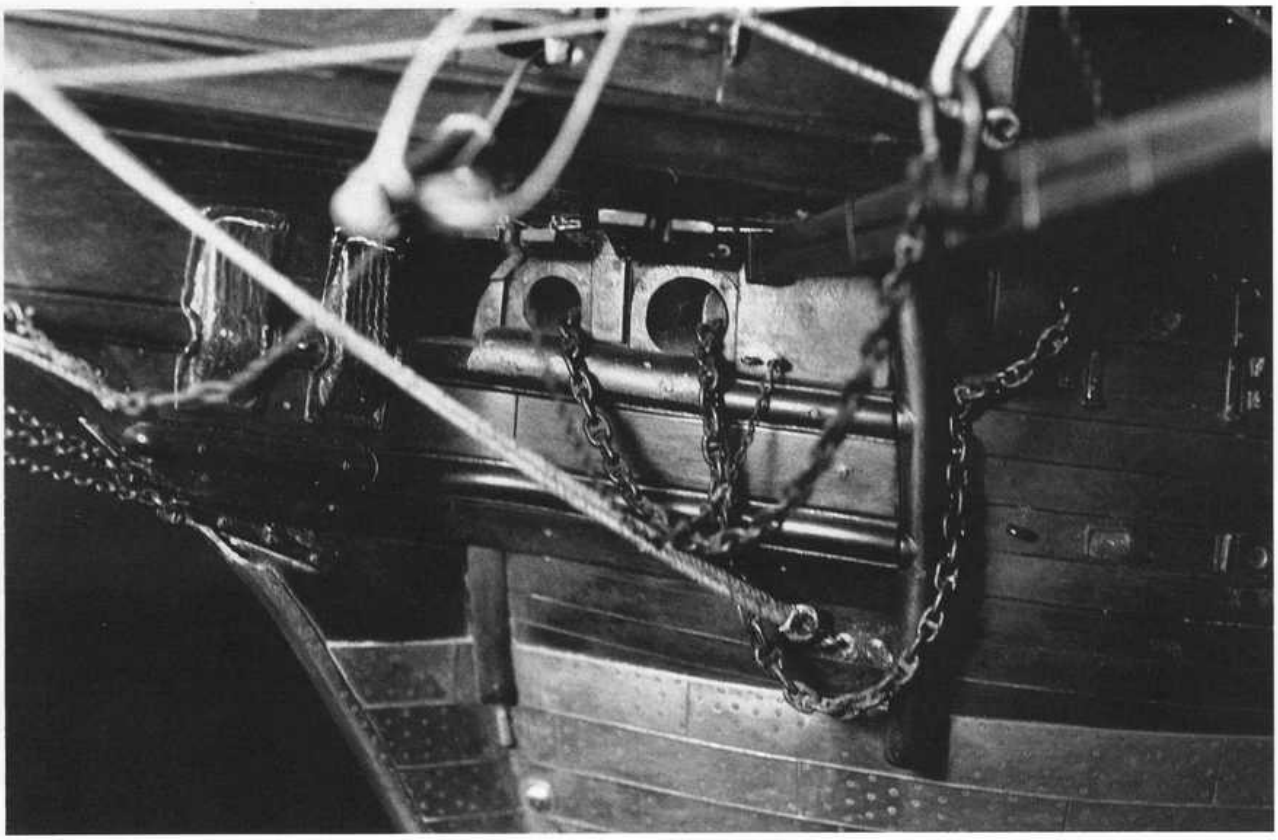
8. (*Unnamed frigate of the 2nd Rank, ca 1835*). Round stern. Note the unbroken sweep of the curves, the disappearance of the wing transom, and the ability of the vessel to defend herself from the stern when required, by moving guns round from the broadside (these stern-chase ports were only armed when needed).

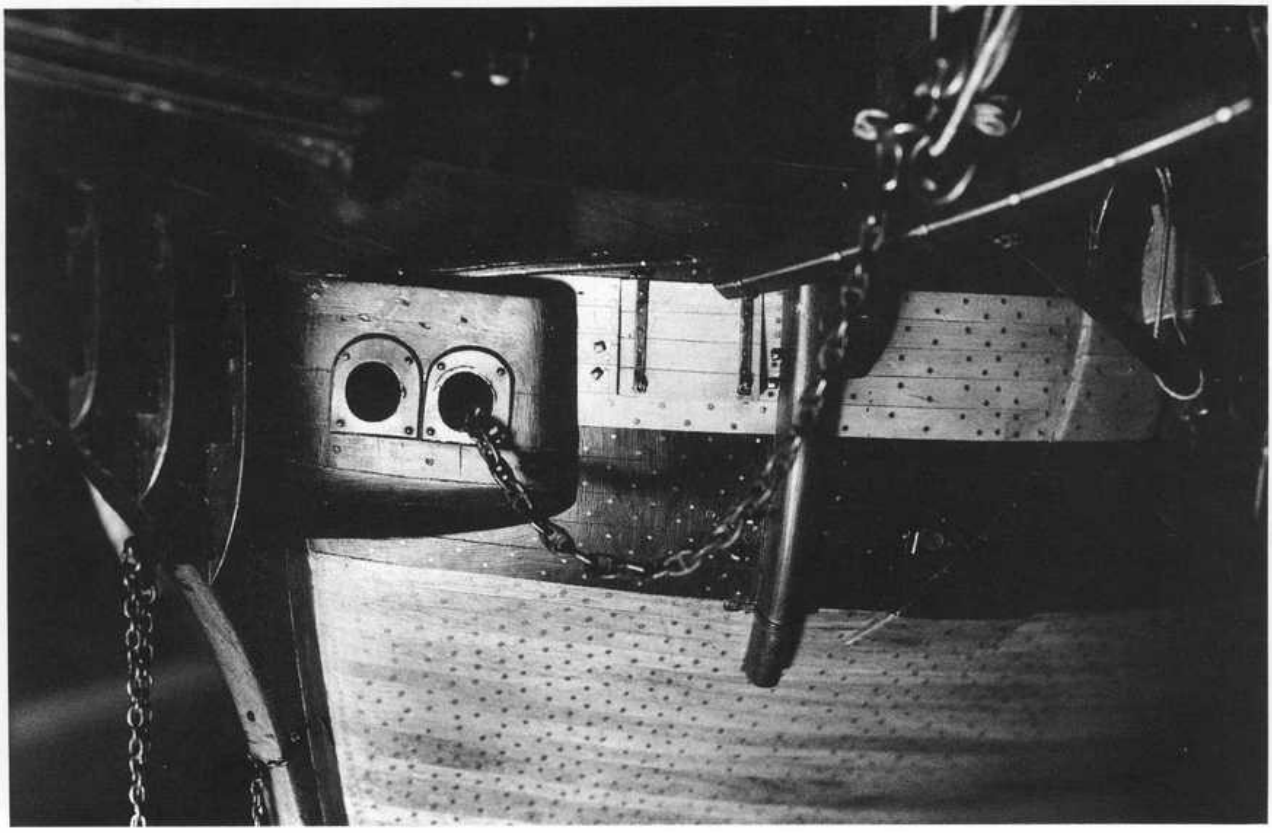


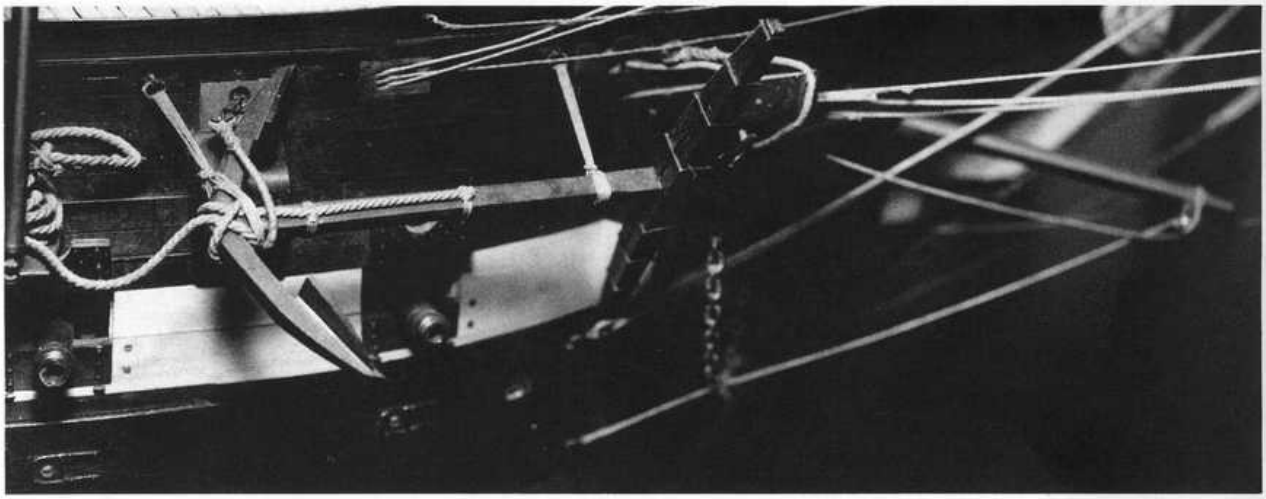
10. (*L'Alceste*). This close-up view of the berthed up head is full of interesting detail: the gammoning, the chains and stirrups of the bobstays, the waste-pipe of the head-pump, the inner hawsehole and cast-iron hawse-pipe for the chain-cable, the outer hawsehole lined with lead for the hemp cables, the split lid of the port-light of the sick-bay, and the soil-pipe of the starboard heads. A heavy half-round moulding takes the place of the hawse-bolsters. At the forward end of the cheeks of the head can be seen small cleats.









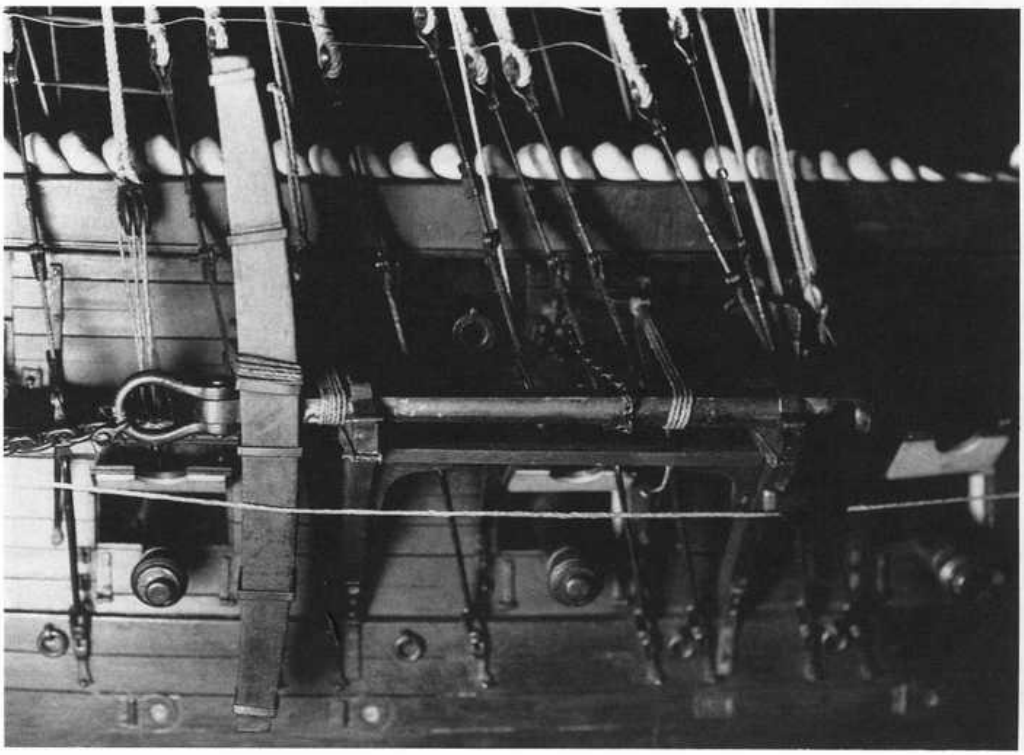


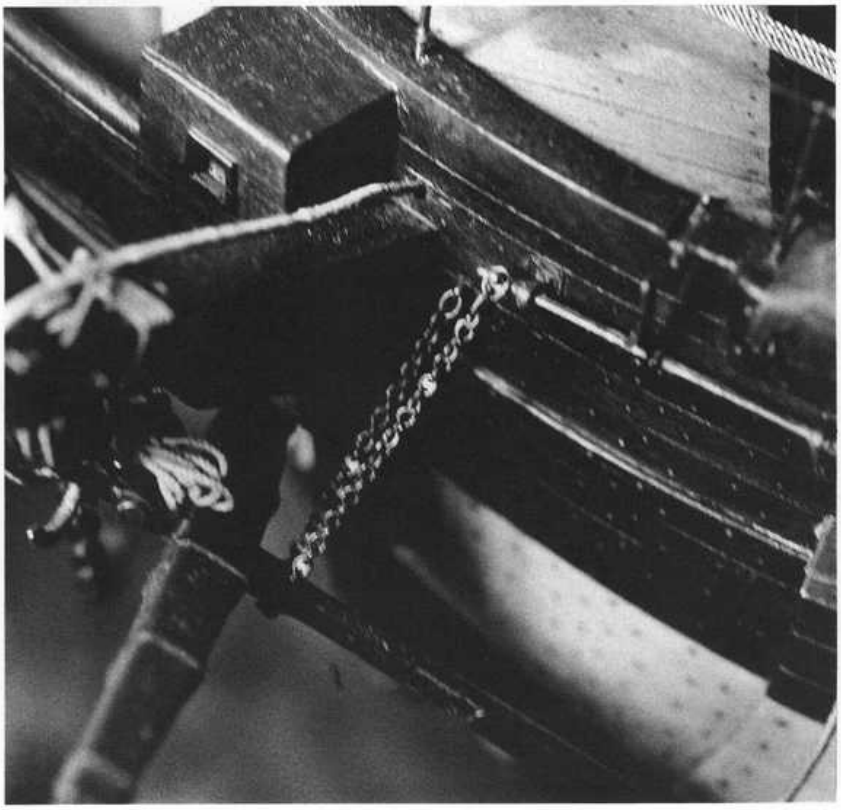
11. (*La Belle-Poule*). More or less the same items can be seen in this view as in the previous photograph, apart from the fact that both hawseholes are lined for chain-cables; they have small lids with a cut-away for the chains. The inner hawsehole for the port bower anchor seems to be of smaller diameter than the outer one, for the sheet anchor. Note the small glazed portholes and the lining designed to protect the outlet-pipe of the head-pump (in the angle of the stem).

12. (*La Poursuivante*). A variant on the details shown in the two previous pictures: the cheeks of the head are no longer separate, but merge into a solid in the angle formed by the bow and the stem, which has markedly less projection. The hawseholes are pierced in the middle of this solid structure. A crescent-shaped anchor-lining prevents damage to the planking of the hull.

13. (*L'Alceste*). Stowage of the bower anchor. Note the bracket supporting the fluke and the small hole above in which can be seen the chain extending the buoy-rope. The anchor is secured by two lashings.

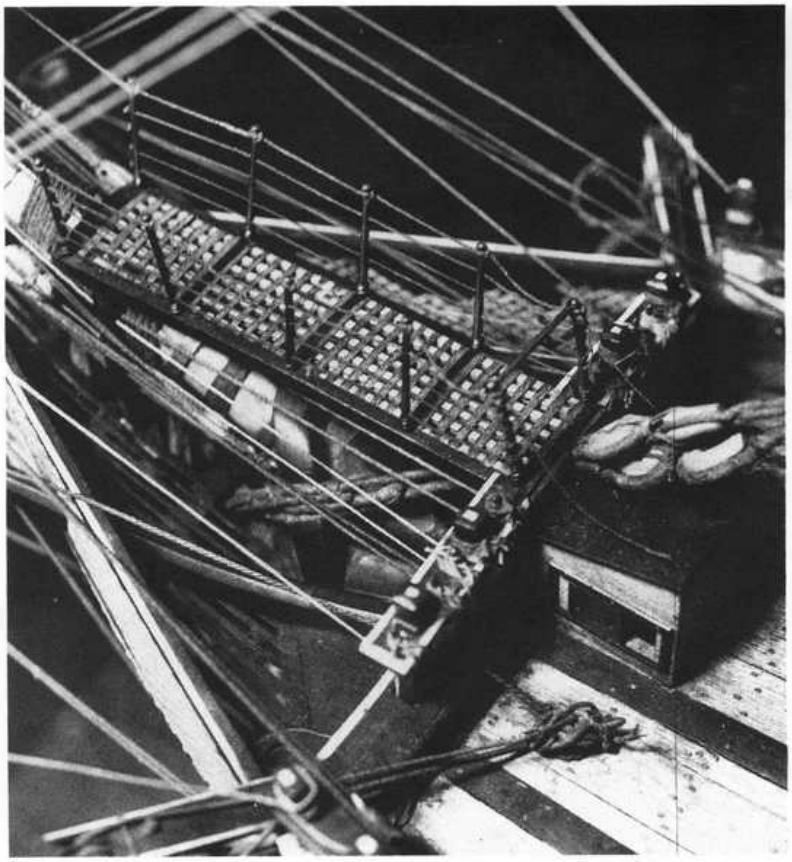
14. (*La Belle-Poule*). Stowage of the sheet anchor abaft the fore-channels. Two hinged brackets joined by a stool support the anchor, which is held in place by two hinged clamps and two lashings. Also visible is the chain-stopper of the tumbler (simultaneous release gear). In the background can be seen a 30-pdr shell-gun, recognisable by its aim frontlet.





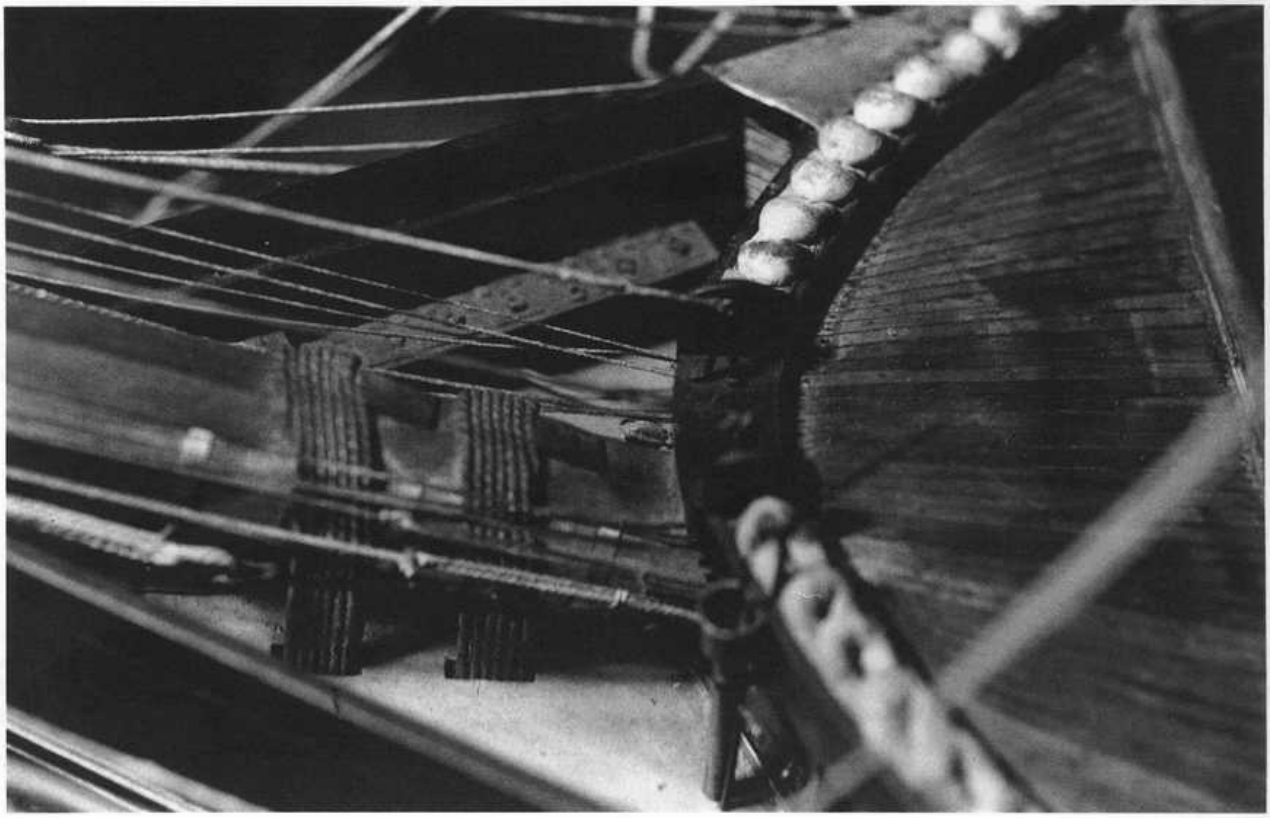
15. (*L'Alceste*). Stowage of the sheet anchor abaft the fore-channels. The shank is secured by two lashings, and the anchor is supported by two dagger brackets.

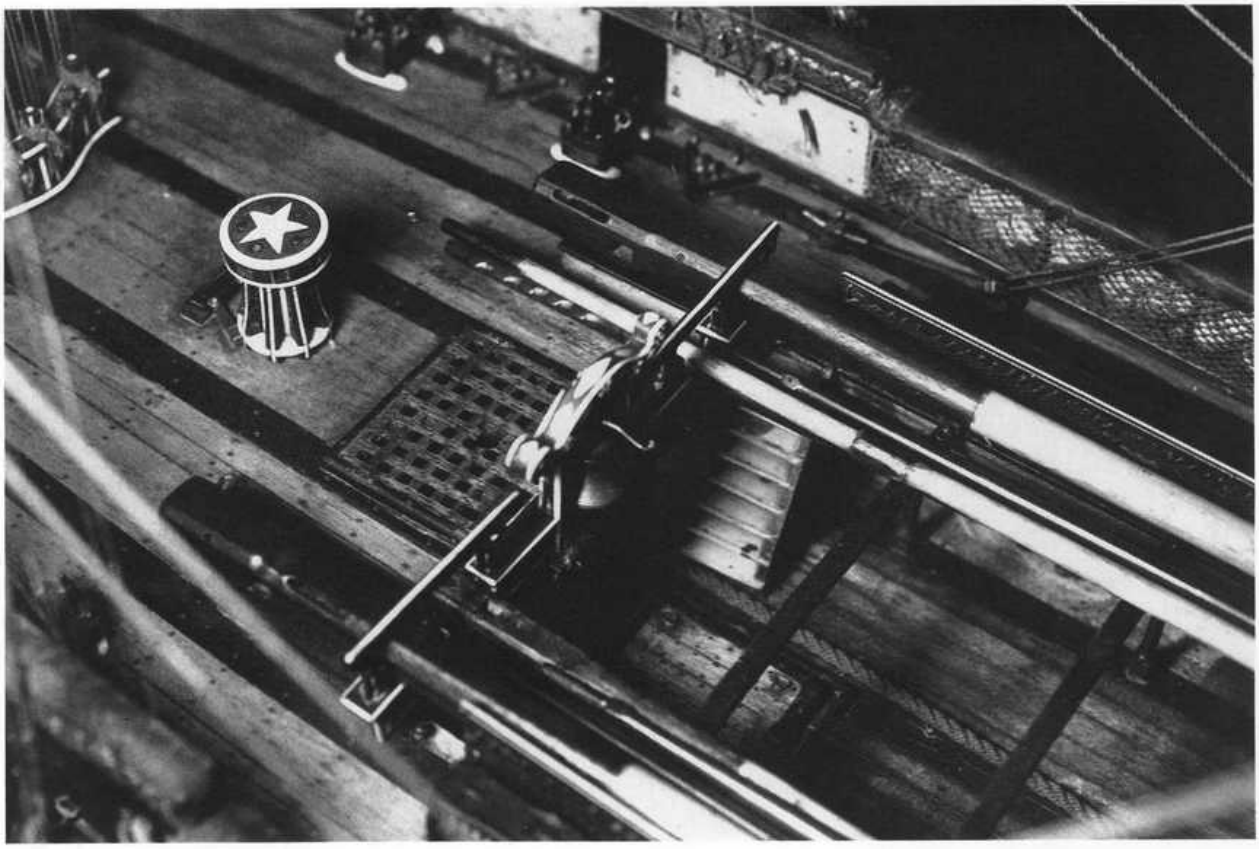
16. (*La Poursuivante*). Simultaneous release mechanism as described above for letting go the anchors. Just forward of the cathead can be seen the port latrine, while to the right of the photograph the crescent-shaped anchor lining is visible.

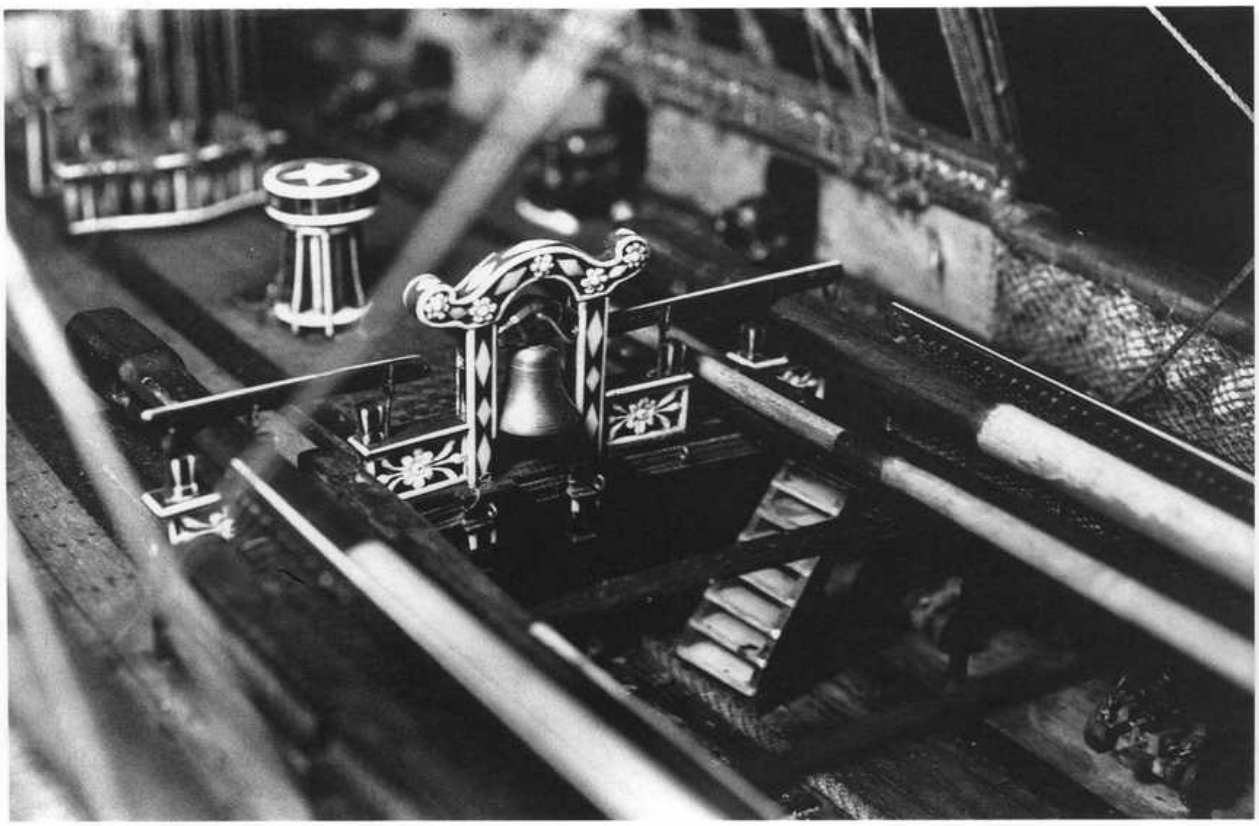


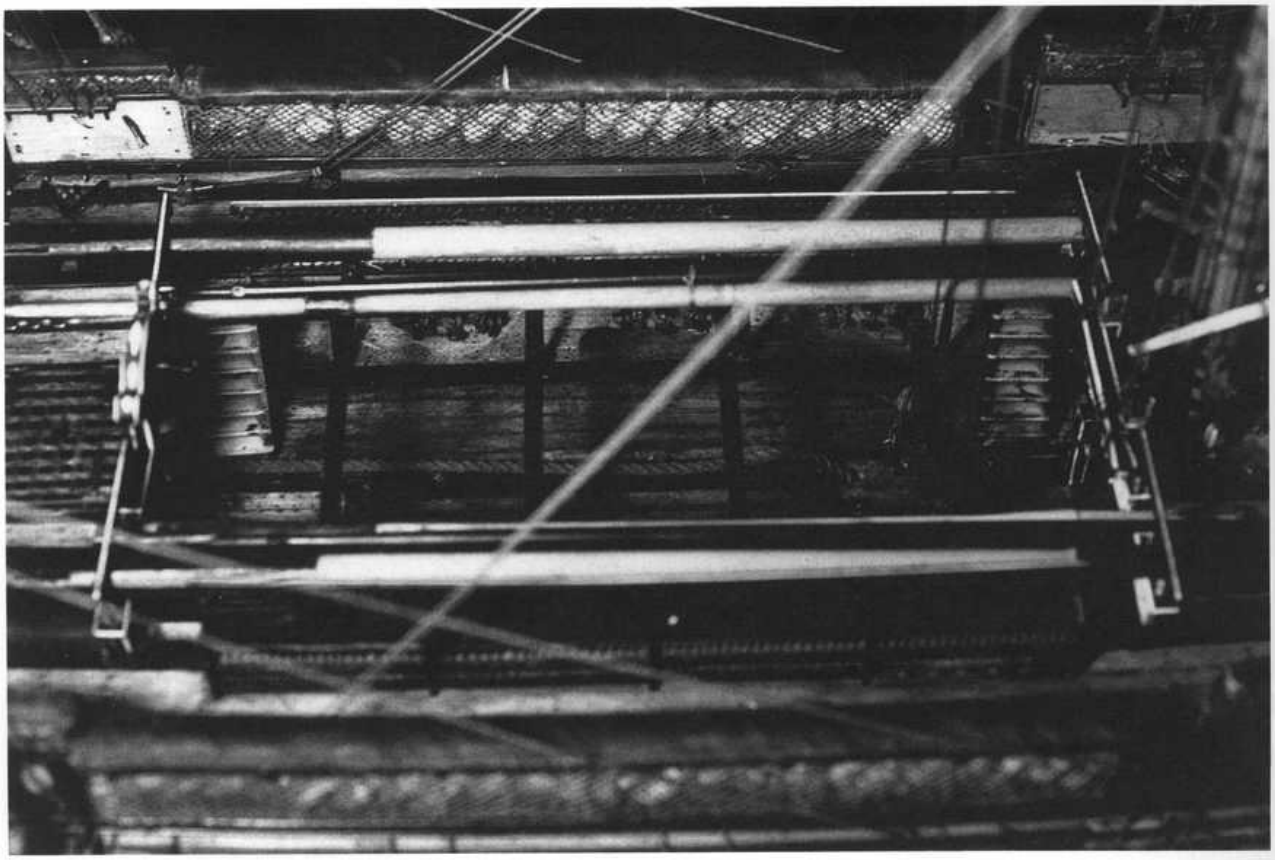
17. (*La Flore*). Forecastle and head. An ugly and cumbersome gangway leads down to the bowsprit. The cat-tails follow the line of the beakhead bulkhead. Note the extended bollard timbers either side of the bowsprit. Abaft the bulkhead can be seen a diminutive structure with a sliding scuttle on the side, possibly for passing up cartridges.

18. (*La Belle-Poule*). Head and topgallant forecastle at the fore end of the spar deck. Comparison with the previous photograph highlights the differences. The platform of the head has been covered with lead, the number of seats of ease is increased, and there are enclosed latrines for the petty officers. The hammocks are arranged neatly along the top of the solid breastwork of the round bow.





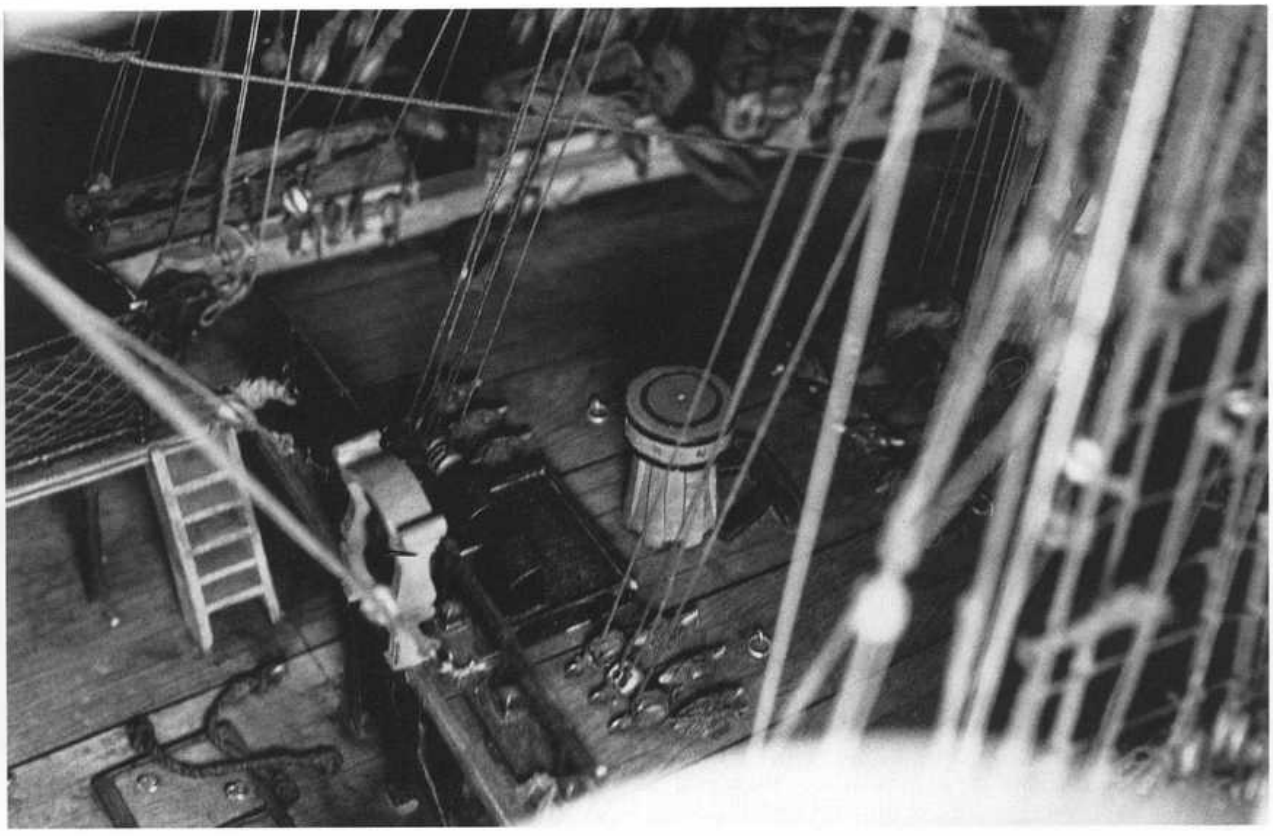




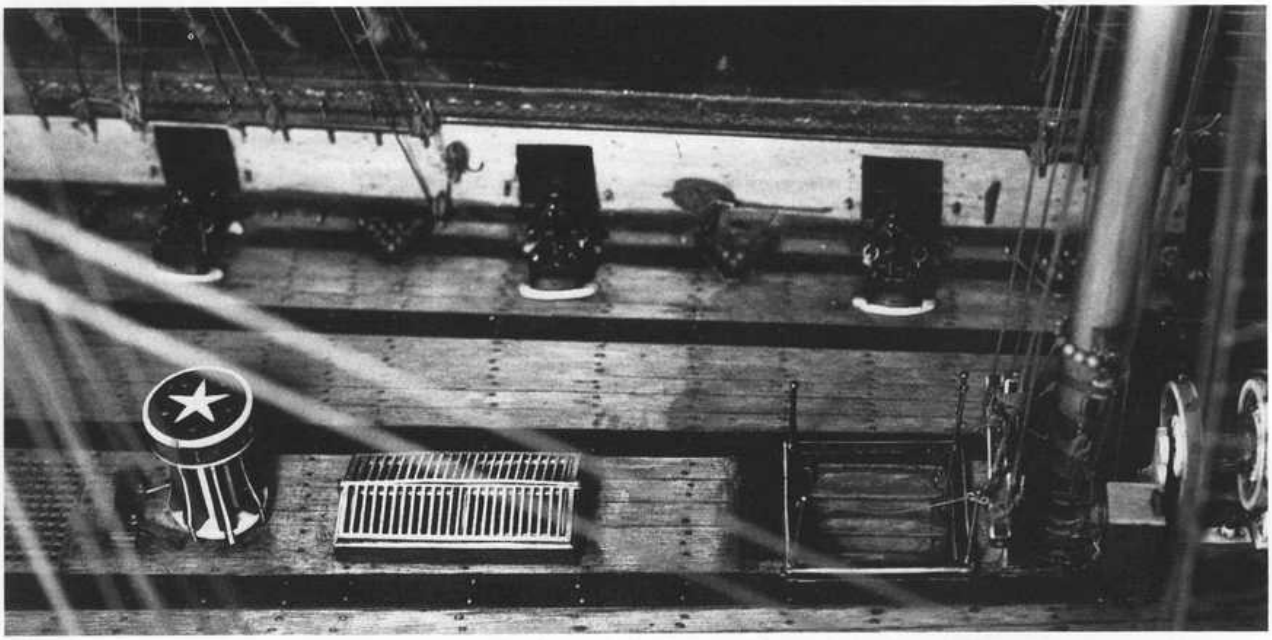
19. (*La Flore*). View of the forecastle. Abaft the belfry is the smoke-scuttle of the galley fires, while the fore jeer capstan can be seen ahead of it.
The gangways are joined by skid-beams which support the spare spars and the boats (which have disappeared); there are fowl-coops placed along the inner side of the gangways, while on the outboard side can be seen the crew's hammocks stowed in the solid bulwarks.

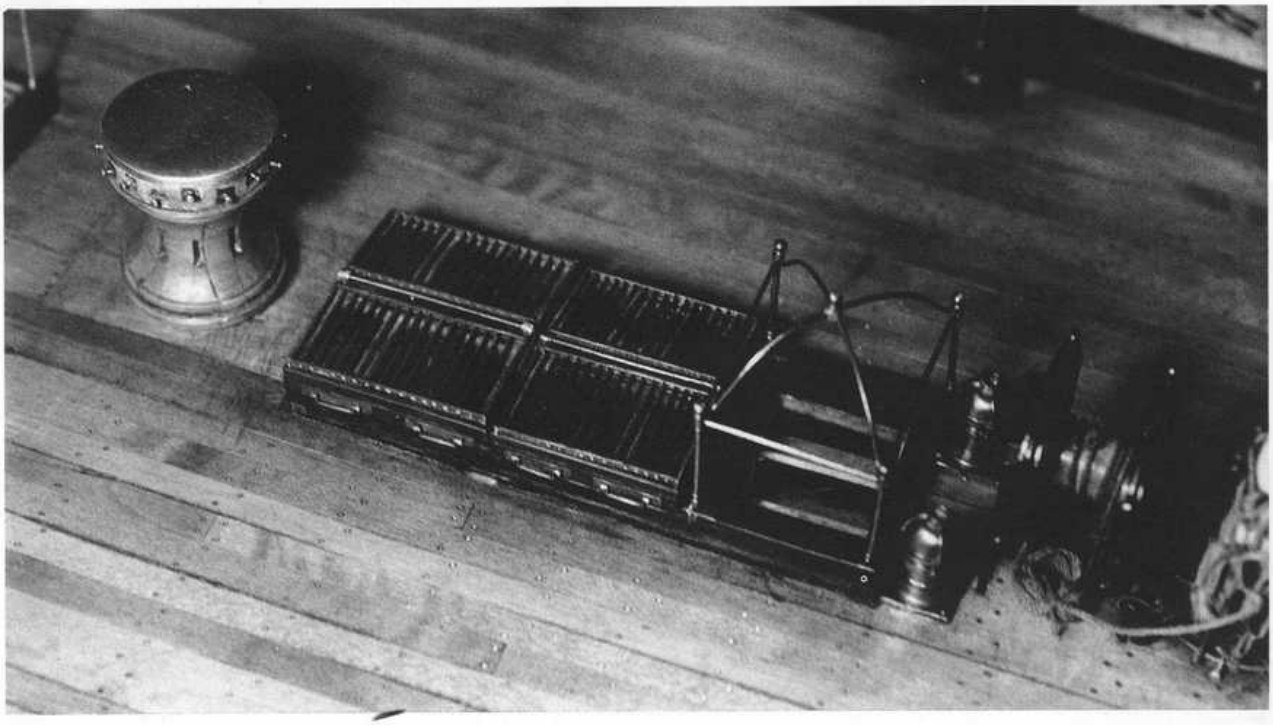
20. (*La Flore*). Close-up of the forecastle breastwork from a different angle. This gives a clearer view of the way the spare spars are stowed on the skid-beams. As in the previous photograph it is possible to make out a cable stretched out along the main deck as far as the main-hatch.

21. (*La Flore*). The same items can be seen in this view, but it gives a better idea of the space gained on the main deck by moving the spare spars and boats up to the spar deck in imitation of English practice. The gangway ladders can be seen, and to the right, the end of a pump brake.



22-23-24. (*Unnamed 18-dr frigate, ca 1800*). All three views are of the same model.
The first photograph (above, left) shows a close-up of the forecastle breastwork, from which it can be seen that there is no interruption for the spare spars, which must therefore be stowed, with the boats, on the main deck. Looking carefully, it is just possible to distinguish two sheaves in each of the breastwork stanchions.
In the second photograph (below, left) it is possible to see that the ninepin-blocks by the foremast are supplemented by a series of cleats nailed to the deck. By the same token, there are three large cleats and lead-blocks on either side of the galley chimneys. Just to be made out on the main deck are two cable stoppers (*74-G.S.*, vol. IV).
The third photograph (above) shows the quarterdeck breastwork, with the smaller belfry for the watch-bell. On either side of the vessel, along the waist, are the hammock-racks supported by cranes between which the nettings are stretched. Along the inboard side of the gangways the arrangement is similar, except that the netting stanchions are plain. The main topsail-sheet bitts are situated on the main deck, and the main-hatch is open, allowing a view of the casing of the galley fire with its reinforcement in the shape of a St. Andrew's cross.



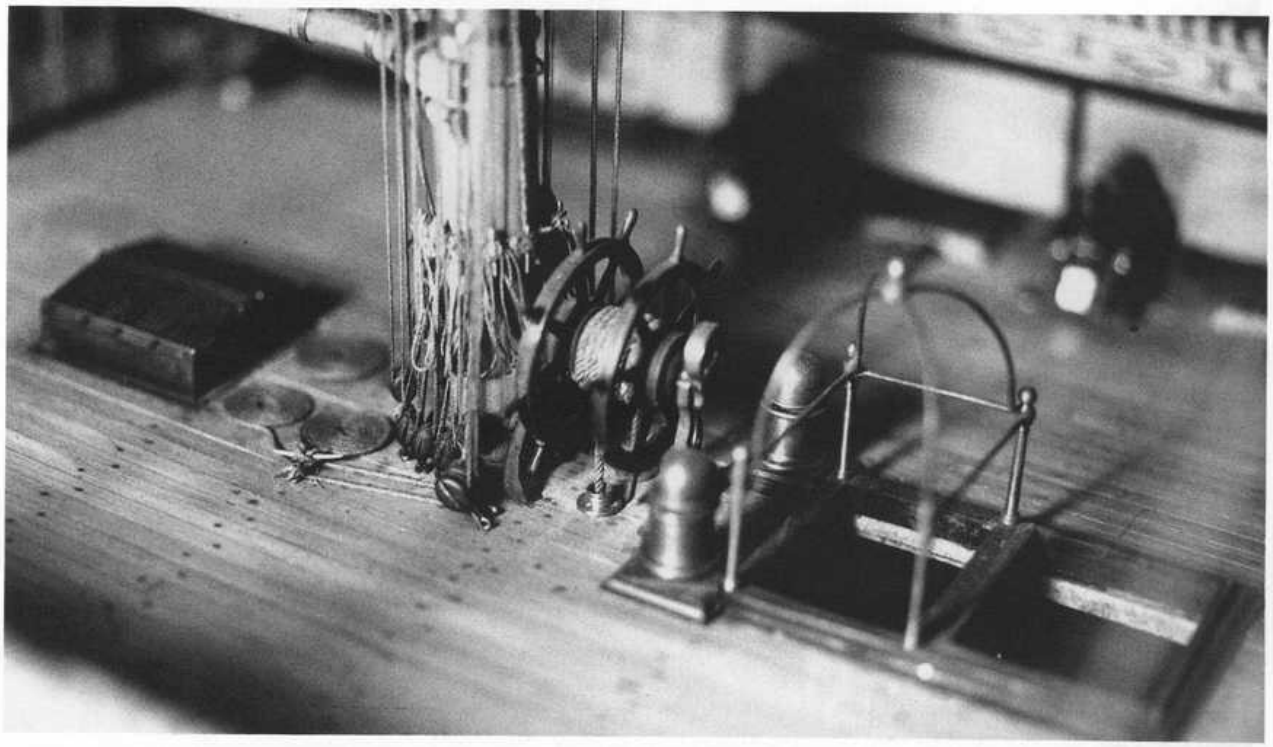


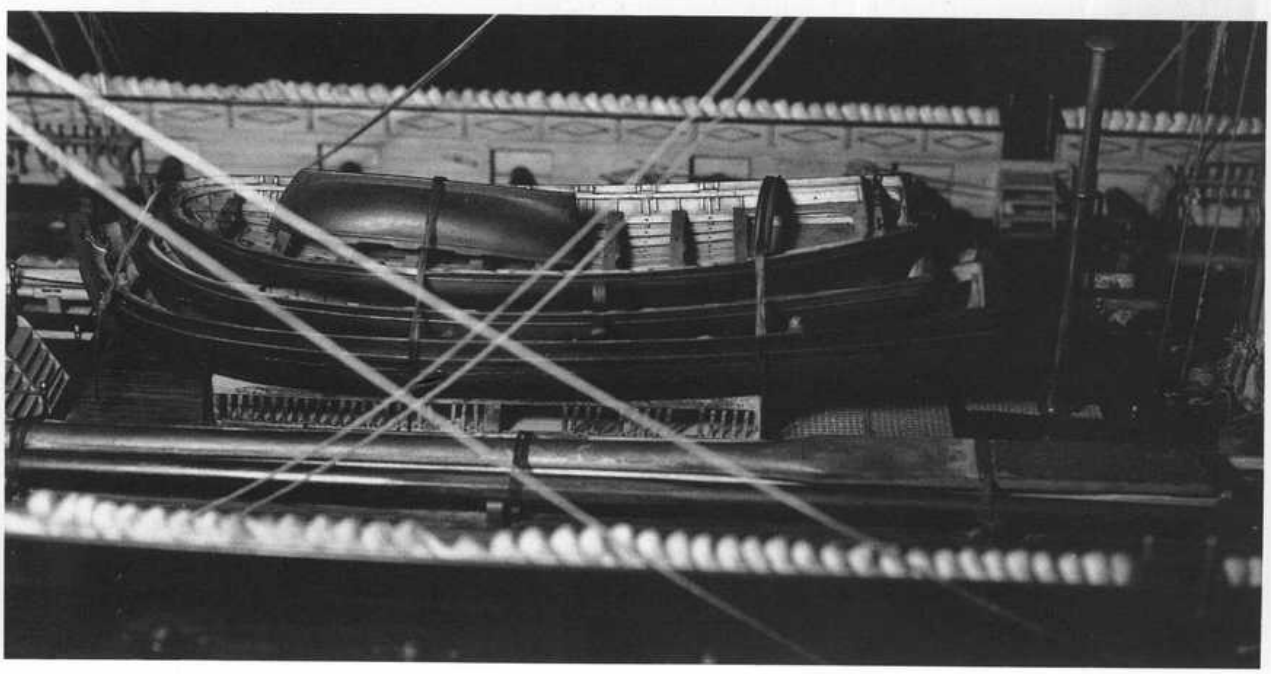
26. (*La Belle-Poule*) (upper photograph). The upper barrel of the main capstan has alternate bars set at two levels, and the pigeon-holes are occupied by little drawers. To the right can be seen the upper skylight, which is in two parts arranged so that they can be removed; light passes down through a second skylight below to provide some illumination to the wardroom on the berth deck. The companion of the officers' ladderway is formed of an iron framework covered by a canvas dome. Next to the ladderway are the binnacles and the double wheel.

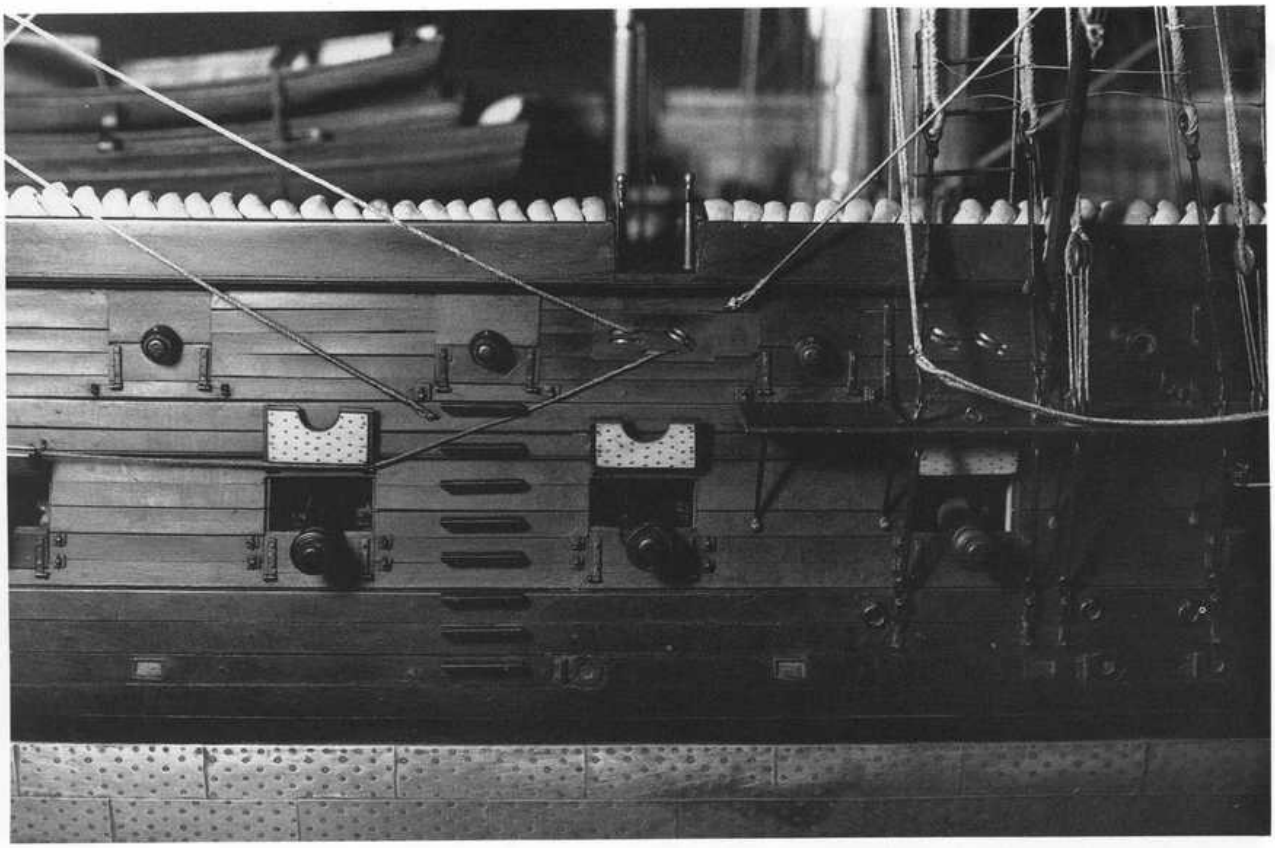
28. (*La Belle-Poule*) (opposite). The longboat, with its thwarts removed, allows the barge to be nested inside it, and inside the barge is the cutter; resting on the thwarts of the cutter and turned upside down is the small jolly-boat allowed to the midshipmen. Shaped to fit under the longboat is a chicken-coop. To the left can be seen the crew's ladderway set fore-and-aft, and to the right is the oven chimney with its strengthening-rod.

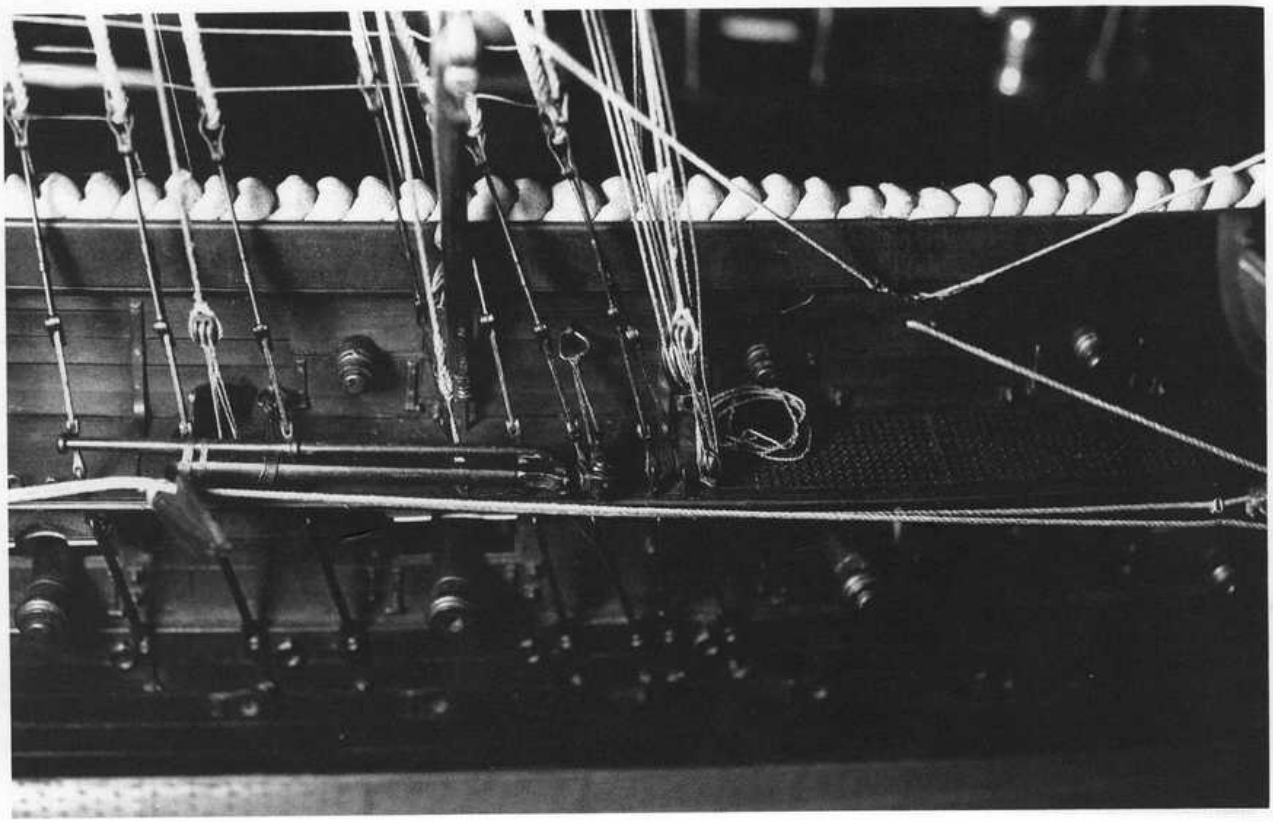
25. (*La Flore*) (opposite). Forward of the upper barrel of the main capstan is the after hatch, formed of gratings. Abaft the capstan is the upper skylight, followed by the officers' ladderway, which is surrounded by four iron stanchions and a handrope. Forward of the mizen-mast are the topsail-sheet bitts, and abaft it the double wheel and the binnacles, of which only the port one can be seen. In the background are the carronades arming the quarterdeck and a long pin-rail.

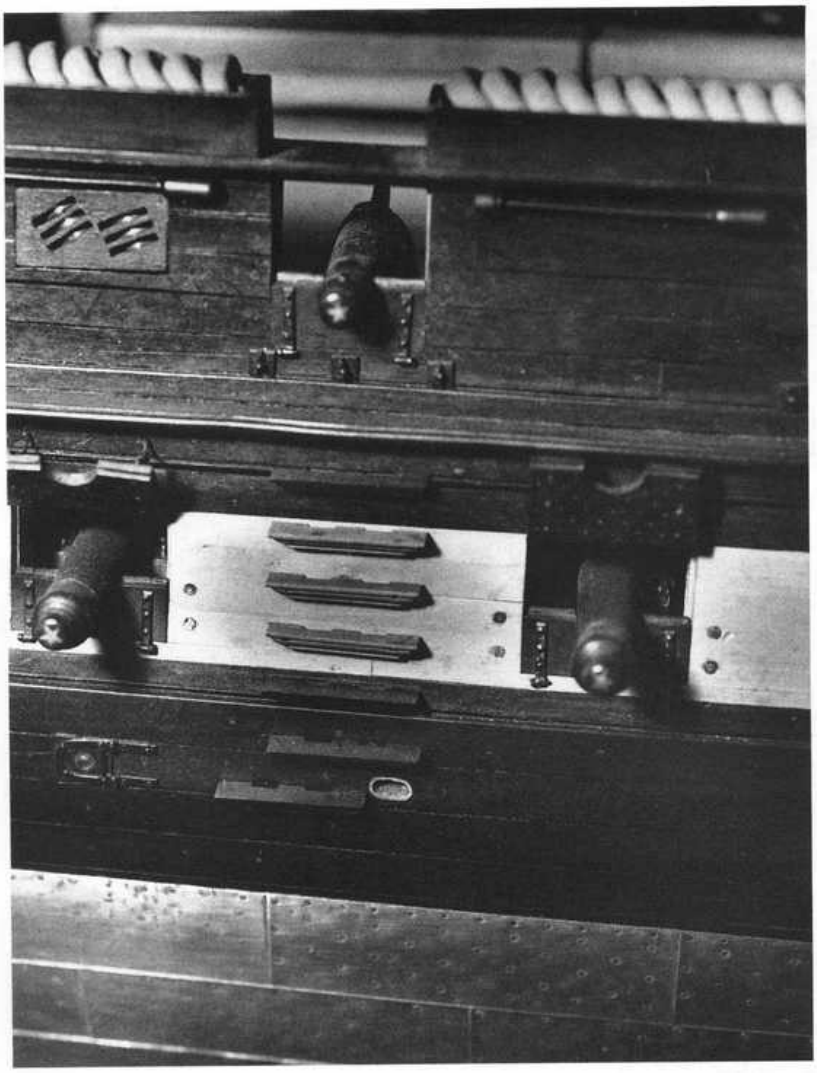
27. (*La Belle-Poule*) (below, top). Forward of the officers' ladderway is a small scuttle to receive a skylight, and another, designed to provide light to the great cabin, can be seen abaft the mizen-mast. The double wheel appears to incorporate a tell-tale for the tiller. Around the mast is a bronze spider-hoop with belaying-pins.





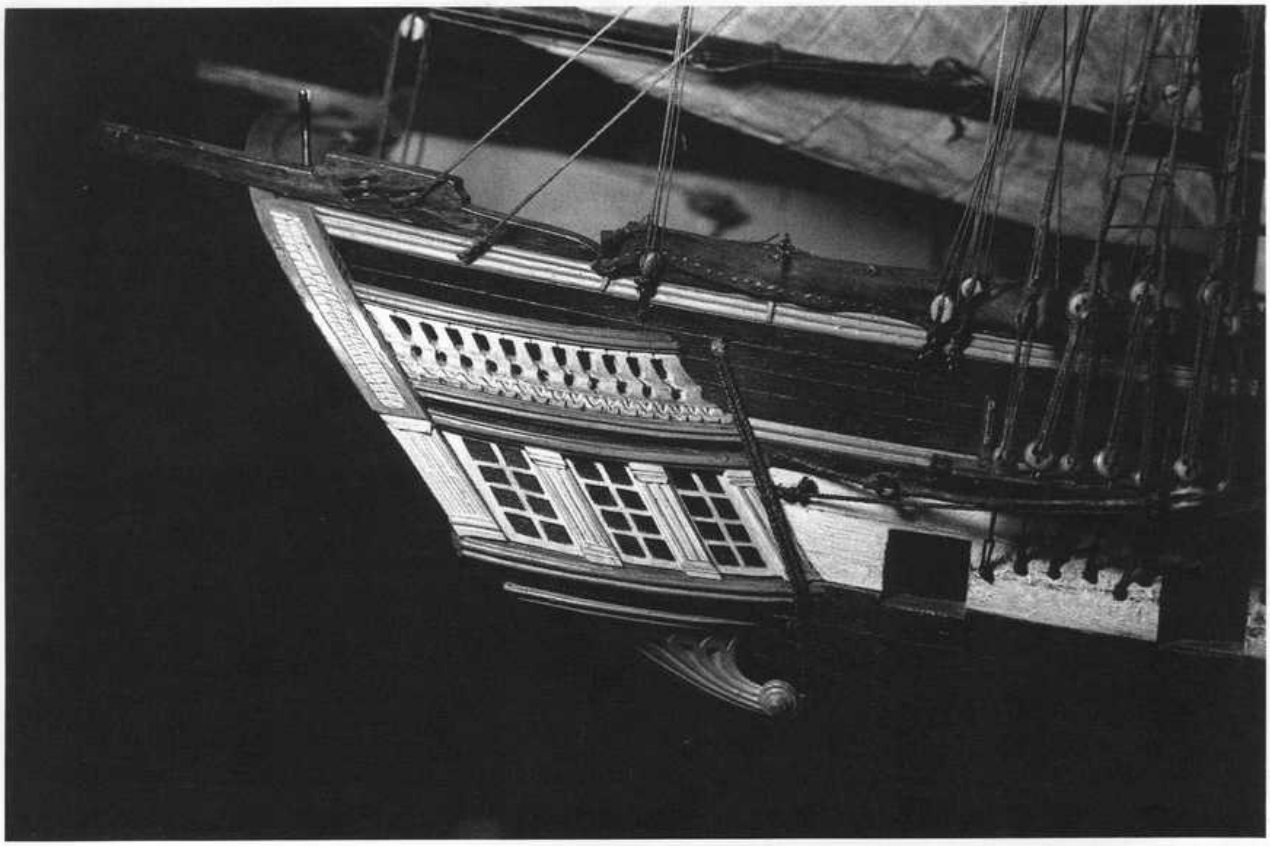




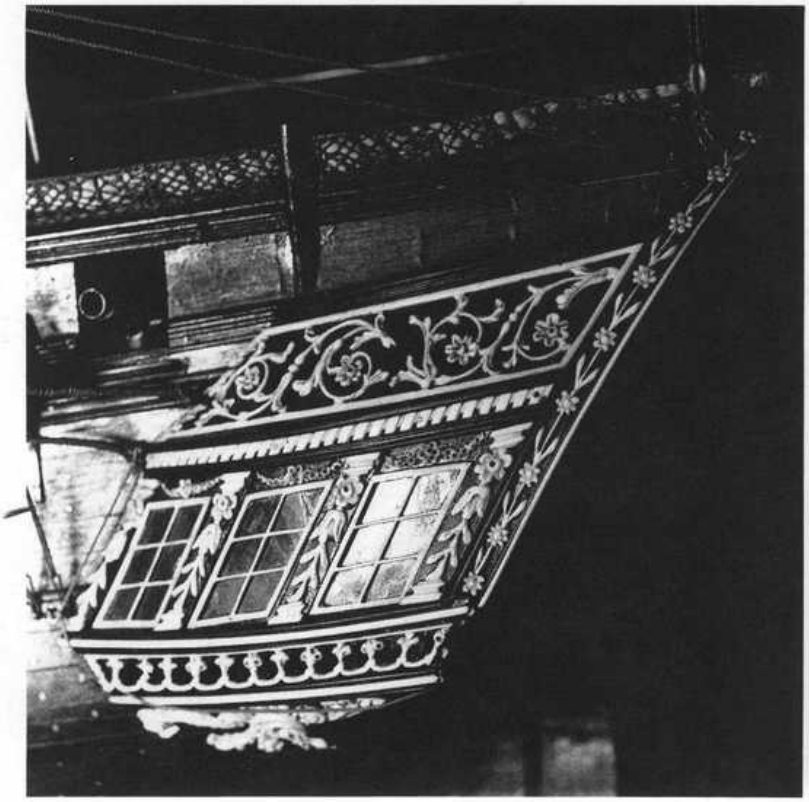


31. (*L'Alceste*) (above). Another view of an entering ladder, clearly ending at the carronade port. In the case of the main deck ports, the upper part of the half-lid is raised and lowered by a span and tackle, but since this is impossible for the spar deck ports, the upper part of their lids is made light enough to be shifted by hand. Note the ends of the ring- and eyebolts of the gun-tackles and breechings of the 30-pdr long guns, and of the staples and fighting-bolts of the 30-pdr carronades. The sponge-rammers are hung beneath the moulding of the planksheer over which the hammocks are stowed in solid casings.

29-30. (*La Belle-Poule*) (opposite). The upper photograph shows a close-up of the after end of the main channels, linked by a grating to the mizen-channels. An iron-stocked kedge anchor is resting in the main channels, beneath the single davit used for lowering it or the boats.
The lower photograph clearly indicates the regular spacing of the gunports with their half-lids. In the case of the spar deck ports the upper panel of the port-lid has no hinges. The entering ladder appears to lead directly to a carronade port, although there is an entering port in the bulwarks to the right with two stanchions. Just visible behind the main-shrouds can be seen the jacob's ladder leading up to the ratlings.

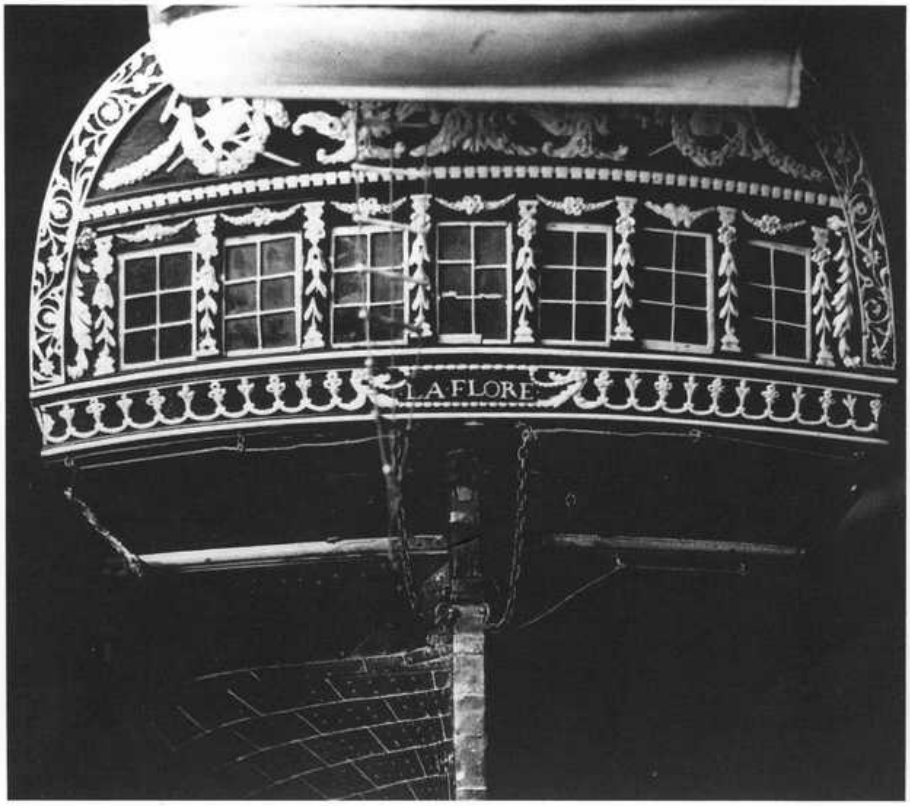


32. (*Unnamed 18-dr frigate, ca 1800*). View of the quarter-gallery. Note the way it is tucked into the angle formed by the projection of the horseshoe arch and the frigate's side. The quarter-lights are false, and the doorway leads off from the main deck.
Bolted to the plankshеer is a davit for a jolly-boat, incorporating four sheaves; above it can be seen the jaws of the crane to support the boom. Overhead the plankshеer are the low hammock-racks (they are higher in the waist).



33. (*La Flore*). Another view of a quarter-gallery; like the previous one, it conforms exactly to the arrangements followed by the Dockyard carvers who, to my knowledge, never respected the standard design developed by Lubet.

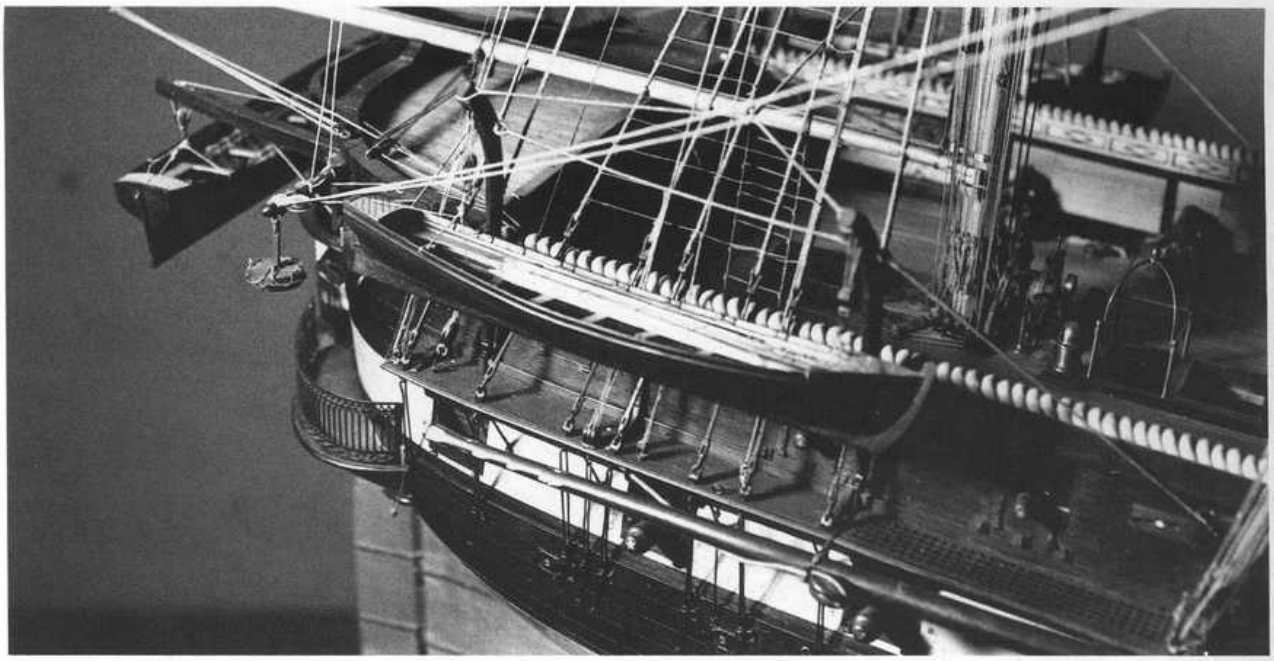
34. (*Unnamed 18-dr frigate, ca 1800*). The stern. Although not particularly well executed, it nevertheless provides a good example of the typical horseshoe shape combined with pilasters between the sternlights (the outboard lights are false). The taffarel is too small for anything other than a simple motif of two palm leaves linked by a knot; the emblem which originally occupied the space above has been lost.



35. (*La Flore*). Another example of the horseshoe. The carved-work of the taffarel is partially masked by the jolly-boat on its davits. Note the rigging of the rudder, with the chain pendants extended round the quarter by ropes reeving through ringbolts. A rudder-strop completes the arrangement (see *74-G.S.*, vol. II). Just below the wing transom on the starboard side can be seen another line (its equivalent on the port side is missing); they were designed to immobilize the rudder if the tiller should break. Also visible is a jacob's ladder suspended from the boom.

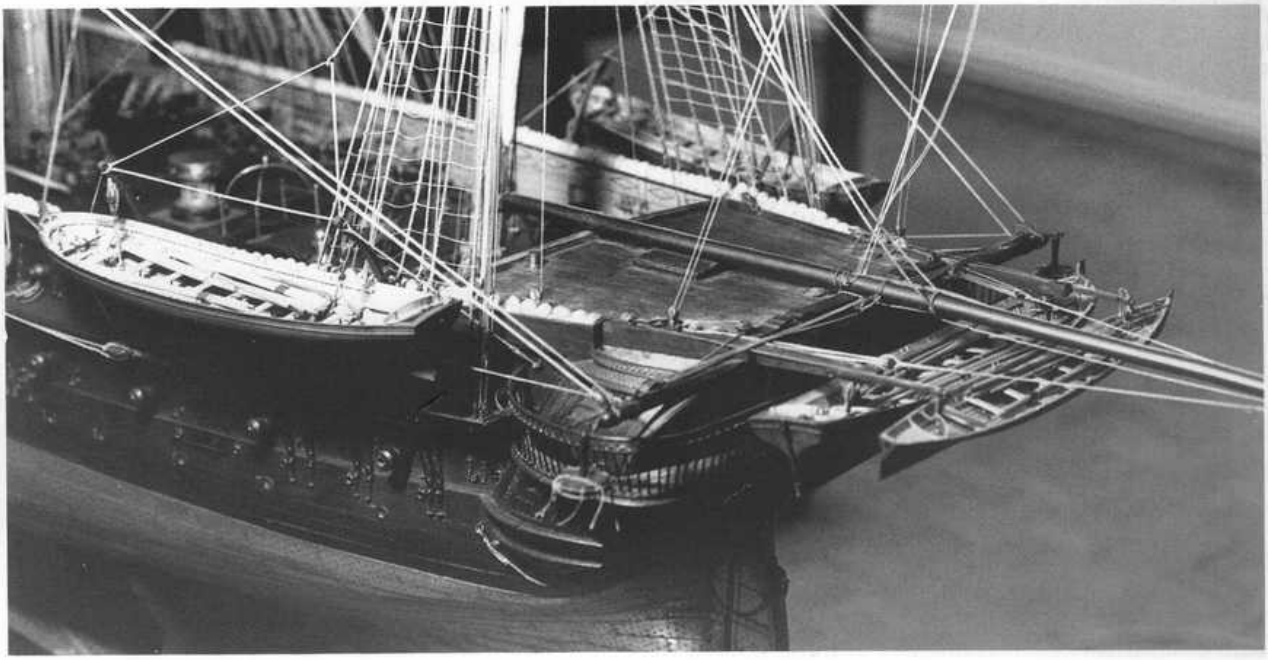
36. (*La Poursuivante*). View of the spar deck, ending in a little poop or deckhouse which is clearly visible in this photograph. The stern shows a very squat and rather flattened curve of the horseshoe which is not very flattering, hardly helped by the paucity of carved-work.

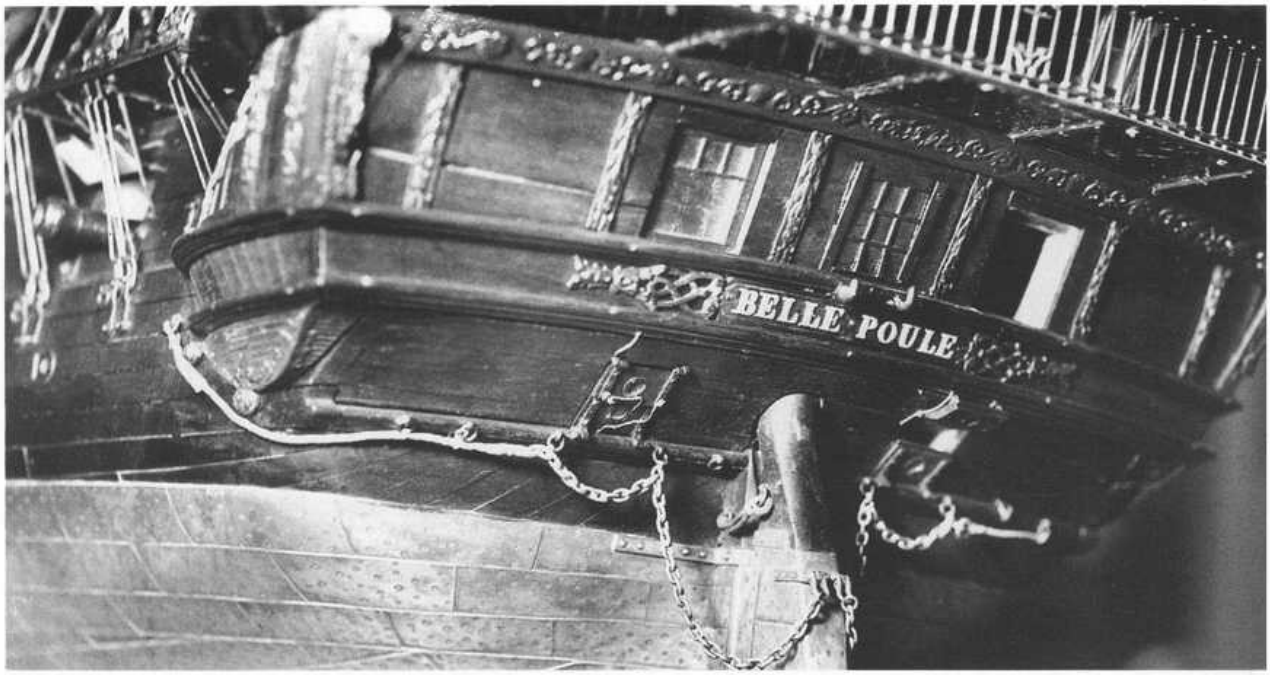
37. (*La Charte*). This frigate was a 30-pdr vessel of the 3rd Rank, and it provides an early and very ugly example of the round stern. The multiplicity of lights on the main deck, and the effect of three towers formed by the quarter-galleries to port and starboard and the space needed for the rudderhead amidships (the counter no longer exists), combine to give an impression of a "folly"! There is a quarterdeck cabin with access to a stern-gallery and the upper level of the quarter-galleries; the latter are entirely berthed up, providing a strange contrast with the plethora of lights below. In short, the effect is as bizarre as it is ugly, and it may be that it was simply a bungled attempt to copy an English design.

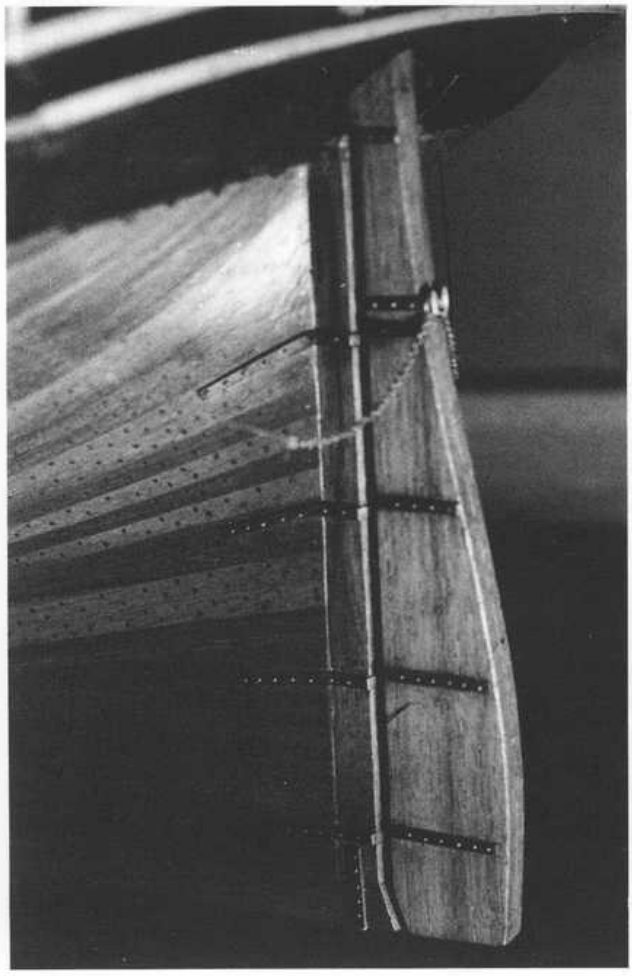


38. (*L'Alceste*) (above). Another example of a round stern. The large number of items visible in this photograph can only be summarised: joining of the main- and mizen-channels by a grating – iron rigging-screws – spare topsail-yard – a quarter-boat on either side with another boat slung over the stern, making six boats in all – life-buoy hung from the outrigger for the mainbrace – stern-gallery with iron balustrade, roughly at the level of the main deck, rather than at quarterdeck level as foreseen by the Regulations – quarterdeck cabin – jacob's ladder leading up to the ratlings – wheel forward of the mizen-mast – binnacles – framework of the hood over the after ladderway – hammock-casings over the rail.

39. (*La Belle-Poule*) (below). Overall view of a square stern. Most of what can be seen has already been commented on elsewhere. Note the presence of an extra gig of very light construction, supported by iron cranes extending the davits. The quarter-galleries are on two levels, and the stern-walk with its iron balustrade continues right round the quarter, as it used to do in the ship-frigates of a century or more earlier. The length of the boom may seem surprising, but in fact it measured no less than 21.5 metres in frigates of the 1st Rank.



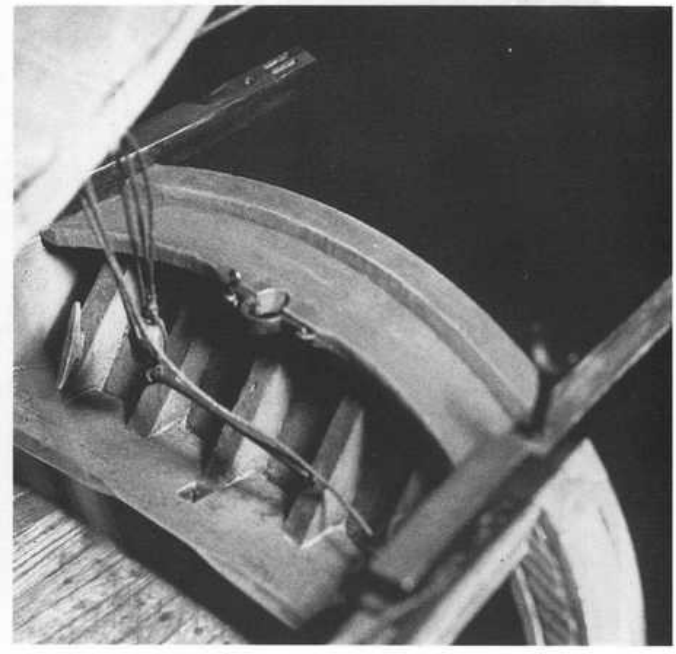


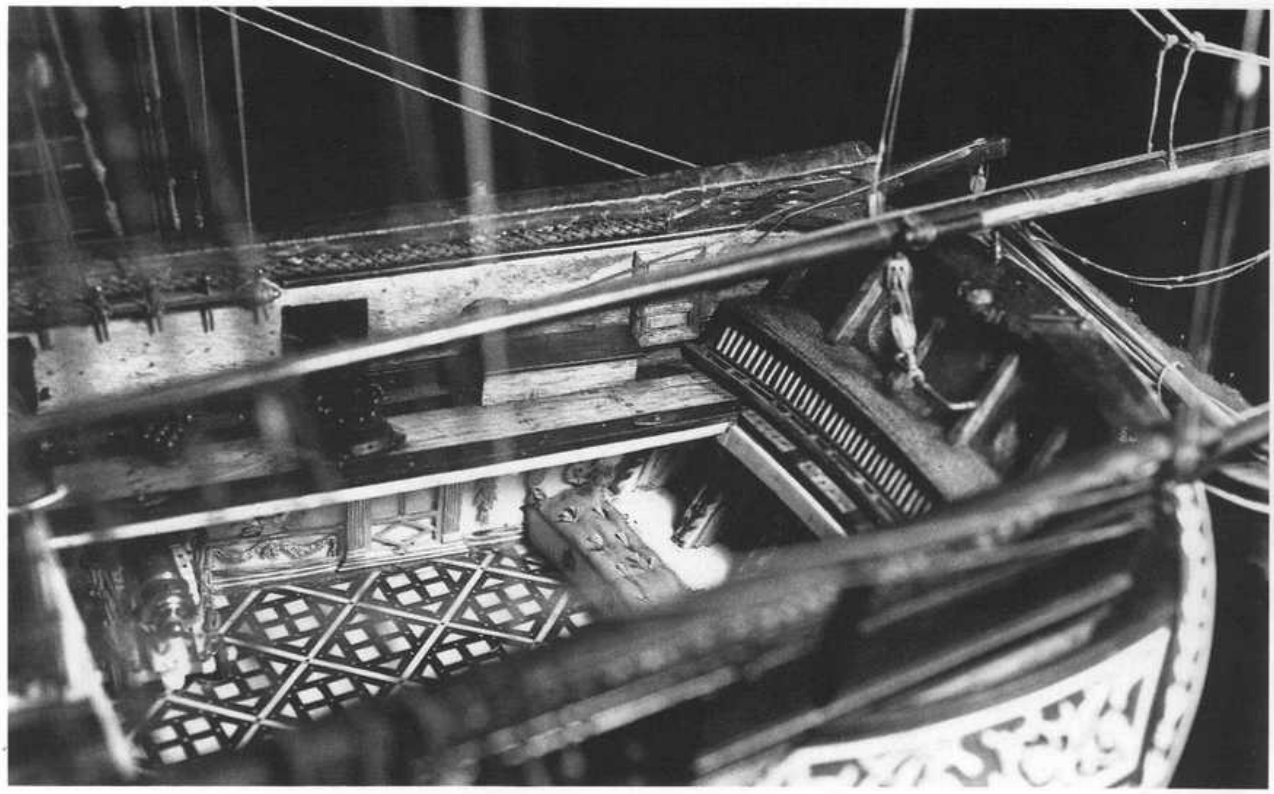


40. (*La Belle-Poule*). Close-up of the stern; the gallery is entirely made of iron, including the walk, which is supported by brackets, the vertical part of which are masked by carved motifs. Note the offset, round rudderhead which reduces the size of the helm-port to scarcely more than that of the rudderhead; note also the rudder-strop and the small glazed portholes in the stern-ports.

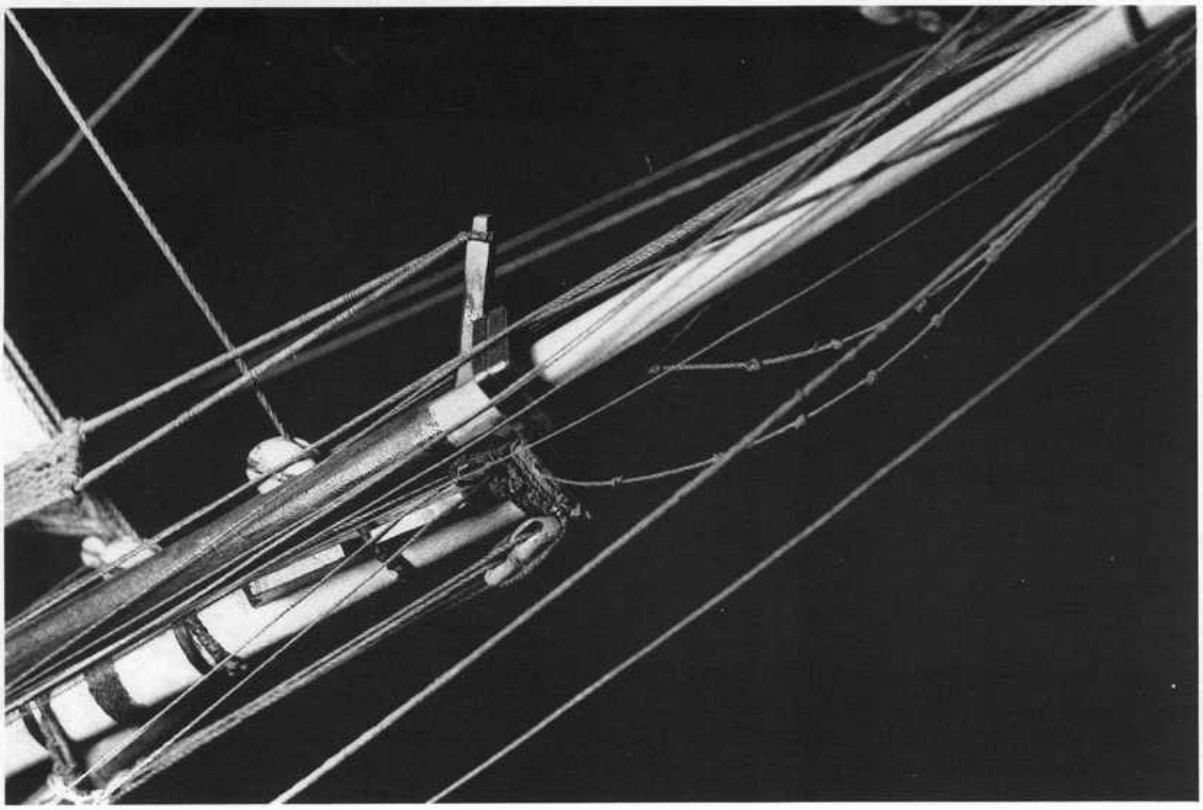
41. (*La Poursuivante*) (left). The English-style rudder blade was adopted at the end of the 18th century.

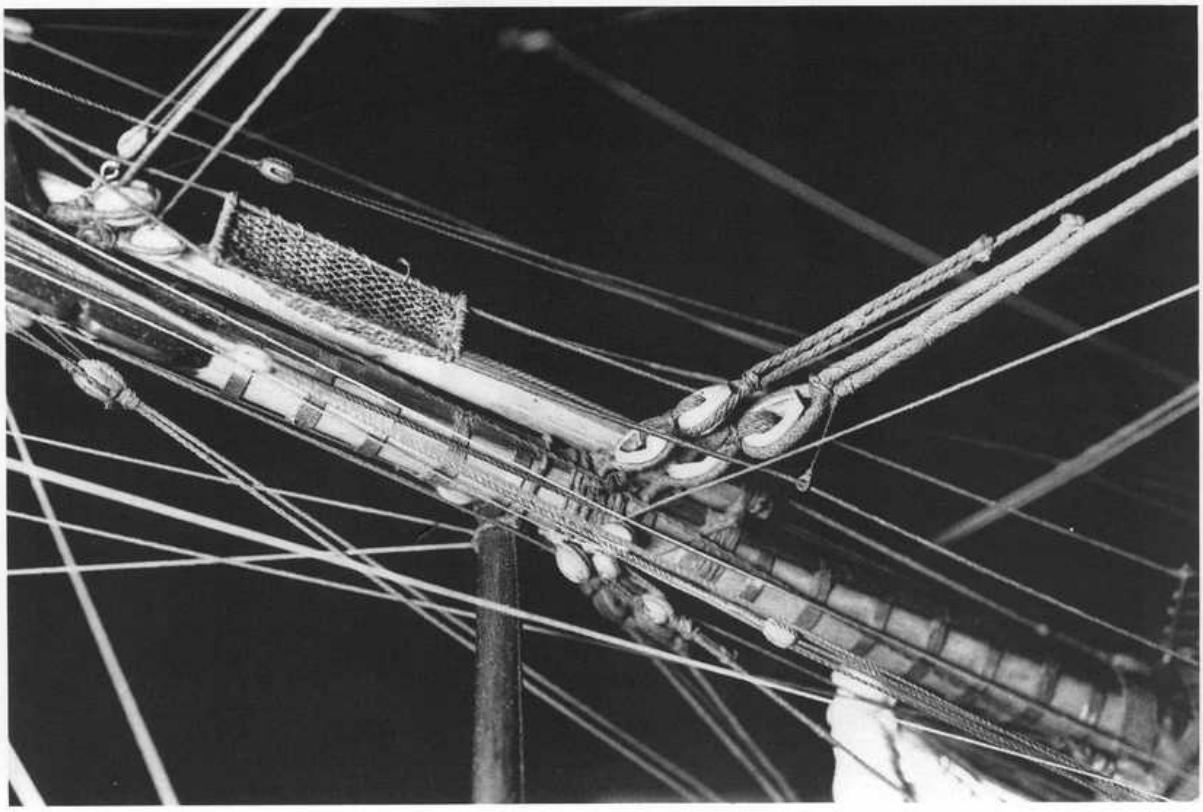
41b. (*Unnamed 18-dr frigate, ca 1800*) (below). Interesting view of the structure of the upper part of the taffarel.

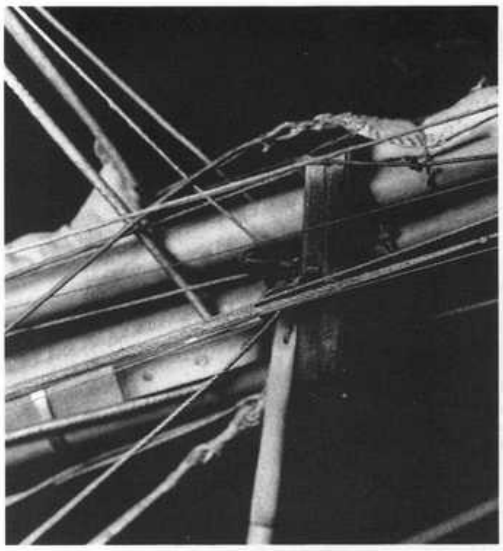


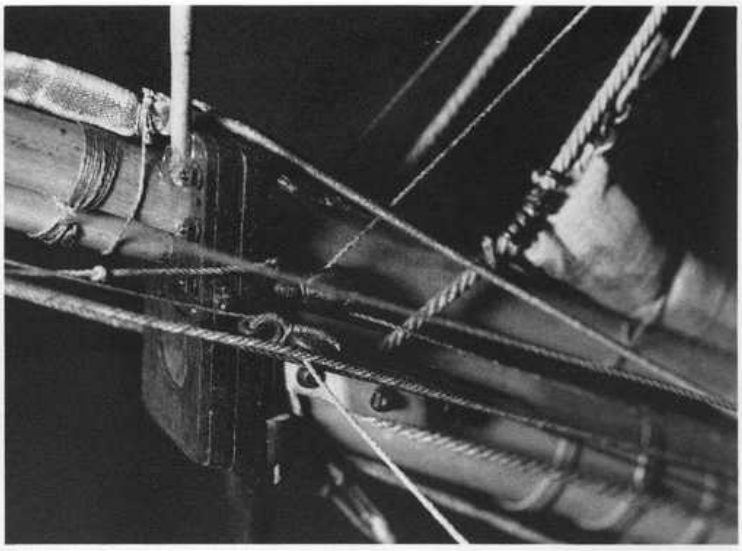


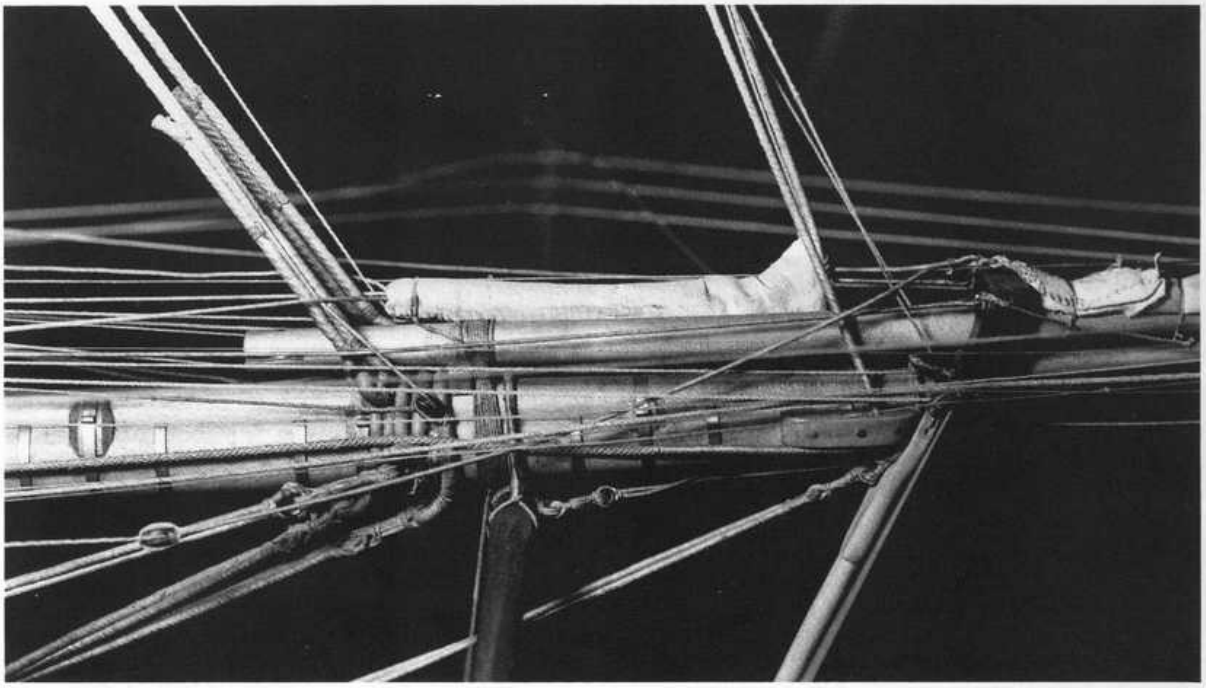
42-43. (*La Flore*). Two views of the great cabin, the domain of the Captain. At the level of the quarterdeck can be seen the doorway leading to the canvas shelter (not shown) over the upper-finishing of the quarter-gallery. There is also an arms chest and a poultry-coop with feeders hard up against the stern. Note that there is no ensign-staff any more, since it is flown from the end of the gaff.











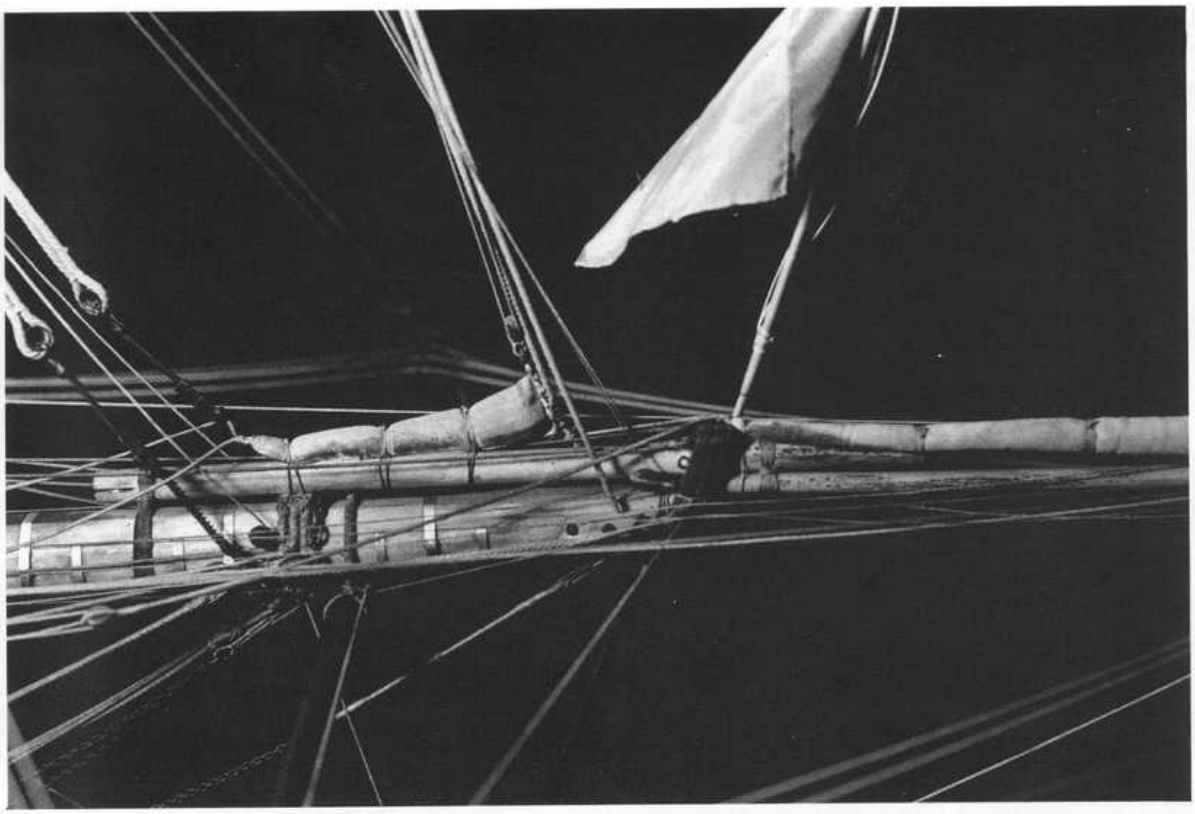
44. (*Unnamed 18-dr frigate, ca 1800*) (opposite, top). All the photographs on these two pages show details of the rigging of bowsprits. This photograph shows the arrangements typical of the end of the 18th century: cap offset because of the forestay collars and the jackstaff standard, the final reminder of the earlier sprit-topmast, and the bees. No flying jibboom as yet.

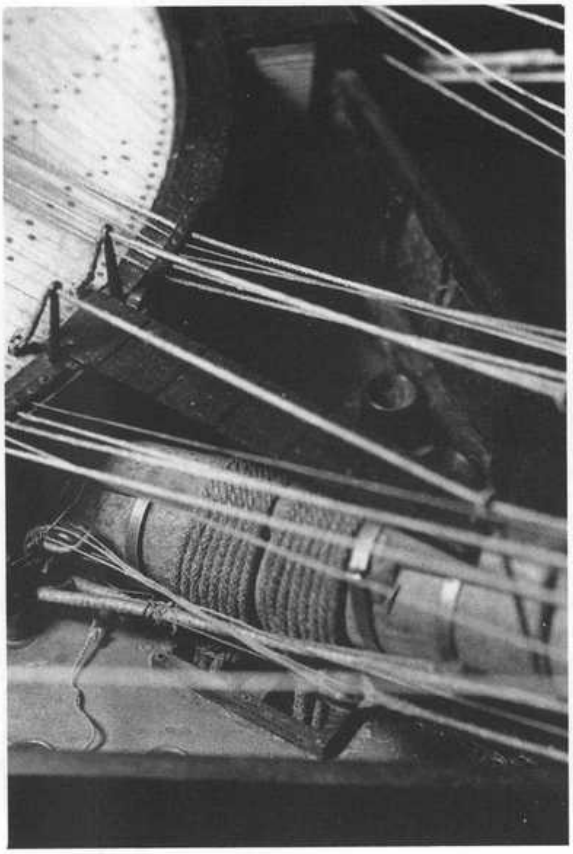
45. (*La Flore*) (opposite, bottom). This photograph complements the previous one, showing how the collars of the forestay and fore preventer-stay make it necessary to offset the cap to starboard to allow the jibboom to be moved in and out.

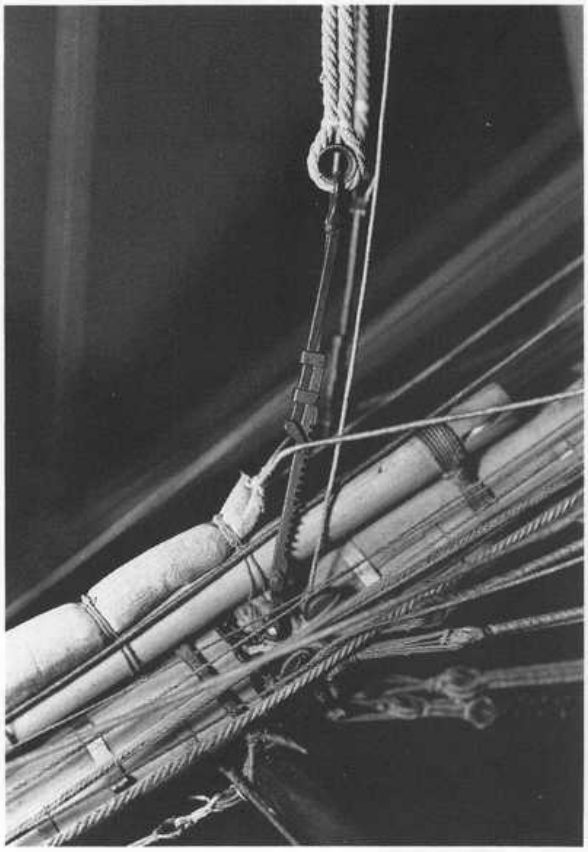
46-47. (*La Belle-Poule*, top, left; *L'Alceste*, top, right). New method of rigging the bowsprit cap which came in at the beginning of the 19th century, with the cap placed vertically along the axis. The bees have been replaced by fixed-blocks, the fore-top-mast stay reeving through the sheave; note also the jackstaff and the jaws of the dolphin-striker. The flying jibboom is blocked by the cap, and its heel-lashing can be seen.

48. (*L'Alceste*) (above). This photograph shows how it was possible to rearrange the former position of the cap, thanks to the suppression of the hearts*: a collar passed round the bowsprit has an eye which is turned in by the thimble at the end of the stay; the arrangement is a simple one, but does not make it easy to set up the stay. The two stays being thus rigged on either side of the bowsprit, there is now room for the jibboom to pass between them.

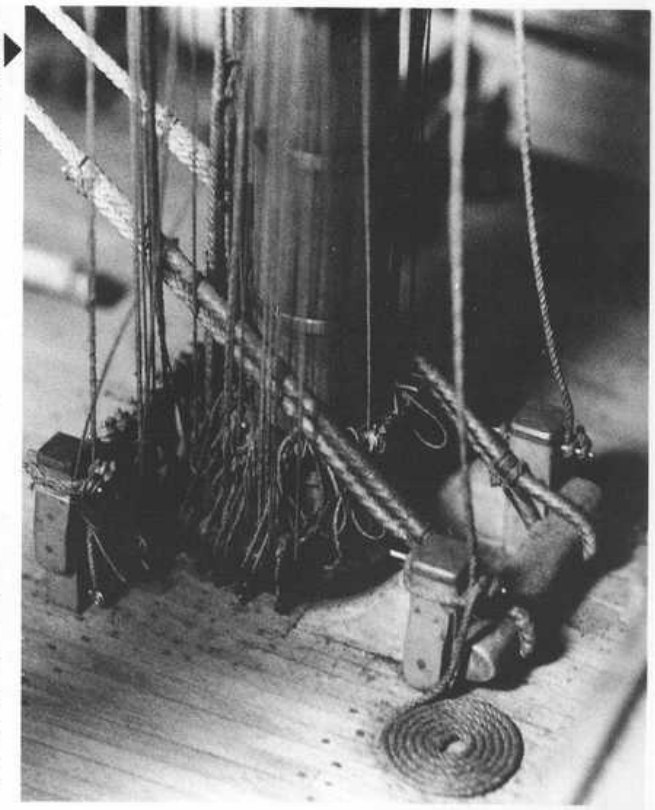
*Alternatively, open hearts may be used, since the jibboom can pass between their horns, but they are somewhat fragile.





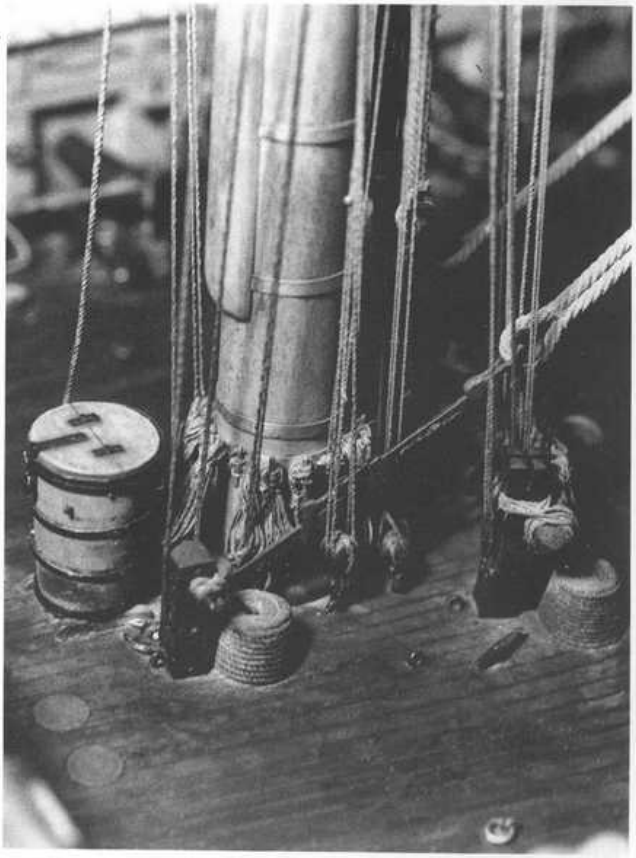


52. (*L'Alceste*). The fore topsail-sheet bitts have a cross-piece similar to that of the riding bitts, thereby providing a new belaying point for the mainstay and main preventer stay, which now have no collars or hearts for setting them up. On the other side of the mast can be seen the ninepin blocks, the pins of which have an iron axle and a fixed-block.

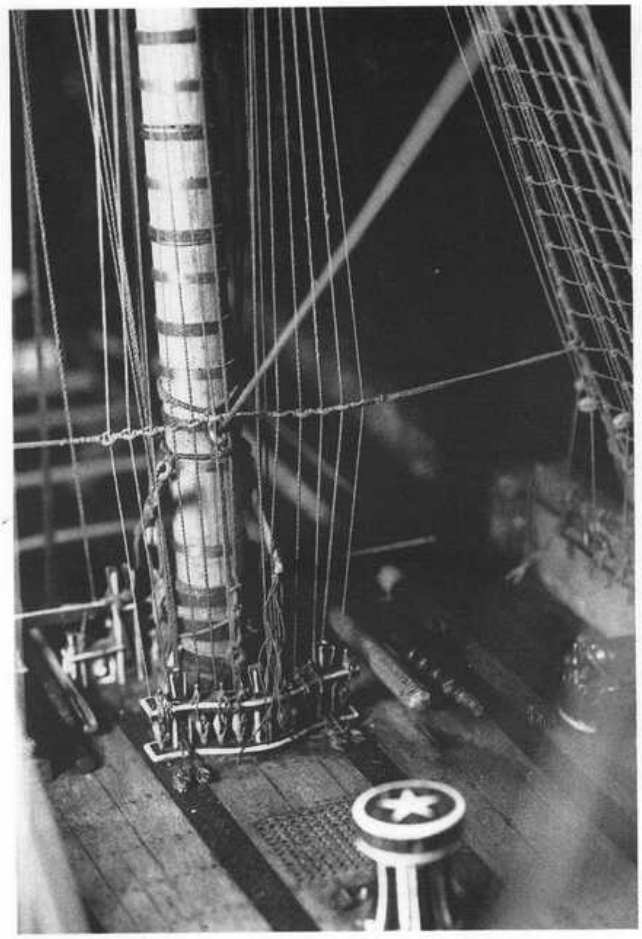


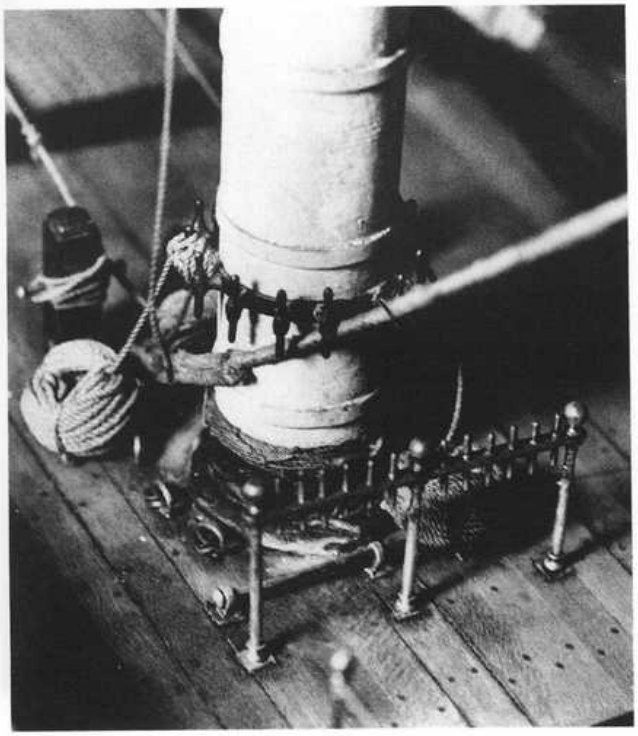
49-50. (*La Belle-Poule*) (opposite, top and bottom right). In the first photograph can be seen a large part of the rigging of the bowsprit, along which the jibs are furled. With the cap now set vertically along the axis of the spar, the jackstaff standard has now disappeared, and the jackstaff is secured direct to the cap. Note the fish, which is secured by means of hinged mould-hoops, visible in both the lower right picture and in the preceding one. The forestay and fore preventer-stay are set up by means of iron racks, best seen in photograph n° 50.

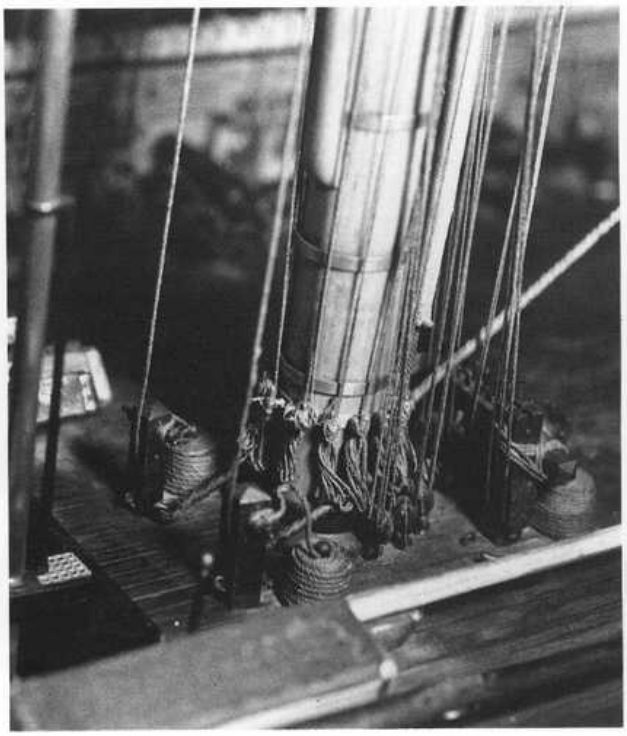
53. (*La Belle-Poule*). Rack-bars provide a better method of securing and setting up the stays of the mainmast. Note the spider-hoop at the foot of the foremast fitted with a number of small belaying pins. Forward of the mast is a scuttlebutt.

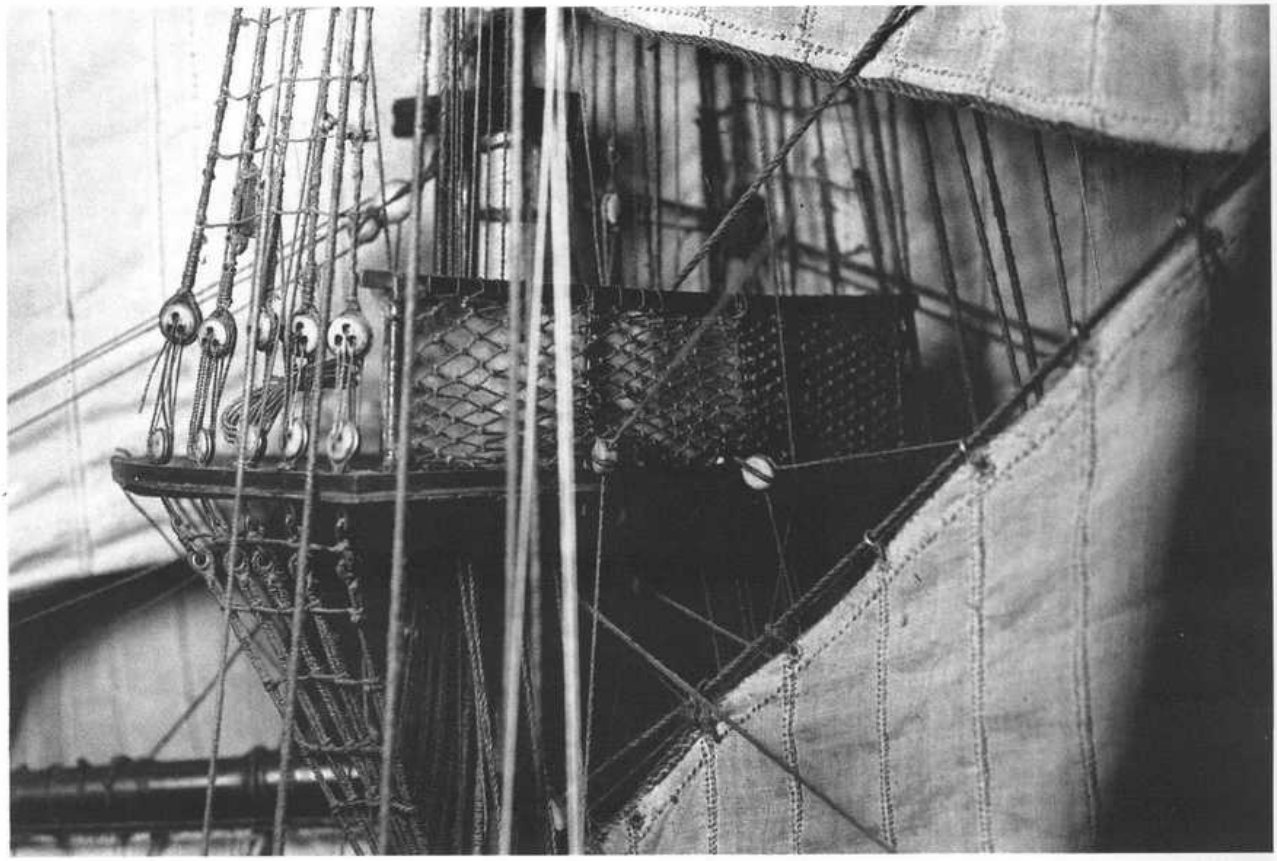


51. (*La Belle-Poule*) (opposite, bottom left). Close-up of the gammoning where the turns pass through the scuttle cut in the head. The gangplank leading down to the head can be seen, with its two handrail stanchions, and next to them is a series of small sheaves leading the rigging of the bowsprit aft, an arrangement which replaced the earlier rack-blocks.









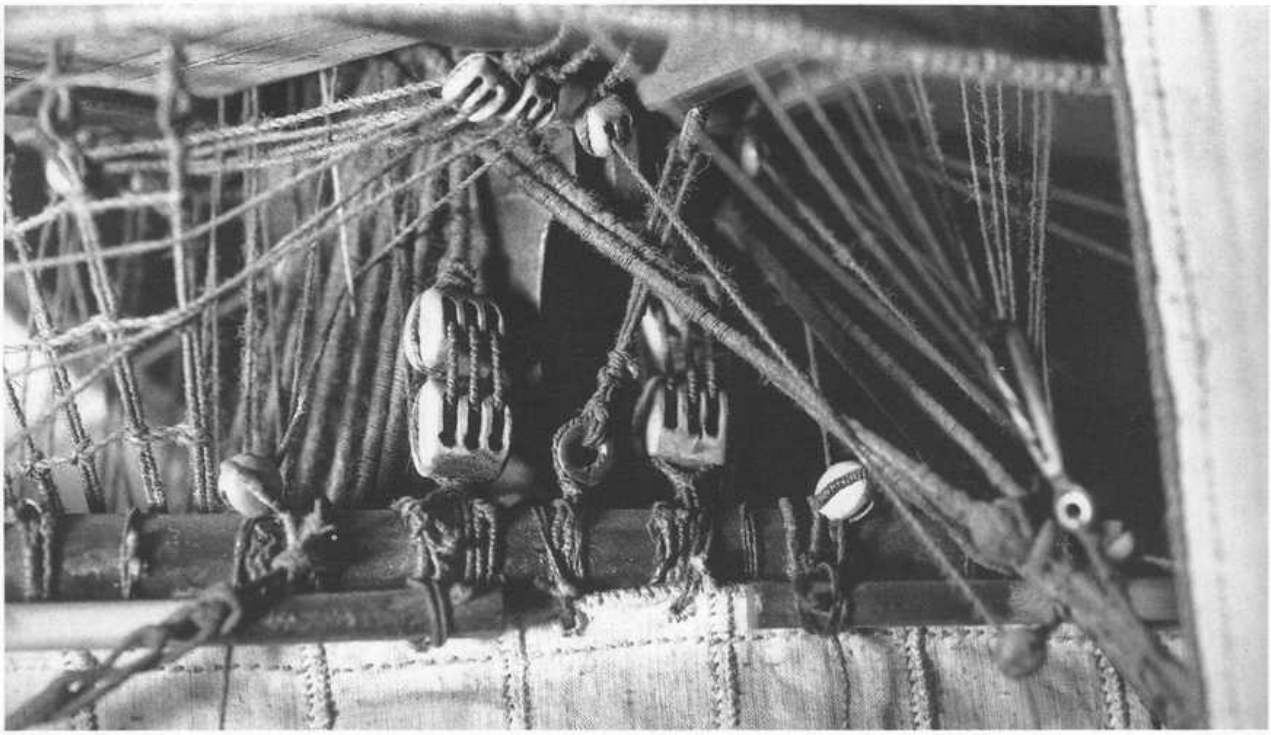
56. (*La Belle-Poule*) (opposite, top right). Another close-up view of the mainmast, showing the spider-hoop with its small belaying pins for the lines reeving through the lead-blocks hooked in the partners. Note also the way the mizen-stay forks, each leg turning in a thimble which is fastened to a ringbolt on the after side of the main topsail-sheet bitts.

54. (*La Flore*) (opposite, top left). Close-up of the mainmast at the level of the quarterdeck showing the ninepin bitts; the mizen-stay reeves through a block strapped round the mast and is then set up by a tackle. An interesting detail is the way the various lines reeve through a sort of necklace of bull's-eyes stretched between the shrouds. Note also the lead-blocks in the shrouds and the pin-rail beneath. Close examination reveals the presence of a pump brake on the starboard side of the mast.

55. (*La Poursuivante*) (opposite, bottom left). Foot of the main-mast, with a bronze pin-rail. The bar fastened to the deck between the rail and the mast is designed to take the thimbles of a series of lead-blocks. The picture also shows an alternative arrangement for securing the foot of the mizen-stay.

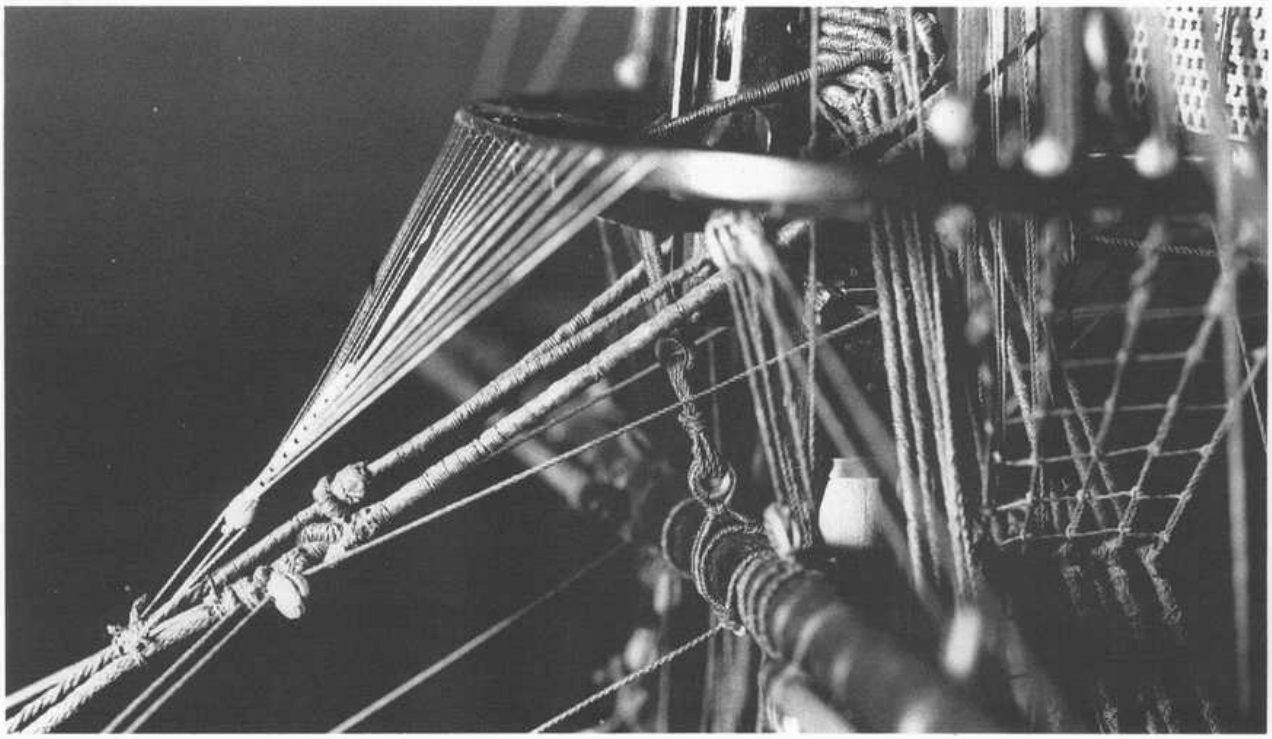
57. (*L'Alceste*) (opposite, bottom right). The main item of interest in this photograph is the arrangement of the main topsail-sheet bitts: the halliards reeve through one of the sheaves in the pins, are made fast to the iron norman, and then coiled up round a wooden spindle, this latter device replacing the earlier halliard-tubs. On the other side of the mast can be seen a pin-rail, the stanchions of which have two transverse grooves at right-angles in their heads for making fast the lines.

58. (*Unnamed 18-dr frigate, ca 1800*). Maintop. Note the shroud-cleat on one of the topmast-shrouds, and the netting barricade lined with canvas.

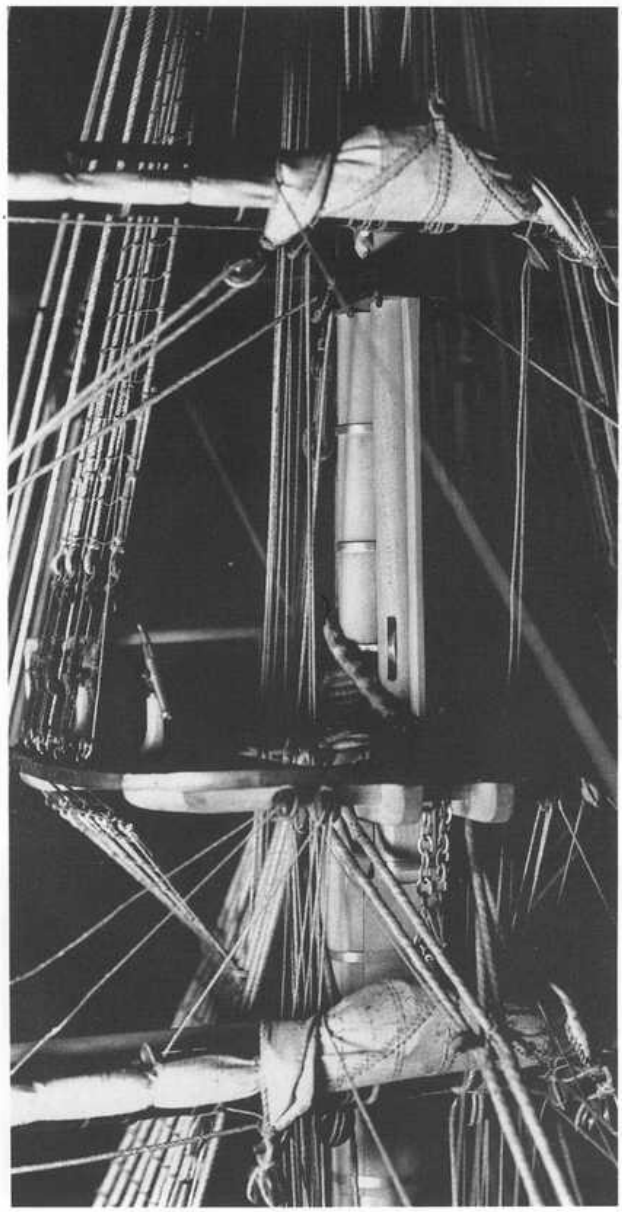


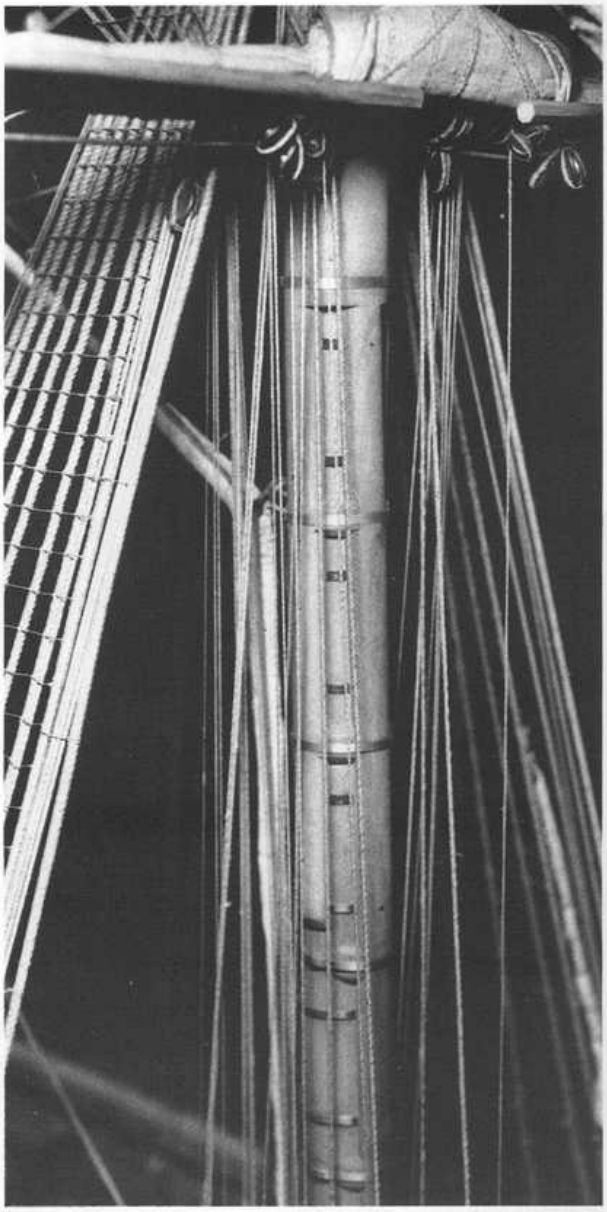
59. (*Unnamed 18-dr frigate, ca 1800*) (above). Close-up of the jeer-blocks of the mainyard, the slings, the inboard ends of the studdingsail booms, and the euphroe. On the left can be seen the robands, knotted together in pairs with half-hitches.

60. (*La Flore*) (below). This example shows the arrangement after the removal of the jeer-blocks, in order to lighten the top-hamper. The blocks were henceforth only used for hoisting and lowering the yard, which was not an everyday occurrence. Note the way the slings pass in front of the crosstrees. The mouse of the mainstay is on the starboard side, that of the preventer-stay to port.



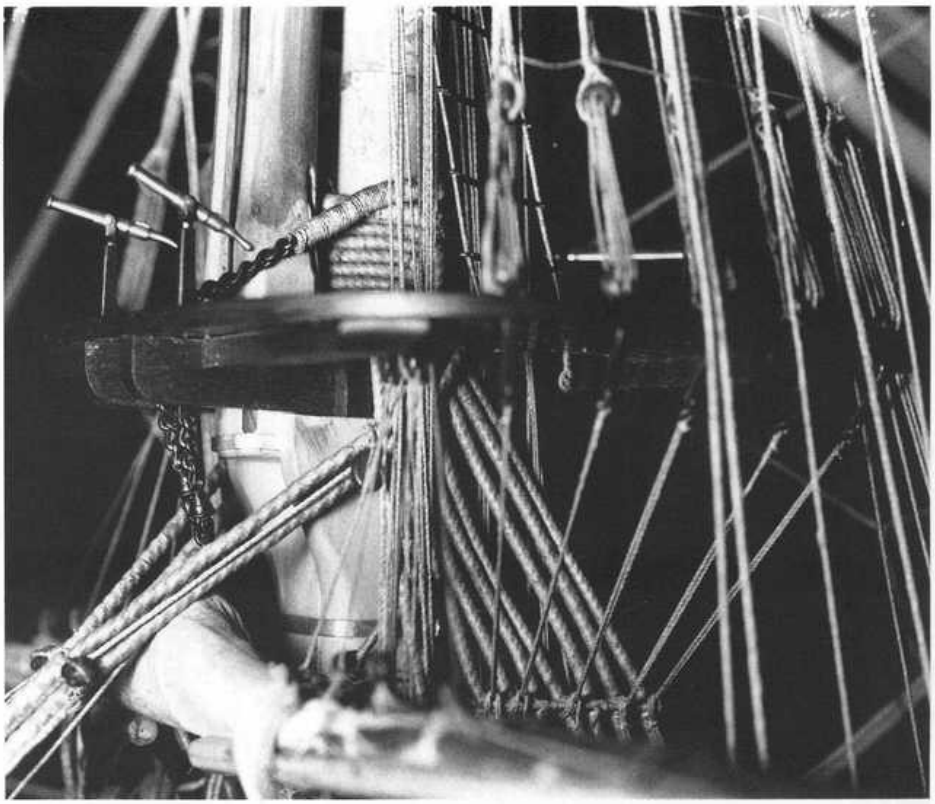
61. (*L'Alceste*) (below). The way the maincourse and the topsail are furled is clearly visible: the practice of furling them up and down the masthead below was abandoned during the last decades of the 18th century. The cap is supported on its fore side by a small cap-shore. Chain-slings have been rigged, and these have been leathered where they pass round the mast. The eyes of the stays are closed by a splice, and mouses have by now been abandoned.



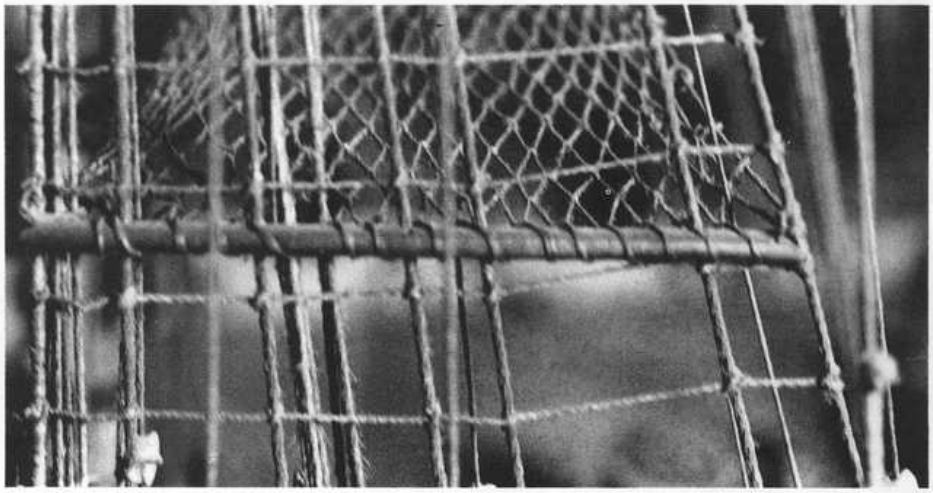


62. (*L'Alceste*) (above). Reinforcement of the lower masts with side-fishes, in addition to the rubbing-paunch on the fore side of the mast.

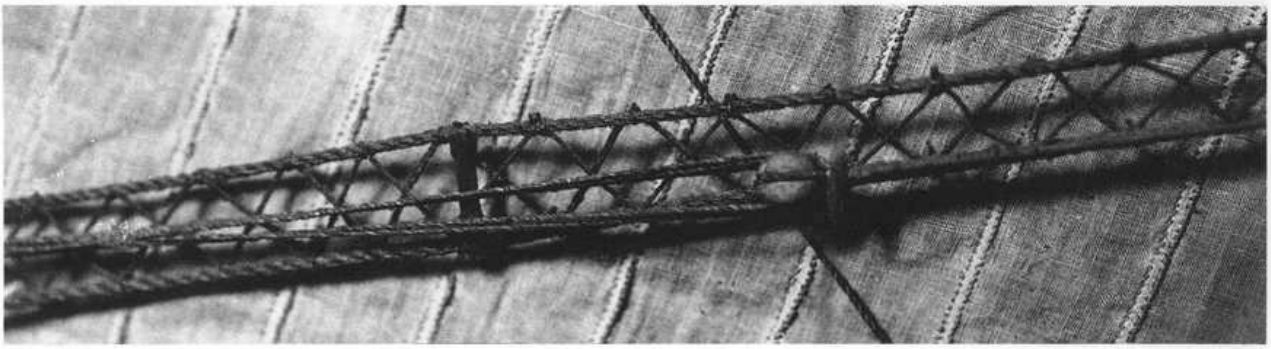
63. (*L'Alceste*) (above). Close-up of the side-fishes where they broaden out to form the bibbs. The crutches of the swivel-guns fit into the top of the vertical arm of a standard, the horizontal arm of which is fayed to the planking of the top. Note also the slings, and the small shroud-trucks seized to the eyes of the stays.

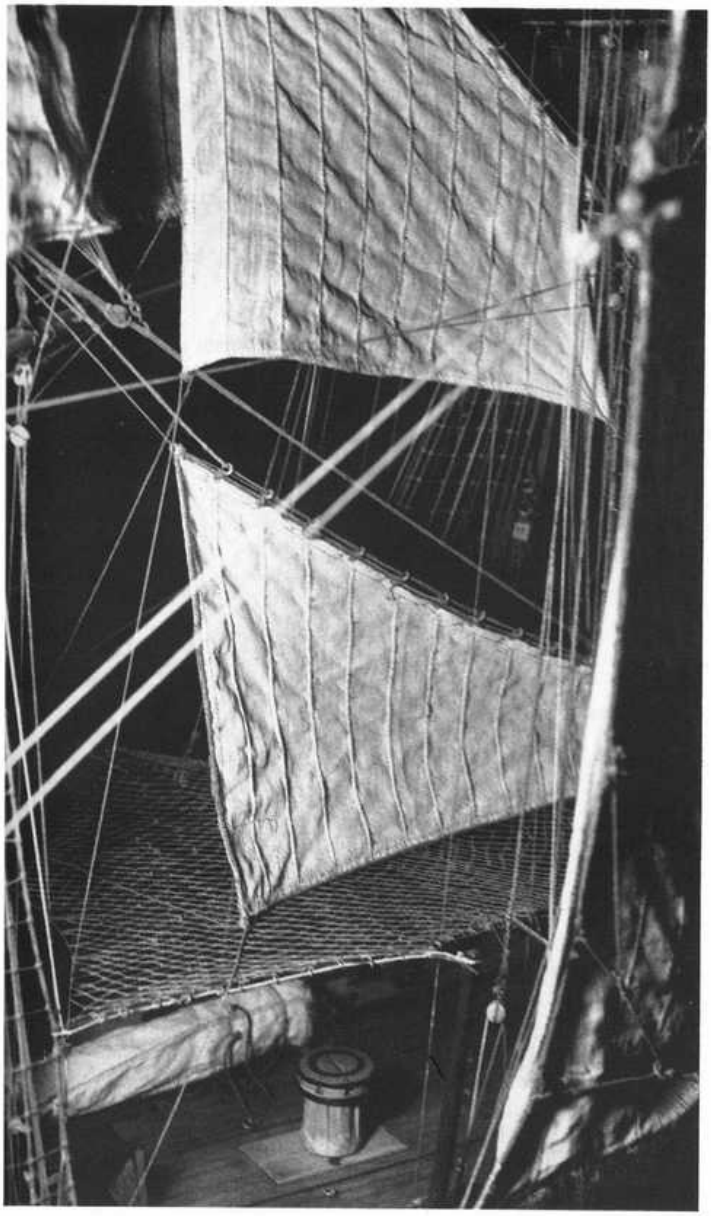


65. (*Unnamed 18-dr frigate, ca 1800*). Save-tate or overhead netting spread between the shrouds by means of a stretcher.



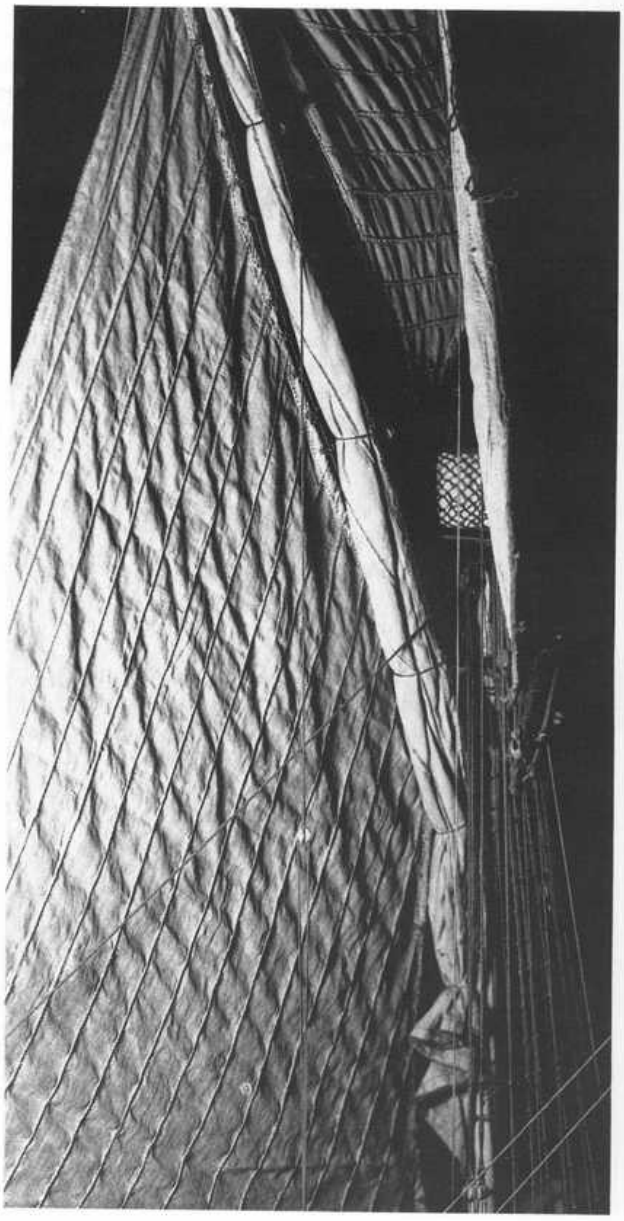
64. (*Unnamed 18-dr frigate, ca 1800*). Close-up of the snaking which was thought to strengthen the mainstay and main springstay by sharing the load between them. The distance separating them is maintained by means of spring-stay-staves, while the snaking is double.





▲ **66.** (*Unnamed 18-dr frigate, ca 1800*). Overall view of the save-tate shown on the opposite page in close-up. It runs between the mainmast and the mizen. Note the stanchion supporting it at the side. The staysails which can be seen are the mizen-staysail and the mizen-topmast staysail.

67. (*Unnamed 18-dr frigate, ca 1800*). Rare representation of the small gaff-mizen, furled along the mast and the gaff. Note also the horizontal cloths of the gaff-topsail. ▼



ALPHABETICAL LIST OF FRIGATES

This overall list covers in some 750 entries the 600 or so frigates of the French Navy built in French yards, or (in the Napoleonic era), in the occupied countries. Not included in this list are foreign-built frigates either bought-in or taken into the Navy following capture.

- This list includes only the summary details of each vessel, sufficient for accurate identification; for more detailed information on each, such as the dimensions or armament, the reader is referred to the individual lists of each class (as indicated in the second column) which appear at the end of the relevant chapters of this book.
- The reference "see" followed by another name in the Names column means that the original name of the vessel was different; it is this original name which should therefore be looked up in the detailed lists at the end of each chapter.
- The reference "Ex" means that the vessel was originally given another name prior to launch.
- The asterisk after the type designation "Ship-frigate" (Ship-frig.*) means that insufficient information has been found to permit an accurate classification.

Name	Type	Place of building	Builder	Laid down	Struck from lists	Date taken	Fate	Names (Original, Second, Third)
12 Avril	30-pdr/3rd	Brest	Hubert, J.B.	1830	1879		See *Charte*	
Abénakise	Ship-Frig. 1st	Quebec	Le Vasseur, R.N.	1756	1757		Taken	
Abondante	Light Frig.	Brest	Hubac, L.	1670	1692		Burned	See *Normande*
Actif	Ship-Frig. 2nd	Brest	Hubac, L.	1671	1694			*Émérillon* 1673
Actif	Ship-Frig. 1st	Rochefort	Malet, H.	1673	1696			*Étoile* 1675
Adélaïde	Ship-Frig. 1st	Toulon	Coulomb, F.	1697	1714		Wrecked	
Adrienne	18-pdr	Toulon	Sané, J.N.	1807	1847			*Aurore* 1814
Adroit	Ship-Frig. 2nd	Bayonne	Saboulin, J.	1666	1673			See *Bayonnais*
Adroit	Ship-Frig. 2nd	Le Havre	Chaillé, B.	1676	1689	1689	Taken	Ex-*Gracieuse*
Adroit	Ship-Frig. 1st	Le Havre	Salicon, E.	1690	1703		Sunk	
Africain	Ship-Frig. 1st	Bayonne	Arnaud, F.	1692	1723			
Africaine	18-pdr	Rochefort	Haran, R.A.	1795	1801	1801	Taken	
Africaine	18-pdr	Rotterdam	Sané, J.N.	1812	1822			See *Ems*
Africaine	30-pdr/3rd	St Servan	Hubert, J.B.	1835	1867			
Agamemnon	30-pdr/1st	Genoa	Sané, J.N.	1812	1836			See *Amphitrite*
Agläé	12-pdr	Rochefort	Duhamel, P.	1788	1802		Wrecked	*Fraternité* 1793
Aigle	Ship-Frig. 2nd	Bayonne	Arnaud, F.	1691	1712		Wrecked	
Aigle	12-pdr	St Malo	Sané, J.N.	1779	1782	1782	Taken	
Aigrette	8-pdr	Le Havre	Ginoux, J.J.	1756	1788			
Aimable	8-pdr	Toulon	Groignard, A.	1774	1782	1782	Taken	
Alceste	12-pdr	Toulon	Coulomb, J.M.B.	1780	1799	1799	Taken	
Alceste	24-pdr	Cherbourg	Leroux, P.	1828	1886			
Alcmène	8-pdr	Toulon	Groignard, A.	1774				
Alcmène	18-pdr	Cherbourg	Rolland, P.	1810	1814	1814	Taken	
Alcyon	Ship-Frig. 1st	Le Havre	Esnault, J.	1666	1686			See *Le Havre*
Alcyon	Ship-Frig. 1st	Dunkirk	Hendrick, H.	1689	1717			
Algérie	30-pdr/3rd	Rochefort	Hubert, J.B.	1843	1867			
Amarante	Light Frig.	Le Havre	Cochois, P.	1707	1724			
Amazone	Ship-Frig. 1st	Brest	Pangalo, B.	1706	1741			
Amazone	12-pdr	St Malo	Guignace, L.M.	1778	1782	1782	Taken	
Amazone	18-pdr	Le Havre	Forfait, P.A.L.	1806	1811		Burned	
Amazone	24-pdr	Brest	Simon, C.	1820	1841			
Ambitieuse	18-pdr	Amsterdam	Sané, J.N.	1812	1814		Ceded to Holland	
Amélie	18-pdr	Toulon	Sané, J.N.	1807	1842			*Junon* 1814
Amétyste	8-pdr	Brest	Geffroy jnr	1753	1771			
Amphitrite	Ship-Frig. 1st	Rochefort	Masson, P.	1696	1698		Sold	
Amphitrite	12-pdr	Bordeaux	Guignace, L.M.	1766	1791			See *Impérieuse*
Amphitrite	18-pdr	Dunkirk	Segondat Duvernet	1803	1837			
Amphitrite	18-pdr	Cherbourg	Rolland, P.	1806	1809		Burned	*Milanaise* 1805; *Sirène* 1814
Amphitrite	18-pdr	Rochefort	Rolland, P.	1806	1821			See *Andromède*
Amphitrite	30-pdr/1st	Genoa	Sané, J.N.	1812	1836			
Amstel	18-pdr	Rotterdam	Sané, J.N.	1812	1814		Ceded to Holland	
Andromaque	12-pdr	Brest	Lamothe, P.A.	1777	1796		Burned	
Andromaque	18-pdr	Nantes	Sané, J.N.	1808	1812		Burned	
Andromaque	30-pdr/1st	Lorient	Boucher, M.	1827	1869			

Name	Type	Place of building	Builder	Laid down	Struck from lists	Date taken	Fate	Names (Original, Second, Third)
Andromède	Light Frig.	Rochefort	Masson, P.	1703	1704			
Andromède	18-pdr	Rochefort	Rolland, P.	1806	1821			*Saale* 1807; *Amphitrite*1814
Andromède	24-pdr	Lorient	Hubert, J.B.	1827	1887			
Antigone	18-pdr	Bordeaux	Rolland, P.	1811	1821			
Aquilon	Ship-Frig. 1st	Toulon	Coulomb, F.	1733	1757			
Arc en Ciel	Ship-Frig. 1st	Dunkirk	Hendrick, H.	1665	1673			See *Flamand*
Arche de Noé	Ship-Frig. 1st	Toulon	Chapelle, F.	1673	1693			See *Éole*
Aréthuse	8-pdr	Le Havre	Ginoux, J.J.	1758	1759	1759	Taken	
Aréthuse	18-pdr	Brest	Ozanne, P.	1789	1793	1793	Taken	
Aréthuse	18-pdr	Nantes	Sané, J.N.	1807	1849			*Elbe* 1807; *Calypso*1814
Aréthuse	18-pdr	Nantes	Sané, J.N.	1808	1833		Cut down to sloop	
Argonaute	Ship-Frig. 1st	Brest	Pangalo, B.	1708	1746			
Argonaute	Ship-Frig. 1st	Brest	Hélie jnr	1722	1747			
Ariane	18-pdr	Nantes	Sané, J.N.	1807	1812		Burned	
Armide	18-pdr	Rochefort	Rolland, P.	1802	1806			
Armide	18-pdr	Nantes	Sané, J.N.	1812	1866			
Arrogant	Ship-Frig. 2nd	Brest	Hubac, L.	1670	1673			See *Victoire*
Arrogant	Ship-Frig. 2nd	Brest	Hubac, L.	1673	1684			See *Cache*
Artémise	12-pdr	Toulon		1794	1798			
Artémise	24-pdr	Lorient	Hubert, J.B.	1826	1887			
Assuré	Ship-Frig. 1st	Dunkirk	Hendrick, H.	1669	1685			*Français* 1671
Astrée	Light Frig.	Brest	Pangalo, B.	1706	1719			
Astrée	Light Frig.	Brest	Ollivier, J.	1727	1737			
Astrée	12-pdr	Brest	Lamothe, P.A.	1780	1794			
Astrée	18-pdr	Genoa	Sané, J.N.	1803	1810	1810	Taken	
Astrée	18-pdr	Nantes	Sané, J.N.	1812	1842			
Atalante	Light Frig.	Rochefort	Malet, H.	1693	1705			See *Salamandre*
Atalante	Ship-Frig. 1st	Le Havre	Cochois, P.	1706	1733			
Atalante	Ship-Frig. 1st	Toulon	Chapelle, J.A.	1740	1761			
Atalante	12-pdr	Toulon	Coulomb, J.L.	1767	1794	1794	Taken	
Atalante	18-pdr	St Malo	Sané, J.N.	1802	1805		Wrecked	
Atalante	18-pdr	Lorient	Sané, J.N.	1809	1825			Ex-*D. d'Angoulême; Eurydice*
Atalante	24-pdr	Lorient	Filhon, P.	1821	1850			
Audacieuse	Light Frig.	Dunkirk	Hendrick, H.	1691	1706		Wrecked	
Auguste	Ship-Frig. 1st	Brest	Geffroy	1738	1746			
Aurore	Light Frig.	In Seudre		1665	1675			*Sybille* 1671
Aurore	Light Frig.	Brest	Hubac, L.	1670	1692	1692	Taken	See *Normande*
Aurore	Light Frig.	Dunkirk	Hendrick, H.	1689	1692	1692	Taken	
Aurore	Light Frig.	Rochefort		1696	1697	1697		Taken
Aurore	Light Frig.	Le Havre	Cochois, P.	1697	1720			
Aurore	Ship-Frig. 1st	Rochefort	Morineau, P.	1744	1753			
Aurore	12-pdr	Rochefort	Chevillard jnr	1768	1793	1793	Taken	*Envieuse* 1767
Aurore	18-pdr	Toulon	Sané, J.N.	1807	1847			See *Adrienne*
Avenant	Ship-Frig. 1st	Brest	Pangalo, B.	1696	1704		Burned	
Aventurier	Ship-Frig. 1st	Marseilles	Audibert	1670	1697			Ex-*Galante* 1671
Badine	Light Frig.	Dunkirk	Hendrick, H.	1678	1684			
Badine	Ship-Frig. 2nd	Rochefort	Masson, P.	1688	1705		Wrecked	
Basque	Ship-Frig. 1st	Bayonne	Saboulin, J.	1669	1694			*Brillant* 1671; *Triton* 1678
Bayonnais	Ship-Frig. 2nd	Bayonne	Saboulin, J.	1666	1673		Wrecked	*Adroit* 1671
Bayonne	Light Frig.	Bayonne		1692	1693			*Jolie* 1692
Beaufort	Ship-Frig. 1st	Toulon	Rodolphe, G.	1661	1686			*Neptune* 1671; *Maure* 1679
Belle	Light Frig.	Rochefort		1667	1673			See *Madeleine*
Belle Gabrielle	30-pdr/1st	Cherbourg	Boucher, M.	1824	1860			*Indépendante* '30
Belle-Poule	12-pdr	Bordeaux	Guignace, L.M.	1765	1780	1780	Taken	
Belle-Poule	18-pdr	Nantes	Sané, J.N.	1802	1806	1806	Taken	
Belle-Poule	30-pdr/1st	Cherbourg	Boucher, M.	1827	1861			
Bellone	Ship-Frig. 1st	Brest	Pangalo, B.	1695	1719			
Bellone	8-pdr	Rochefort		1756	1759			
Bellone	12-pdr	St Malo	Guignace, L.M.	1778	1798	1798	Taken	
Bellone	18-pdr	St Malo	Pestel, F.	1803	1810	1810	Taken	
Bellone	18-pdr	Toulon	Sané, J.N.	1806	1840			See *Pauline*

Name	Type	Place of building	Builder	Laid down	Struck from lists	Date taken	Fate	Names (Original, Second, Third)
Bellone	24-pdr	Cherbourg	Chédeville	1843	1895			
Biche	Light Frig.	Port Royal	Brouillan, J.	1704	1709	1709	Taken	
Bien-Aimé	Ship-Frig. 2nd	Dunkirk	Hendrick, H.	1670	1693			See *Dur*
Bien-Aimé	Light Frig.	Toulon	Chapelle, F.	1671	1685			
Bizarre	Ship-Frig. 1st	Marseilles	Audibert	1670	1694			Ex-*Mignonne*; *Colosse* 1692
Blanche	12-pdr	Le Havre	Ginoux, J.J.	1766	1779	1779	Taken	
Blonde	8-pdr	Le Havre	Ginoux, J.J.	1755	1760			
Bonne	Light Frig.	Brest	Le Brun, F.	1691	1707			
Boudeuse	12-pdr	Nantes	Raffeau	1766	1800			
Bouffone	Ship-Frig. 2nd	Toulon	Rodolphe, G.	1669	1682		Wrecked	*Drôle* 1671; *Gaillard* 1678
Boufonne	Light Frig.	Le Havre	Tortel, J.	1670	1681			See *Dangereux*
Bouffonne	Light Frig.	Brest	Hubac, L.	1678	1696			
Bravoure	12-pdr	St Malo	Duhamel, P.	1793	1801			
Bretonne	Light Frig.	Brest	Hubac, L.	1670	1675	1675	Taken	*Tempête* 1671
Brillant	Ship-Frig. 1st	Bayonne	Saboulin, J.	1669	1694			See *Basque*
Brune	8-pdr	Le Havre	Ginoux, J.J.	1755	1761			
Brusque	Ship-Frig. 1st	Dunkirk	Debast	1665	1688			See *Dunkerque*
Brutal	Ship-Frig. 1st	Dunkirk	Hendrick, H.	1671	1689			*Croissant* 1675
Caché	Ship-Frig. 2nd	Brest	Hubac, L.	1673	1684		Wrecked	*Arrogant* 1673; *Galant* 1678
Caiche Neuve	Light Frig.	Brest	Hubac, L.	1671	1681			See *Railleuse*
Calypso	12-pdr	Brest	Forfait, P.A.L.	1785	1793			
Calypso	18-pdr	Lorient	Forfait, P.A.L.	1805	1825			
Calypso	18-pdr	Nantes	Sané, J.N.	1807	1849			See *Aréthuse*
Calypso	24-pdr	Toulon	Garnier, H.	1820	1856			See *Cérès*
Canadien	Ship-Frig.*	Quebec		1670	1677			
Capable	Ship-Frig. 1st	Toulon	Rodolphe, G.	1665	1690			See *Provençal*
Capricieuse	12-pdr	Lorient	Segondat Duvernet, C.A.	1779	1780	Burned		
Capricieuse	12-pdr	Lorient	Segondat Duvernet, C.A.	1786	1799			*Charente* 1793
Capricieux	Ship-Frig. 2nd	Dunkirk	Hendrick, H.	1689	1690		Wrecked	
Carmagnole	18-pdr	Brest	Sané, J.N.	1792	1800		Wrecked	*Rassurante* 1795
Caroline	18-pdr	Antwerp	Sané, J.N.	1806	1809	1809	Taken	
Castor	8-pdr	Quebec	Le Vasseur, R.N.	1744	1747			
Cérès	12-pdr	Rochefort	Bombelle	1779	1787			
Cérès	18-pdr	Brest	Sané, J.N.	1810	1814	1814	Taken	
Cérès	24-pdr	Toulon	Garnier, H.	1820	1856			*Marie Thérèse* '33; *Calyspo* 1835
Changé	Ship-Frig. 1st	Toulon	Chapelle, F.	1673	1693			See *Éole*
Charente	12-pdr	Lorient	Segondat Duvernet, C.A.	1786	1799		Wrecked	See *Capricieuse*
Charente Infér[re]	12-pdr	Rochefort	Haran, R.A.	1794	1796	1796	Taken	*Tribune* 1794
Charmante	Light Frig.	Dunkirk	Hendrick, H.	1678	1684			
Charmante	Light Frig.	Dunkirk	Hendrick, H.	1688	1692		Burned	
Charmante	12-pdr	Rochefort	Chevillard jnr	1777	1780			
Charte	30-pdr/3rd	Brest	Hubert, J.B.	1830	1879			*Constitution* '48
Chasse	Light Frig.	Le Havre	Chaillé, B.	1702	1709		Sold	
Cheval Marin	Ship-Frig. 1st	Toulon	Coulomb, L.	1664	1728			Ex-*Prince* 1665
Chiffonne	12-pdr	Nantes		1795	1802	1802		Taken
Chimère	12-pdr	Toulon	Coulomb, J.M.B.	1758	1783			
Choquante	Light Frig.	Brest	Hélie	1691	1702		Burned	
Christine	Light Frig.	Brest		1666	1680		Sold	*Sans Peur* 1671
Circée	18-pdr	Rochefort	Rolland, P.	1811	1832		Cut down to a sloop	
Cléopâtre	12-pdr	St Malo	Sané, J.N.	1781	1792	1792	Taken	
Cléopâtre	18-pdr	Cherbourg	Rolland, P.	1812	1823			
Cléopâtre	24-pdr	St Servan	Hubert, J.B.	1827	1869			
Clorinde	18-pdr	Nantes	Gauthier, J.A.	1807	1814	1814	Taken	
Clorinde	24-pdr	Cherbourg	Bretocq, L.	1819	1833			
Clorinde	24-pdr	Brest	Perroy, J.B.	1837	1838			
Clorinde	30-pdr/3rd	Cherbourg	Boucher, M.	1842	1888			
Cocarde	12-pdr	St Malo	Duhamel, P.	1793	1802			
Colosse	Ship-Frig. 1st	Marseilles	Audibert	1670	1694			See *Bizarre*
Colosse	30-pdr/1st	Toulon	Sané, J.N.	1813	1840			See *Pallas*
Comète	8-pdr	Brest	Ollivier, J.L.	1752	1761			
Comte	Ship-Frig. 1st	Brest	Hubac, L.	1664	1676			See *Duc*

Name	Type	Place of building	Builder	Laid down	Struck from lists	Date taken	Fate	Names (Original, Second, Third)
Comte	Ship-Frig. 1st	Brest	Le Brun, P.	1677	1698			Ex-*Fidèle*
Concorde	12-pdr	Rochefort	Chevillard snr	1777	1783	1783	Taken	
Concorde	18-pdr	Brest	Lamothe, P.A.	1791	1800	1800	Taken	
Consolante	24-pdr	Lorient	Boux	1772	1784			
Consolante	18-pdr	St Malo	Pestel, F.	1795	1803		Wrecked	
Constance	18-pdr	Brest	Sané, J.N.	1812	1836			
Constant	Ship-Frig. 1st	Dunkirk	Hendrick, H.	1669	1692		Sold	*Oiseau* 1671
Constitution	30-pdr/3rd	Brest	Hubert, J.B.	1830	1879			See *Charte*
Coquille	12-pdr	Bayonne	Haran, R.A.	1794	1810			See *Patriote*
Cornélie	18-pdr	Brest	Sané, J.N.	1794	1808	1808	Taken	
Cornélie	18-pdr	Bordeaux	Rolland, P.	1812	1814			
Coste Angélique	Light Frig.	Le Havre	Cochois, P.	1714	1718		Sold	
Courageuse	12-pdr	Rochefort	Chevillard snr	1778	1787	1797	Taken	
Courageuse	18-pdr	Brest	Sané, J.N.	1794	1801			
Courageuse	12-pdr	Toulon		1794	1799			
Courageux	Ship-Frig. 1st	Concarneau	Hubac, L.	1657	1673			See *Triomphe*
Créole	18-pdr	Nantes	Lamothe, P.A.	1795	1803	1803	Taken	
Croissant	Ship-Frig. 2nd	Dunkirk	Hendrick, H.					See *Brutal*
Croissant	Ship-Frig. 2nd	Toulon	Coulomb, L.	1679	1704			See *Royale*
Cybèle	18-pdr	Brest	Lamothe, P.A.	1789	1809			
Cybèle	18-pdr	Le Havre	Sané, J.N.	1810	1833		Cut down to a sloop	
Danäé	12-pdr	Le Havre	Ginoux, J.J.	1756	1759	1769		
Danäé	8-pdr	Nantes	Groignard, A.	1763	1779			
Danäé	12-pdr	Lorient	Segondat Duvernet, C.A.	1782	1795			
Danäé	18-pdr	Genoa	Pestel, F.	1804	1812		Blown up	
Danäé	18-pdr	Dunkirk	Segondat Duvernet, C.A.	1805	1873			See *Nymphe*
Danäé	24-pdr	St Servan	Hubert, J.B.	1827	1878			
Dangereux	Light Frig.	Le Havre	Tortel, J.	1670	1678			See *Embuscade*
Dangereux	Light Frig.	Le Havre	Tortel, J.	1670	1681			*Boufonne* 1671; *Dangereux* 1678
Dauphin	Ship-Frig.*	Le Havre	Le Chevallier, R.	1638	1661			
Dauphin	Light Frig.	Dunkirk	Hendrick, H.	1679	1689			See *Railleuse*
Dauphin Bayonne	Ship-Frig. 2nd	Bayonne	Malet, H.	1667	1690			*Perle* 1675
Dauphiné	Ship-Frig. 1st	Le Havre	Chaillé-Cochois	1696	1702		Burned	
Dauphiné	Light Frig.	Le Havre	Cochois, P.	1703	1705		Wrecked	
Décade	12-pdr	Bordeaux		1794	1798	1798	Taken	Ex-*Macreuse*
Dédaigneuse	12-pdr	Bordeaux	Guignace, L.M.	1766	1784			
Dédaigneuse	12-pdr	Bayonne	Haran, R.A.	1797	1801	1801	Taken	
Diane	Light Frig.	Lorient	Coulomb, P.	1704	1705		Wrecked	
Diane	Ship-Frig. 2nd	Le Havre	Cochois, P.	1706	1711			
Diane	Ship-Frig. 1st	Toulon	Coulomb, F.	1741	1758			
Diane	12-pdr	St Malo	Maistral, J.J.	1778	1780			See *Minerve*
Diane	18-pdr	Toulon	Simon, C.	1794	1800	1800	Taken	
Didon	18-pdr	St Malo	Pestel, F.	1797	1805	1805	Taken	
Didon	18-pdr	Lorient	Sané, J.N.	1810	1891			*D. de Berry* '16; *Résolue* '30
Didon	30-pdr/1st	Toulon	Leroux, P.	1825	1867			
Dieppoise	Light Frig.	Dieppe		1667	1675		Sold	*Lutine* 1671
Diligente	Light Frig.	Brest	Hubac, L.	1666	1675		Broken up	
Diligente	Light Frig.	Rochefort	Guichard, J.	1676	1691		Stranded	
Diligente	Light Frig.	Le Havre	Chaillé-Salicon	1692	1694	1694	Taken	
Diligente	8-pdr	Lorient	Coulomb, J.L.	1756			Bought Cie des Indes	
Diligente	8-pdr	Lorient	Coulomb, J.L.	1765			Bought Cie des Indes	
Dragon	Ship-Frig. 2nd	Brest	Hubac, L.	1646	1674			
Dragon	Ship-Frig. 2nd	Brest	Hubac, L.	1673	1712			See *Entreprenant*
Drôle	Ship-Frig. 2nd	Toulon	Rodolphe, G.	1669	1682			See *Bouffone*
Dryade	Ship-Frig. 1st	Le Havre	Cochois, P.	1702	1709	1709	Taken	
Dryade	18-pdr	St Malo	Sané, J.N.	1782	1796			*F. de Lys* 1819; *Résolue* 1830
Dryade	18-pdr	Genoa	Sané, J.N.	1812	1835			
Dryade	30-pdr/1st	Rochefort	Leroux, P.	1822	1838			
Duc	Ship-Frig. 1st	Brest	Hubac, L.	1664	1676		Wrecked	*Comte* 1671
Desse de Berry	18-pdr	Lorient	Sané, J.N.	1810	1891			See *Didon*
Dunkerquois	Ship-Frig. 1st	Dunkirk	Debast	1665	1688			*Brusque* 1671

Name	Type	Place of building	Builder	Laid down	Struck from lists	Date taken	Fate	Names (Original, Second, Third)
Dur	Ship-Frig. 2nd	La Ciotat	Coulomb, L.	1661	1688			See *St Joseph*
Dur	Ship-Frig. 2nd	Dunkirk	Hendrick, H.	1670	1693			*Éveillé* 1671; *Bien-Aimé* 1685
Éclair	Ship-Frig. 2nd	Rochefort	Aubin	1672	1710			*Soleil Afriq.* '75; *Lion* 1678
Écueil	Ship-Frig.*	Brest	Hubac, L.	1660	1673			See *Infante*
Écueil	Ship-Frig. 1st	Le Havre	Salicon, E.	1678	1689		Sold	Ex-*Marin* 1678; Ex-*Lion* 1678
Écureuil	Ship-Frig. 2nd	Concarneau	Hubac, L.	1658	1675		Fireship	*Orage* 1671; *Éclair* 1675
Egyptienne	24-pdr	Toulon	Caro, F.	1799	1801	1801		
Elbe	18-pdr	Nantes	Sané, J.N.	1807	1849			See *Aréthuse*
Elbœuf	Ship-Frig.*	Elbœuf	Richot, M.	1646	1670			
Élisa	18-pdr	Le Havre	Sané, J.N.	1806	1806		Wrecked	
Embuscade	Light Frig.	Le Havre	Tortel, J.	1670	1678		Sold	*Dangereux* 1677; *Embuscade* 1677
Embuscade	Light Frig.	Le Havre	Salicon, E.	1680	1698			Ex-*Royale* 1681
Embuscade	Light Frig.	Le Havre	Chaillé, B.	1703	1707	1707	Taken	
Embuscade	8-pdr	Le Havre	Chaillé	1745	1746	1746	Taken	
Embuscade	12-pdr	Rochefort	Vial du Clairbois, H.S.	1789	1803	1803	Taken	
Émeraude	Light Frig.	Dunkirk	Hendrick, H.	1691	1702		Burned	
Émeraude	8-pdr	Le Havre	Chaillé	1744	1757			
Émeraude	12-pdr	St Malo	Sané, J.N.	1779	1787			
Émeraude	18-pdr	Bayonne	Rolland, P.	1808	1817			
Émérillon	Ship-Frig. 2nd	Brest	Hubac, L.	1671	1694			See *Actif*
Emporté	Ship-Frig. 1st	Dunkirk	Hendrick, H.	1683	1704			Ex-*Trompeuse* '83
Ems	18-pdr	Rotterdam	Sané, J.N.	1812	1822			*Africaine* 1814
Engageante	12-pdr	Toulon	Estienne, J.F.	1767	1794	1794	Taken	
Enjouée	12-pdr	Le Havre	Ginoux, J.J.	1766	1774			
Entendu	Ship-Frig.*	St Malo		1664	1692			See *Dauphin*
Entendu	Ship-Frig. 2nd	Dunkirk	Hendrick, H.	1671	1675			See *Fâcheux*
Entreprenant	Ship-Frig. 2nd	Rochefort	Guichard, J.	1671	1704			*Vigilant* 1673; *Mignon* 1678
Entreprenant	Ship-Frig. 2nd	Brest	Hubac, L.	1673	1712			*Dragon* 1673
Entreprenante	Light Frig.	Bayonne	Barthe	1691	1702		Burned	
Entreprenante	30-pdr/1st	Lorient	Boucher, M.	1829	1885			
Envieuse	12-pdr	Rochefort	Chevillard	1767	1793			See *Aurore*
Éole	Ship-Frig.*	St Malo	Tanguy	1655	1673			See *Françoise*
Éole	Ship-Frig. 1st	Toulon	Chapelle, F.	1673	1693			Ex-*Arche de Noé*; *Changeant* '92
Érigone	18-pdr	Antwerp	Sané, J.N.	1810	1825			
Érigone	30-pdr/3rd	St Servan	Hubert, J.B.	1830	1865			
Espérance	12-pdr			1779			Bought-in	
Étoile	Ship-Frig. 1st	Rochefort	Malet, H.	1673	1696			See *Actif*
Étoile	Light Frig.	Le Havre	Cochois, P.	1703	1704	1704	Taken	
Étoile	Ship-Frig.*	Le Havre	Chaillé, P. jnr	1745	1747	1747	Taken	
Étoile	8-pdr	Toulon	Pomet, N.	1766			Wrecked	
Étoile	18-pdr	Nantes	Sané, J.N.	1812	1814	1814	Taken	
Eurydice	18-pdr	Rotterdam	Sané, J.N.	1809	1847			
Eurydice	18-pdr	St Malo	Sané, J.N.	1810	1825			See *Prégel*
Eurydice	18-pdr	Amsterdam	Sané, J.N.	1811	1814		Ceded to Holland	
Éveillé	Ship-Frig. 2nd	Dunkirk	Hendrick, H.	1670	1693			See *Dur*
Éveillé	Ship-Frig. 2nd	Brest	Hubac, L.	1685	1702	1689	Taken	
Fâcheux	Ship-Frig. 1st	Dunkirk	Hendrick, H.	1671	1675		Burned	*Entendu* 1675
Faucon	Ship-Frig.*	Brest	Hubac, L.	1656	1673			See *St Sébastien*
Faucon	Ship-Frig. 1st	Rochefort	Guichard, J.	1673	1708			Ex-*Inconnu*
Favori	Ship-Frig. 1st	Bayonne	Arnaud, F.	1691	1702		Fireship	
Favorite	Light Frig.	Rochefort		1671	1674		Burned	
Favorite	Ship-Frig. 2nd	Le Havre	Chaillé, B.	1676	1709			See *Palmier*
Favorite	Light Frig.	Rochefort	Pomet, F.	1678	1694		Taken	
Favorite	8-pdr	Brest	Ollivier, J.L.	1747	1770			
Fée	Light Frig.	Brest	Hubac, L.	1676	1698			*Jalouse* 1690
Fée	Light Frig.	Dunkirk	Hendrick, H.	1688	1704	1704	Taken	
Fée	12-pdr	Rochefort	Chevillard snr	1779	1783			
Félicité	8-pdr			1756	1761			
Félicité	12-pdr	Brest	Forfait, P.A.L.	1785	1809	1809	Taken	
Fendant	Ship-Frig. 1st	Bayonne	Saboulin, J.	1670	1694			Ex-*Grâces* 1671
Ferme	Ship-Frig. 1st	Toulon	Chapelle, F.	1674	1690			Ex-*Laurier*; *Serpente* 1678

Name	Type	Place of building	Builder	Laid down	Struck from lists	Date taken	Fate	Names (Original, Second, Third)
Fidèle	Ship-Frig. 1st	Toulon	Audibert	1665	1695		See *Toulon*	
Fidèle	Ship-Frig. 1st	Brest	Le Brun, P.	1677	1698			See *Comte*
Fidèle	8-pdr	Rochefort	Geslain, B.	1748	1758			
Fidèle	12-pdr	Le Havre	Forfait, P.A.L.	1789	1802			
Fidèle	12-pdr	Bayonne	Haran, R.A.	1795	1809			*Sirène* 1795
Fidèle	18-pdr	Flushing	Sané, J.N.	1807	1809	1809	Taken	
Fidèle	18-pdr	Rotterdam	Sané, J.N.	1813	1814		Ceded to Holland	
Fine	8-pdr			1744	1746			
Fine	12-pdr	St Malo	Sané, J.N.	1778	1794		Wrecked	
Flamand	Ship-Frig. 1st	Dunkirk	Hendrick, H.	1665	1673	1673	Taken	*Arc en Ciel* '71
Fleur de Lis	Ship-Frig.*	Brest	Carteret, G.	1657	1662			
Fleur de Lys	8-pdr	Brest	Ollivier, J.L.	1753	1760			
Fleur de Lys	12-pdr	Rochefort	Haran, R.A.	1782	1795	1795	Taken	*Pique* 1792
Fleur de Lys	18-pdr	Genoa	Sané, J.N.	1812	1835			See *Dryade*
Flore	Ship-Frig.*	Bayonne	Tassy, A.	1704	1722			See *Vênus*
Flore	Light Frig.	Le Havre	Cochois, P.	1706	1724			
Flore	Ship-Frig. 2nd	Toulon	Coulomb, F.	1728	1761			
Flore	8-pdr	Brest	Groignard, A.	1769	1782	1782	Taken	
Flore	18-pdr	Rochefort	Rolland, P.	1804	1811			
Folle	8-pdr	Nantes	Lamothe, P.A.	1760	1762			
Forte	24-pdr	Lorient	Caro, F.	1794	1800	1800		
Forte	30-pdr/1st	Cherbourg	Boucher, M.	1827	1868			
Fortune	Light Frig.	Dunkirk	Le Vasseur, R.N.	1704	1728			
Fortunée	12-pdr	Le Havre	Forfait, P.A.L.	1777	1793			
Fortunée	12-pdr	Le Havre	Forfait, P.A.L.	1790	1795		Destroyed	
Français	Ship-Frig. 1st	Dunkirk	Hendrick, H.	1669	1685			See *Assuré*
Français	Ship-Frig. 1st	Le Havre	Salicon, E.	1687	1735			
Franchise	12-pdr	Bayonne	Haran, R.A.	1798	1798	1798	Taken	
Françoise	Ship-Frig. 1st	St Malo	Tanguy	1655	1673			*Éole* 1671
Friponne	Light Frig.	Rochefort	Mallet, P.	1670	1690	1690	Taken	
Friponne	8-pdr	Rochefort	Morineau, P.	1747	1761			
Friponne	12-pdr	Lorient	Segondat Duvernet, C.A.	1779	1796			
Furieuse	18-pdr	Cherbourg	Forfait, P.A.L.	1794	1809	1809	Taken	
Gaillard	Ship-Frig. 2nd	Toulon	Rodolphe, G.					See *Bouffone*
Gaillard	Light Frig.	Rochefort	Pomet, F.	1678	1687			See *Gaillarde*
Gaillard	Ship-Frig. 1st	Le Havre	Salicon, E.	1683	1689		Sold	
Gaillarde	Light Frig.	Dieppe		1667	1681			*Inconnu* 1678; *Incommode* 1678
Gaillarde	Light Frig.	Dunkirk	Hendrick, H.	1676	1695			*Sorcière* 1676
Gaillarde	Light Frig.	Rochefort	Pomet, F.	1678	1687			*Gaillard* 1690; *Séditieux* 1691
Gaillarde	Ship-Frig. 2nd	Rochefort	Masson, P.	1687	1712		Sold	
Galant	Ship-Frig. 2nd	Brest	Hubac, L.					See *Caché*
Galant	Ship-Frig. 1st	Brest	Hubac, L.	1666	1688			*Opiniâtre* 1678
Galante	Ship-Frig. 1st	Marseilles	Audibert	1670	1697			See *Aventurier*
Galathée	Light Frig.	Brest	Pangalo, B.	1696	1708	1708	Taken	
Galathée	Light Frig.	Le Havre	Cochois, P.	1707	1712	1712	Taken	
Galathée	Light Frig.	Brest	Salinoc	1744				
Galathée	12-pdr		Haran, R.A.	1779	1795		Wrecked	
Galathée	18-pdr	Genoa	Pestel, F.	1808	1837			
Gazelle	Light Frig.	Le Havre	Poirier, G.	1729	1748			
Gentille	Light Frig.	Le Havre	Chaillé, B.	1688	1697			
Gentille	Light Frig.	Dieppe	Guroult	1701	1702		Sold	
Gentille	Light Frig.	Le Havre	Cochois, P.	1702	1708	1708	Taken	
Gentille	12-pdr	St Malo	Guignace, L.M.	1778	1795	1795	Taken	
Gloire	Ship-Frig. 1st	Lorient	Hélie-Donnard	1707	1709	1709	Taken	
Gloire	Ship-Frig. 1st	Le Havre	Poirier, G.	1726	1740			
Gloire	12-pdr	St Malo	Guignace, L.M.	1778	1795	1795	Taken	
Gloire	18-pdr	Nantes	Forfait, P.A.L.	1803	1806	1806	Taken	
Gloire	18-pdr	Le Havre	Sané, J.N.	1811	1822			
Gloire	24-pdr	Rochefort	Hubert, J.B.	1827	1847			
Glorieux	30-pdr/1st	Rochefort	Sané, J.N.	1805	1857	See *Minerve*		
Gracieuse	Light Frig.	Le Havre	Chaillé, B.	1688	1697		Wrecked	

Name	Type	Place of building	Builder	Laid down	Struck from lists	Date taken	Fate	Names (Original, Second, Third)
Gracieuse	Light Frig.	Toulon	Coulomb, L.	1672	1675	1675	Taken	
Gracieuse	Ship-Frig. 2nd	Le Havre	Chaillé, B.	1676	1689			See *Adroit*
Gracieuse	Light Frig.	Le Havre	Cochois, P.	1701	1702	1702	Taken	
Gracieuse	Light Frig.	Le Havre	Cochois, P.	1702	1719			See *Nymphe*
Gracieuse	8-pdr	Toulon	Chapelle, F.	1749	1783			
Gracieuse	12-pdr	Toulon	Chapelle, J.A.	1750	1783			
Gracieuse	12-pdr	Rochefort	Chevillard jnr	1785	1796	1796	Taken	*Unité* 1793; *Variante* 1796
Grand Ponton	Ship-Frig. 2nd	Brest	Hubac, L.	1660	1677			See *Sauveur*
Griffon	Ship-Frig. 1st	Lorient	Coulomb, P.	1704	1714	1712	Taken	
Guerrière	Light Frig.	Bayonne	Arnaud, F.	1692	1693		Wrecked	
Guerrière	18-pdr	Cherbourg	Lafosse, J.F.	1798	1806	1806	Taken	
Guerrière	30-pdr/1st	Toulon	Sané, J.N.	1812	1840			Ex-*Romulus*
Hardi	Ship-Frig. 2nd	Brest	Hubac, L.	1670	1692			See *Périlleux*
Hasardeux	Ship-Frig.*	Brest		1659	1673			See *Ville de Rouen*
Hasardeux	Ship-Frig. 1st	Rochefort	Malet, H.	1673	1695		Wrecked	
Hasardeux	Ship-Frig. 1st	Lorient	Brun, F.	1698	1705			See *Maurepas*
Hautaine	Light Frig.	Dunkirk	Hendrick, H.	1693	1702			
Hébé	12-pdr	Le Havre	Ginoux, J.J.	1757	1764			
Hébé	18-pdr	St Malo	Sané, J.N.	1782	1782	1782	Taken	
Hébé	18-pdr	Venice	Sané, J.N.	1811	1814		Ceded to Austria	
Hélène	12-pdr	Rochefort	Chevillard jnr	1789	1793	1793	Taken	
Héliopolis	30-pdr/3rd	Rochefort	Hubert, J.B.	1830	1880			
Hercule	Ship-Frig. 1st	Brest	Hubac, L.	1673	1678		Wrecked	*Arrogant* 1678
Hercule	Ship-Frig. 2nd	Brest	Hubac, L.	1678	1704		Burned	
Hermine	Ship-Frig. 2nd	Dunkirk	Hendrick, H.	1663	1680			
Hermine	8-pdr			1756	1761			
Herminie	30-pdr/1st	Lorient	Boucher, M.	1824	1838			
Hermione	Ship-Frig. 1st	Brest	Hubac, L.	1699	1705		Lost	
Hermione	Light Frig.	Bayonne	Desjumeaux	1707	1710		Sold	
Hermione	12-pdr	Rochefort	Morineau, P.	1748	1757			
Hermione	12-pdr	Rochefort	Chevillard snr	1779	1793		Wrecked	
Hermione	18-pdr	Lorient	Geoffroy, A.	1803	1805			*Ville de Milan* 1803
Hermione	18-pdr	St Malo	Sané, J.N.	1811	1840			See *Illyrienne*
Héroïne	Light Frig.	Brest		1692	1694	1694	Taken	
Héroïne	Light Frig.	Brest		1696	1697	1697	Taken	
Héroïne	Ship-Frig. 2nd	Bayonne	Tassy, A.	1699	1702		Wrecked	
Héroïne	Light Frig.	Dunkirk	Le Vasseur, R.N.	1703	1708	1708	Taken	
Héroïne	8-pdr	Brest	Geffroy jnr	1752	1766			
Heureuse	Light Frig.	Dieppe	Chauvel	1692	1693	1693	Taken	
Hirondelle	Ship-Frig. 2nd	Dunkirk	Volquenirt	1663	1679			
Hirondelle	Ship-Frig. 2nd	Brest	Hubac, L.	1679	1687			
Hirondelle	Ship-Frig. 2nd	Toulon	Chapelle, F.	1699	1703		Wrecked	
Hortense	18-pdr	Toulon	Sané, J.N.	1803	1840			
Illyrienne	18-pdr	St Malo	Sané, J.N.	1811	1840			*Hermione* 1814
Immortalité	12-pdr	Lorient	Pénétreau, P.J.	1794	1798	1798	Taken	
Immortelle	18-pdr	Amsterdam	Sané, J.N.	1813	1814		Ceded to Holland	
Impatiente	18-pdr	Lorient	Segondat Duvernet, C.A.	1794	1796		Wrecked	
Impérieuse	12-pdr	Bordeaux	Guignace, L.M.	1766	1791			*Amphitrite* 1767
Impérieuse	18-pdr	Toulon	Coulomb, J.M.B.	1786	1793	1793	Taken	
Incommode	Light Frig.	Dieppe		1667	1681			See *Gaillarde*
Inconnu	Light Frig.	Dieppe		1667	1681			See *Gaillarde*
Inconnu	Ship-Frig. 1st	Rochefort	Guichard, J.	1673	1708			See *Faucon*
Inconstante	12-pdr	Le Havre	Ginoux, J.J.	1766	1781			
Inconstante	12-pdr	Rochefort	Chevillard jnr	1789	1793	1793	Taken	
Inconstante	18-pdr	Antwerp	Sané, J.N.	1812	1814		Allowed to France	
Indépendante	30-pdr/1st	Cherbourg	Boucher, M.	1824	1860			See *Belle Gabrielle*
Indienne	18-pdr	Le Havre	Forfait, P.A.L.	1795	1809		Wrecked	
Indiscrète	12-pdr	Nantes	Raffeau	1766	1783	1783	Taken	
Infante	Ship-Frig. 1st	Brest	Hubac, L.	1660	1673		Wrecked	*Écueil* 1671
Infatigable	18-pdr	Le Havre	Tellier, C.	1799	1806	1806	Taken	
Infidèle	12-pdr	Le Havre	Ginoux, J.J.	1766	1778			

Name	Type	Place of building	Builder	Laid down	Struck from lists	Date taken	Fate	Names (Original, Second, Third)
Insurgente	12-pdr	Lorient	Pénétreau, P.J.	1793	1799			
Iphigénie	12-pdr	Lorient	Guignace, L.M.	1777	1795			
Iphygénie	18-pdr	Dunkirk	Segondat Duvernet, C.A.	1805	1814			
Iphygénie	18-pdr	Cherbourg	Sané, J.N.	1810	1814	1814	Taken	*Oder* 1807; *Thémis* 1814
Iphygénie	30-pdr/1st	Toulon	Leroux, P.	1822	1872			
Iris	12-pdr	Toulon	Coulomb, J.M.B.	1781	1793		Burned	
Isis	12-pdr	Rochefort	Haran, R.A.	1780				
Isis	30-pdr/3rd	Brest	Boucher, M.	1846	1886			
Istrienne	18-pdr	Trieste	Sané, J.N.	1813	1813			
Italienne	18-pdr	St Malo	Pestel, F.	1803	1810			See *Sultane*
Jadhe	18-pdr	Rotterdam	Sané, J.N.	1812	1821			*Psyché* 1814
Jalouse	Light Frig.	Brest	Hubac, L.	1676	1698			See *Fée*
Jason	Ship-Frig. 1st	Le Havre	Poirier, G.	1724	1747			
Jeanne d'Arc	24-pdr	Brest	Simon, C.	1819	1833			
Jeanne d'Arc	30-pdr/3rd	Lorient	Guillemard, J.F.	1835	1864			
Jeux	Ship-Frig. 2nd	Rochefort	Guichard, J.	1669	1687		Sold	
Jeux	Ship-Frig. 2nd	Dunkirk	Hendrick, H.	1689	1706	1706	Taken	
Joli	Ship-Frig. 2nd	Brest	Hubac, L.	1670	1692			See *Périlleux*
Jolie	Light Frig.	Le Havre	Chaillé, B.	1675	1692		Wrecked	
Jolie	Light Frig.	Bayonne		1692	1693			See *Bayonne*
Jolie	Light Frig.	Bayonne	Arnaud, F.	1693	1702		Wrecked	
Joyeuse	Light Frig.	Le Havre	Salicon, E.	1691	1702	1702	Taken and retaken	
Joyeuse	Light Frig.	Le Havre	Cochois, P.	1702	1703		Burned	
Junon	Ship-Frig. 1st	Le Havre	Chaillé, P. jnr	1747	1757			
Junon	12-pdr	Rochefort	Chevillard jnr	1777	1780			
Junon	18-pdr	Toulon	Coulomb, J.M.B.	1782	1799	1799	Taken	
Junon	18-pdr	Le Havre	Forfait, P.A.L.	1805	1809		Broken up	
Junon	18-pdr	Toulon	Sané, J.N.	1807	1842			See *Amélie*
Justice	12-pdr	Toulon		1794	1796			See *Courageuse*
Laurier	Ship-Frig. 2nd	Brest	Hubac, L.	1670	1677		Wrecked	
Laurier	Ship-Frig. 1st	Toulon	Chapelle, F.	1674	1690			See *Ferme*
Laurier	Ship-Frig. 2nd	Brest	Hubac, L.	1678	1684			See *Marquis*
Le Havre	Ship-Frig. 1st	Le Havre	Esnault, J.		1666	1686		*Alcyon* 1671
Léger	Ship-Frig. 2nd	Le Havre	Salicon, E.	1680	1695			
Légère	Light Frig.			1659	1678			See *Petite Infante*
Légère	Light Frig.	Brest	Pangalo, B.	1682	1693	1693	Taken	
Légère	12-pdr	Le Havre	Ginoux, J.J.	1766	1779			
Licorne	8-pdr	Brest	Geffroy snr	1755	1778			
Lion	Ship-Frig. 2nd	Brest	Hubac, L.	1660	1677			See *Sauveur*
Lion	Ship-Frig. 2nd	Rochefort	Aubin	1672	1710			See *Éclair*
Lion	Ship-Frig.*	Le Havre	Salicon, E.	1678	1689			See *Écueil*
Lion d'Or	Ship-Frig. 2nd	Marseilles	Étienne, J.	1660	1673			*Vigilant* 1671
Loire	18-pdr	Nantes	Degay, P.	1795	1798	1798	Taken	
Lutine	Light Frig.	Dieppe		1667	1675			See *Dieppoise*
Lutine	Light Frig.	Dunkirk	Hendrick, H.	1675	1703		Wrecked	*Vipère* 1678
Lutine	12-pdr	Toulon	Coulomb, J.M.B.	1779	1781	1781	Taken	
Macreuse	12-pdr	Bordeaux		1794	1798			See *Décade*
Madeleine	Light Frig.	Rochefort		1667	1673			*Belle* 1671
Magicienne	18-pdr	Rochefort	Rolland, P.	1813	1840			
Malicieuse	8-pdr	Le Havre	Ginoux, J.J.	1756	1777			
Maligne	Light Frig.	Rochefort	Guichard, J.	1670	1695			
Manche	18-pdr	Cherbourg	Sané, J.N.	1804	1810	1810	Taken	
Mancini	Ship-Frig. 1st	Toulon	Rodolphe, G.	1661	1686			See *Beaufort*
Marie-Thérèse	24-pdr	Toulon	Garnier, H.	1820	1856			See *Cérès*
Marin	Ship-Frig. 1st	Le Havre	Salicon, E.					See *Écueil*
Marin	Ship-Frig. 2nd	Rochefort	Malet, H.	1679	1705			
Marquis	Ship-Frig. 2nd	Brest	Hubac, L.	1678	1684		Wrecked	Ex-*Laurier*
Maure	Ship-Frig. 1st	Toulon	Rodolphe, G.	1661	1686			See *Beaufort*
Maure	Ship-Frig. 1st	Bayonne	Saboulin, J.	1670	1685			Ex-*Artois* 1671; *Content* 1678
Maurepas	Ship-Frig. 1st	Lorient	Brun, F.	1698	1705		Sold	Ex-*Hasardeux* '98
Médée	Light Frig.	Dunkirk	Le Vasseur, R.N.	1703	1708	1708	Taken	

Name	Type	Place of building	Builder	Laid down	Struck from lists	Date taken	Fate	Names (Original, Second, Third)
Médée	8-pdr	Brest	Ollivier, B.	1740	1744			
Médée	12-pdr	St Malo	Guignace, L.M.	1778	1800	1800	Taken	
Médée	18-pdr	Genoa	Sané, J.N.	1810	1850			
Méduse	Light Frig.	Brest	Pangalo, B.	1699	1713		Wrecked	
Méduse	18-pdr	Lorient	Segondat Duvernet, C.A.	1782	1796		Burned	
Méduse	18-pdr	Nantes	Sané, J.N.	1806	1816			
Mégère	8-pdr	Bayonne	Tenard	1744	1749			
Melpomène	18-pdr	Toulon	Coulomb, J.M.B.	1788	1794	1794	Taken	
Melpomène	30-pdr/1st	Cherbourg	Boucher, M.	1825	1845			
Mercure	Ship-Frig. 2nd	Toulon	Rodolphe, G.	1669	1690			See *Trompeuse*
Meuse	18-pdr	?	Sané, J.N.	1811	1814			
Mignon	Ship-Frig. 1st	Toulon	Rodolphe, G.	1665	1690			See *Provençal*
Mignon	Ship-Frig. 2nd	Rochefort	Guichard, J.	1671	1704			See *Entreprenant*
Mignone	Ship-Frig. 1st	Marseilles	Audibert	1670	1694			See *Le Bizarre*
Mignone	Light Frig.	Dunkirk	Hendrick, H.	1672	1694			
Mignonne	8-pdr	Toulon	Sausillon, C.	1765	1779			Ex-*Précieuse*
Milanaise	18-pdr	Dunkirk	Segondat-Duvernet, C.A.	1803	1837			See *Amphitrite*
Minerve	8-pdr	Toulon	Coulomb, J.L.	1757	1762			
Minerve	12-pdr	St Malo	Maître-Sané	1778	1780		Wrecked	*Diane* 1778
Minerve	18-pdr	Toulon	Coulomb, J.M.B.	1782	1794	1794	Taken	
Minerve	18-pdr	Toulon	Coulomb, J.M.B	1793	1795	1795	Taken	
Minerve	18-pdr	Nantes	Sané, J.N.	1801	1806	1806	Taken	*Présidente* 1803
Minerve	18-pdr	Rochefort	Rolland, P.	1804	1806	1806	Taken	
Minerve	30-pdr/1st	Rochefort	Sané, J.N.	1805	1857			
Modeste	12-pdr	Toulon	Coulomb, J.M.B.	1785	1793	1793	Taken	
Monarque	Ship-Frig. 1st	Toulon	Pomet	1684				See *Sirène*
Montagne	18-pdr	Rochefort	Chevillard jnr	1794	1806			See *Volontaire*
Moqueuse	Light Frig.	Brest		1676	1686		Sold	
Mouche ?	Light Frig.	?		1704	1704	1704	Taken	
Mutine	Light Frig.	Rochefort		1670	1675	1675	Taken	
Mutine	Light Frig.	Brest	Le Brun, P.	1676	1694		Wrecked	
Mutine	Ship-Frig.*	Lorient	Coulomb, P.	1692	1695			
Mutine	Ship-Frig. 1st	Brest	Le Brun, F.	1694	1707		Stranded	
Mutine	Light Frig.	Brest	Geffroy jnr	1744				
Naïade	Light Frig.	Dunkirk	Hendrick, H.	1691	1695			
Naïade	Light Frig.	Brest	Pangalo, B.	1696	1705			
Naïade	Light Frig.	St Malo		1706	1710			
N.D. des Anges	Light Frig.	Dunkirk		1665	1674			*Subtile* 1671
Némésis	24-pdr	Brest	Perroy, J.B.	1828	1866			
Neptune	Ship-Frig. 1st	Toulon	Rodolphe, G.	1661	1686			See *Beaufort*
Néréïde	Light Frig.	Brest	Pangalo, B.	1696	1713			
Néréïde	Ship-Frig. 1st	Rochefort	Ollivier, J.	1722	1743			
Néréïde	12-pdr	St Malo	Sané, J.N.	1779	1797	1797	Taken	
Néréïde	18-pdr	St Malo	Pestel, F.	1808	1811	1811	Taken	
Néréïde	18-pdr	Toulon	Sané, J.N.	1812	1825			See *Rancune*
Néréïde	24-pdr	Lorient	Hubert, J.B.	1828	1887			
Niémen	18-pdr	Bordeaux	Rolland, P.	1808	1809	1809	Taken	
Niobé	24-pdr	Rochefort	Hubert, J.B.	1827	1881			See *Virginie*
Normande	Light Frig.	Brest	Hubac, L.	1670	1689			See *Aurore*
Normande	Light Frig.	Brest	Hubac, L.	1670	1692			*Aurore* 1671; *Volante* 1688
Nymphe	Light Frig.	Le Havre	Cochois, P.	1702	1719			*Gracieuse* 1705
Nymphe	8-pdr	Rochefort	Groignard, A.	1752	1757			
Nymphe	12-pdr	Brest	Lamothe, P.A.	1777	1780	1780	Taken	
Nymphe	18-pdr	Brest	Lamothe, P.A.	1782	1793		Wrecked	
Nymphe	18-pdr	Nantes	Sané, J.N.	1807	1832			
Nymphe	18-pdr	Dunkirk	Segondat Duvernet, C.A.	1805	1873			*Vistule* 1807; *Danäé* 1814
Oiseau	Ship-Frig. 1st	Dunkirk	Hendrick, H.	1669	1692			See *Constant*
Oiseau	Ship-Frig. 2nd	Brest	Hubac, L.	1695	1704		Burned	
Oiseau	8-pdr	Toulon	Coulomb, J.L.	1757	1762			
Oiseau	8-pdr	Rochefort	Clairin Deslauriers	1768	1779	1779	Taken	
Opale	8-pdr	Bayonne		1757	1762			

Name	Type	Place of building	Builder	Laid down	Struck from lists	Date taken	Fate	Names (Original, Second, Third)
Opiniâtre	Ship-Frig. 1st	Brest	Hubac, L.	1666	1688			See *Galant*
Opiniâtre	Ship-Frig.*	Dunkirk	Hendrick, H.	1689	1690		Taken	
Opiniâtre	Ship-Frig. 1st	Rochefort	Malet, H.	1690	1699		Sold	
Orage	Ship-Frig. 2nd	Concarneau	Hubac	1675				See *Écurueil*
Oriflamme	30-pdr/3rd	St Servan	Hubert, J.B.	1830	1865			See *Érigone*
Pallas	12-pdr	St Malo	Guignace, L.M.	1777	1778	1778	Taken	
Pallas	18-pdr	Nantes	Sané, J.N.	1806	1821			
Pallas	30-pdr/1st	Toulon	Sané, J.N.	1813	1840			
Palmier	Ship-Frig. 2nd	Le Havre	Chaillé, B.	1676	1709		Sold	Ex-*Favorite*; Ex-*Soleil Afrique*
Pandore	24-pdr	Brest	Perroy, J.B.	1829	1893			
Panthère	Light Frig.	Brest	Coulomb, J.L.	1744	1745	1745	Taken	
Panthère	12-pdr	Bordeaux		1794	1796			*Républicaine* '95
Parfaite	Ship-Frig. 1st	Toulon	Coulomb, F.	1703	1718		Wrecked	
Parfaite	Ship-Frig. 1st	Brest	Hélie jnr	1722	1746			
Patriote	12-pdr	Bayonne	Haran, R.A.	1794	1810			*Coquille* 1795
Pauline	18-pdr	Toulon	Sané, J.N.	1806	1840			*Bellone* 1814
Pénélope	18-pdr	Bordeaux	Rolland, P.	1802	1816			
Pénélope	30-pdr/3rd	Lorient	Guillemard, J.F.	1830	1864			
Pensée	18-pdr	Le Havre	Forfait, P.A.L.	1794	1795			See *Spartiate*
Périlleux	Ship-Frig. 2nd	Brest	Hubac, L.	1670	1692		Wrecked	*Hardi* 1671; *Joli* 1678
Perle	Ship-Frig. 2nd	Bayonne	Malet, H.	1667	1690			See *Dauphin Bayon.*
Perle	Ship-Frig. 1st	Rochefort	Malet, H.	1690	1699			See *Poli*
Perle	18-pdr	Toulon	Coulomb, J.M.B.	1789	1795	1795	Taken	
Perle	18-pdr	Dunkirk	Segondat Duvernet, C.A.	1808	1823			
Persévérante	30-pdr/1st	Brest	Simon, C.	1829	1867			
Pétillant	Ship-Frig. 2nd	Brest	Hubac, L.	1670	1694			See *Tourbillon*
Petite Infante	Light Frig.			1659	1678	*Légère* 1671		
Piémontaise	18-pdr	St Malo	Pestel, F.	1804	1808	1808	Taken	
Pique	12-pdr	Rochefort	Haran, R.A.	1782	1795			See *Fleur de Lys*
Pléyade	8-pdr	Toulon	Coulomb, J.M.B.	1754	1784			
Poli	Ship-Frig. 2nd	La Ciotat	Coulomb, L.	1661	1688			See *St Joseph*
Poli	Ship-Frig. 1st	Rochefort	Malet, H.	1690	1712			Ex-*Perle* 1691
Pomone	Ship-Frig. 2nd	Toulon	Coulomb, P.	1749	1760			
Pomone	18-pdr	Rochefort	Bombelle	1782	1794	1794	Taken	
Pomone	18-pdr	Genoa	Sané, J.N.	1803	1811	1811	Taken	
Postillon	Light Frig.	Marseilles	Imbert	1665	1669			
Poursuivante	24-pdr	Toulon	Barallier, L.	1827	1865			
Pourvoyeuse	24-pdr	Lorient	Boux	1772	1774			
Précieuse	8-pdr	Toulon	Sausillon, C.	1765	1779			See *Mignonne*
Précieuse	12-pdr	Toulon	Coulomb, J.M.B.	1777	1800			
Précieuse	18-pdr	Antwerp	Sané, J.N.	1812	1814		Ceded to the Allies	
Prégel	18-pdr	St Malo	Sané, J.N.	1810	1825			*Eurydice* 1814
Preneuse	18-pdr	Rochefort	Haran, R.A.	1794	1799	1799	Taken	
Présidente	18-pdr	Nantes	Sané, J.N.	1801	1806			See *Minerve*
Pressante	Light Frig.	Brest	Hubac, L.	1676	1694			See *Subtile*
Prince	Ship-Frig. 1st	Toulon	Coulomb, L.	1664	1728			See *Cheval Marin*
Prosélyte	12-pdr	Le Havre		1785	1793	1793	Taken	
Proserpine	18-pdr	Brest	Sané, J.N.	1785	1796	1796	Taken	
Provençal	Ship-Frig. 1st	Toulon	Rodolphe, G.	1665	1690			*Mignon* 1671; *Capable* 1678
Prudente	12-pdr	St Malo	Guignace, L.M.	1778	1779	1779	Taken	
Prudente	12-pdr	Lorient	Segondat Duvernet, C.A.	1789	1798			
Psyché	12-pdr	Nantes	Degay, P.	1798	1809	1809	Taken	
Psyché	18-pdr	Rotterdam	Sané, J.N.	1812	1821			See *Jadhe*
Psyché	30-pdr/3rd	Brest	Boucher, M.	1842	1867			
Railleuse	Light Frig.	Brest	Hubac, L.	1671	1681			Ex-*Caiche Neuve* 1671
Railleuse	Light Frig.	Dunkirk	Hendrick, H.	1676	1689	1689	Taken	Ex-*Dauphin*
Railleuse	Ship-Frig.*	Dunkirk	Hendrick, H.	1683	1694			See *Solide*
Railleuse	Light Frig.	Dunkirk	Hendrick, H.	1689	1703		Burned	
Railleuse	12-pdr	Rochefort	Haran, R.A.	1777	1797			
Rancune	18-pdr	Toulon	Sané, J.N.	1812	1825			*Néréïde* 1814
Rassurante	18-pdr	Brest	Sané, J.N.	1792	1800			See *Carmagnole*

Name	Type	Place of building	Builder	Laid down	Struck from lists	Date taken	Fate	Names (Original, Second, Third)
Régénérée	12-pdr	Rochefort	Duhamel, P.	1793	1801	1801	Taken	
Reine Blanche	24-pdr	Cherbourg	Leroux, P.	1830	1859			
Renommée	Ship-Frig. 1st	Bayonne	Tassy, A.	1697	1713			
Renommée	8-pdr	Brest	Clairin Deslauriers	1744	1747			
Renommée	12-pdr	Brest	Groignard, A.	1767	1784			
Renommée	18-pdr	Nantes	Sané, J.N.	1805	1811		Taken	
Renommée	30-pdr/1st	Rochefort	Leroux, P.	1826	1878			
Républicaine	12-pdr	Bordeaux		1794	1796			See *Panthère*
Résistance	24-pdr	Nantes	Degay, P.	1793	1797	1797		
Résolue	12-pdr	St Malo	Guignace, L.M.	1778	1798	1798	Taken	
Résolue	18-pdr	Lorient	Sané, J.N.	1810	1891			See *Didon*
Résolue	18-pdr	Genoa	Sané, J.N.	1812	1835			See *Dryade*
Réunion	12-pdr	Toulon	Coulomb, J.M.B.	1785	1793	1793	Taken	
Révolutionnaire	18-pdr	Le Havre	Forfait, P.A.L.	1794	1794	1794	Taken	
Rhin	18-pdr	Toulon	Sané, J.N.	1801	1806	1806	Taken	
Rieuse	Ship-Frig. 1st	Toulon	Audibert	1674	1698			See *Arc en Ciel*
Romulus	30-pdr/1st	Toulon	Sané, J.N.	1812	1840			See *Guerrière*
Rose	Ship-Frig.*	Toulon	Chapelle, J.A.	1750	1758			
Rose	8-pdr	Toulon	Chapelle, F.	1752			Wrecked	
Royale	Ship-Frig. 2nd	Toulon	Coulomb, L.	1679	1704		Burned	*Sérieux* 1680; *Croissant* 1690
Royale	Light Frig.	Le Havre	Salicon, E.	1680	1698			See *Embuscade*
Rubis	Ship-Frig. 1st	Le Havre	Poirier, G.	1728	1747			
Rubis	18-pdr	?	Sané, J.N.	1811	1813		Wrecked	
Ruppel	18-pdr	Amsterdam	Sané, J.N.	1812	1814		Allowed to France	
Saale	18-pdr	Rochefort	Rolland, P.	1806	1821			See *Andromède*
Saint Joseph	Ship-Frig. 2nd	La Ciotat	Coulomb, L.	1661	1688			*Dur* 1671; *Poli* 1678
Saint Sébastien	Ship-Frig.*	Brest	Hubac, L.	1656	1673		Wrecked	*Faucon* 1671
Salamandre	Light Frig.	Rochefort	Malet, H.	1693	1705			*Atalante* 1696
Salamandre	Light Frig.	Toulon	Coulomb, F.	1696	1709			
Sans Peur	Light Frig.	Brest		1666	1680			See *Christine*
Sauvage	8-pdr	Brest		1755	1759			
Sauveur	Ship-Frig. 2nd	Brest	Hubac, L.	1660	1677			*Lion* 1671; *Grand Ponton* '76
Séditieux	Light Frig.	Rochefort	Pomet, F.	1678	1687			See *Gaillarde*
Seine	18-pdr	Le Havre	Forfait, P.A.L.	1793	1798	1798	Taken	
Sémillante	12-pdr	Lorient	Pénétreau, P.J.	1790	1810			
Sémillante	30-pdr/1st	Lorient	Boucher, M.	1827	1855			
Sensible	12-pdr	Nantes	Raffeau	1766	1781			
Sérieuse	12-pdr	Toulon	Coulomb, J.M.B.	1779	1798		Wrecked	
Sérieux	Ship-Frig. 2nd	Toulon	Coulomb, L.	1679	1704			See *Royale*
Serpent	Ship-Frig. 1st	Toulon	Chapelle, F.	1674	1690			See *Ferme*
Serpente	Light Frig.	Dunkirk	Hendrick, H.	1677	1691			
Serpente	Light Frig.	Le Havre	Renaud	1691	1692		Wrecked	Ex-*Yack* 1692
Serpente	Light Frig.	Le Havre	Brun, F.	1692	1697			
Sibylle	Light Frig.	Rochefort	Masson, P.	1703	1705	1705	Taken	
Sibylle	12-pdr	Brest	Sané, J.N.	1777	1783	1783	Taken	
Sibylle	18-pdr	Toulon	Sané, J.N.	1790	1794	1794	Taken	
Sibylle	24-pdr	Toulon	Barallier, L.	1829	1883			
Sincère	12-pdr	Le Havre	Ginoux, J.J.	1766	1777		Sold	
Sirène	Ship-Frig. 1st	Toulon	Pomet, F.	1664	1684		Wrecked	Ex-*Monarque* '65
Sirène	8-pdr	Brest	Coulomb, J.L.	1744	1760			
Sirène	8-pdr	Lorient	Coulomb, J.L.	1755			Bought Cie des Indes	
Sirène	12-pdr	Bayonne	Haran, R.A.	1795	1809			See *Fidèle*
Sirène	18-pdr	Dunkirk	Segondat Duvernet, C.A.	1803	1837			See *Amphitrite*
Soleil Afrique	Ship-Frig. 2nd	Rochefort	Aubin	1672	1710			See *Éclair*
Soleil Afrique	Ship-Frig. 2nd	Le Havre	Chaillé, B.	1676	1709			See *Palmier*
Soleil Afrique	Ship-Frig. 2nd	Rochefort	Malet, H.	1680	1698			
Solide	Ship-Frig. 1st	Dunkirk	Hendrick, H.	1683	1694		Wrecked	Ex-*Railleuse*
Sorcière	Light Frig.	Dunkirk	Hendrick, H.	1675	1695			See *Gaillarde*
Sourdis	Ship-Frig.*	Toulon		1640	1661			
Spartiate	18-pdr	Le Havre	Forfait, P.A.L.	1794	1795			*Pensée* 1795
Subtile	Light Frig.	Dunkirk		1665	1674			See *N.D. des Anges*

Name	Type	Place of building	Builder	Laid down	Struck from lists	Date taken	Fate	Names (Original, Second, Third)
Subtile	Light Frig.	Brest	Hubac, L.	1676	1694			*Pressante* '78
Subtile	Light Frig.	Rochefort	Poirier, G.	1741	?			
Suffisante	Light Frig.	Dunkirk	Le Vasseur, R.N.	1691	1695			
Sultane	12-pdr	Toulon	Poumet, N.	1764	1793			
Sultane	18-pdr	St Malo	Pestel, F.	1803	1810			*Italienne* 1805
Sultane	18-pdr	Nantes	Sané, J.N.	1813	1814	1814		
Surveillante	12-pdr	Lorient	Guignace, L.M.	1778	1797		Wrecked	
Surveillante	18-pdr	Nantes	Sané, J.N.	1801	1803	1803	Taken	
Surveillante	30-pdr/1st	Lorient	Boucher, M.	1823	1844			
Sybille	Light Frig.	In Seudre		1665	1675			See *Aurore*
Sylvie	Ship-Frig. 1st	Toulon	Coulomb, F.	1701	1706		Sold	
Syrène	24-pdr	Toulon	Garnier, H.	1820	1861			
Tartu	18-pdr	Nantes	Gauthier, J.A.	1796	1814			See *Uranie*
Tempête	Light Frig.	Brest	Hubac, L.	1670	1675			See *Bretonne*
Tempête	Light Frig.	Rochefort	Saboulin, J.	1676	1690			
Terpsichore	12-pdr	Nantes	Groignard, A.	1757	1784			
Terpsichore	18-pdr	Antwerp	Sané, J.N.	1810	1814	1814	Taken	
Terpsichore	30-pdr/1st	Brest	Leroux, P.	1822	1839			
Thémis	18-pdr	Bayonne	Haran, R.A.	1796	1814			
Thémis	12-pdr	Bayonne	Haran, R.A.	1798	1811			
Thétis	Ship-Frig. 1st	Rochefort	Malet, H.	1696	1705	1705	Taken	
Thétis	Ship-Frig. 1st	Brest	Pangalo jnr	1705	1711	1711	Taken	
Thétis	Light Frig.	Le Havre	Poirier, G.	1722	1734			
Thétis	8-pdr	Brest	Geffroy jnr	1751	1773			
Thétis	18-pdr	Brest	Lamothe, P.A.	1788	1808	1808	Taken	
Thétis	18-pdr	Toulon	Sané, J.N.	1813	1866			
Tigre	Ship-Frig.*	Indret	de Werth, J.	1642	1664			
Tigre	Ship-Frig. 1st	Soubise	Guichard, J.	1665	1689			
Tigre	Ship-Frig. 2nd	Dunkirk	Hendrick, H.	1689	1713		Sold	
Topaze	8-pdr	Brest	Ginoux, J.J.	1750	1773			
Topaze	12-pdr	Toulon	Coulomb, J.M.B.	1789	1793	1793	Taken	
Topaze	18-pdr	Nantes	Forfait, P.A.L.	1804	1809	1809	Taken	
Toulon	Ship-Frig. 1st	Toulon	Audibert	1665	1695			*Fidèle* 1678
Tourbillon	Ship-Frig. 2nd	Brest	Hubac, L.	1670	1694			*Pétillant* 1678
Tourterelle	12-pdr	Bordeaux	Guignace, L.M.	1766	1784			
Trave	18-pdr	Amsterdam	Sané, J.N.	1810	1813	1813	Taken	
Tribune	12-pdr	Rochefort	Haran, R.A.	1794	1796		Taken	See *Charente Inférieure*
Trident	Ship-Frig. 1st	Toulon	Coulomb, L.	1687	1695	1695	Taken	
Triomphe	Ship-Frig. 1st	Concarneau	Hubac, L.	1657	1673			*Courageux* 1671
Triton	Ship-Frig. 1st	Bayonne	Saboulin, J.	1669	1694			See *Basque*
Triton	Ship-Frig. 2nd	Toulon	Rodolphe, G.	1669	1690			See *Trompeuse*
Triton	Ship-Frig. 1st	Brest	Pangalo, B.	1696	1702	1702	Taken	
Trompeuse	Ship-Frig. 2nd	Toulon	Rodolphe, G.	1669	1690			*Triton* 1671; *Mercure* 1678
Trompeuse	Light Frig.	Le Havre	Chaillé, B.	1675	1683			
Trompeuse	Ship-Frig. 1st	Dunkirk	Hendrick, H.	1683	1704			See *Emporté*
Trompeuse	Light Frig.	Dunkirk	Hendrick, H.	1688	1703			
Unité	12-pdr	Rochefort	Chevillard jnr	1785	1796		Taken	See *Gracieuse*
Uranie	18-pdr	Lorient	Segondat Duvernet, C.A.	1788	1797			
Uranie	18-pdr	Nantes	Gauthier, J.A.	1796	1814	1814	Taken	*Tartu* 1793
Uranie	30-pdr/1st	Toulon	Barallier, L.	1826	1865			
Valeur	Light Frig.	Brest		1704	1705	1705	Taken	
Valeur	Light Frig.	Bayonne	Desjumeaux	1706	1720			
Valeureuse	18-pdr	Le Havre	Tellier, C.	1795	1806		Sold to USA	
Variante	12-pdr	Rochefort	Chevillard jnr	1785	1796		Taken	See *Gracieuse*
Vengeance	24-pdr	Nantes	Degay, P.	1794	1800	1800		
Vengeance	30-pdr/1st	Lorient	Boucher, M.	1829	1866			
Vénus	Ship-Frig. 1st	Bayonne	Tassy, A.	1703	1722			
Vénus	Ship-Frig. 2nd	Bayonne	Tassy, A.	1704	1722			
Vénus	Light Frig.	Le Havre	Poirier, G.	1723	1745			
Vénus	12-pdr	St Malo	Sané, J.N.	1779	1797	1797	Taken	
Vénus	18-pdr	Brest	Sané, J.N.	1781	1789		Wrecked	

Name	Type	Place of building	Builder	Laid down	Struck from lists	Date taken	Fate	Names (Original, Second, Third)
Vénus	18-pdr	Le Havre	Forfait, P.A.L.	1805	1810	1810	Taken	
Vénus	18-pdr	Venice	Sané, J.N.	1813	1814		Ceded to Austria	
Vénus	24-pdr	Lorient	Filhon, P.	1820	1846			
Vertu	18-pdr	Lorient	Segondat Duvernet, C.A.	1793	1803	1803	Taken	
Vestale	Ship-Frig. 1st	Toulon	Coulomb, F.	1703	1725		Sold	
Vestale	8-pdr	Le Havre	Ginoux, J.J.	1756	1761			
Vestale	12-pdr	Toulon	Coulomb, J.M.B.	1780	1799	1799	Taken	
Vestale	18-pdr	Rotterdam	Sané, J.N.	1813	1814		Ceded to Holland	
Vestale	24-pdr	Rochefort	Filhon, P.	1820	1834			
Victoire	Ship-Frig.*	Soubise	Brun, F.	1657	1666	1666	Taken	
Victoire	Ship-Frig. 2nd	Brest	Hubac, L.	1670	1673		Fireship	*Arrogant* 1671
Victoire	Light Frig.	Dunkirk	Le Vasseur, R.N.	1704	1713	1709	Taken	
Vigilant	Ship-Frig. 2nd	Marseilles	Étienne, J.	1660	1673			See *Lion d'Or*
Vigilant	Ship-Frig. 2nd	Rochefort	Guichard, J.	1671	1704			See *Entreprenant*
Ville de Milan	18-pdr	Lorient	Geoffroy, A.	1803	1805			See *Hermione*
Ville de Rouen	Ship-Frig.*	Brest		1659	1673		Fireship	*Hasardeux* 1671
Vipère	Light Frig.	Dunkirk	Hendrick, H.	1675	1703			See *Lutine*
Virginie	18-pdr	Brest	Sané, J.N.	1793	1796	1796	Taken	
Virginie	24-pdr	Rochefort	Hubert, J.B.	1827	1881			
Vistule	18-pdr	Dunkirk	Segondat Duvernet, C.A.	1805	1873			See *Nymphe*
Volage	Light Frig.	Rochefort	Morineau, P.	1741	1750			
Volante	Light Frig.	Brest	Hubac, L.	1670	1692			See *Normande*
Volontaire	Ship-Frig. 1st	Toulon	Coulomb, F.	1692	1695		Wrecked	
Volontaire	Ship-Frig. 1st	Toulon	Coulomb, F.	1695	1702	1702	Taken	
Volontaire	18-pdr	Rochefort	Chevillard, J.D.	1794	1806	1806	Taken	Ex-*Montagne* '94
Weser	18-pdr	Antwerp	Sané, J.N.	1811	1813	1813	Taken	
Yack or ***Jack***	Light Frig.	Brest	Le Brun, J.P.	1689	1697			
Yack	Light Frig.	Le Havre	Renaud	1691	1692			See *Serpente*
Zéphir	Light Frig.	Dunkirk	Le Vasseur, R.N.	1706	1713		Wrecked	
Zéphir	Ship-Frig. 1st	Toulon	Coulomb, F.	1728	1762			
Zéphir	18-pdr	Brest	Sané, J.N.	1794	1803		Never completed	
Zéphire	8-pdr	Brest	Ollivier, J.L.	1768	1779			

General Index

This index supplements the foregoing Alphabetical List of Frigates in that it contains the page numbers of all textual references to individual frigates by name; it does not however replace it, in that it contains ***only*** such references, and it should be read therefore in conjunction with both the Alphabetical Index and the individual class lists at the end of each chapter. The main intention in this index has been to list all ship references and proper names, together with significant entries on individual subjects, in order that a reader interested in a particular vessel or subject can locate it more easily; however, no attempt has been made to list every reference to every piece of gear or timber in frigates, which would make a book in itself: the reader is referred instead to the Table of Contents and List of Illustrations and Tables at the beginning of the book, which together provide a detailed guide to individual chapters. Page numbers in **bold** indicate a draught, manuscript or other iconographic material relevant to the entry.The date in brackets after each ship name is the date of laying down, which is not necessarily (especially in the 19th century) the same as the date of launch.